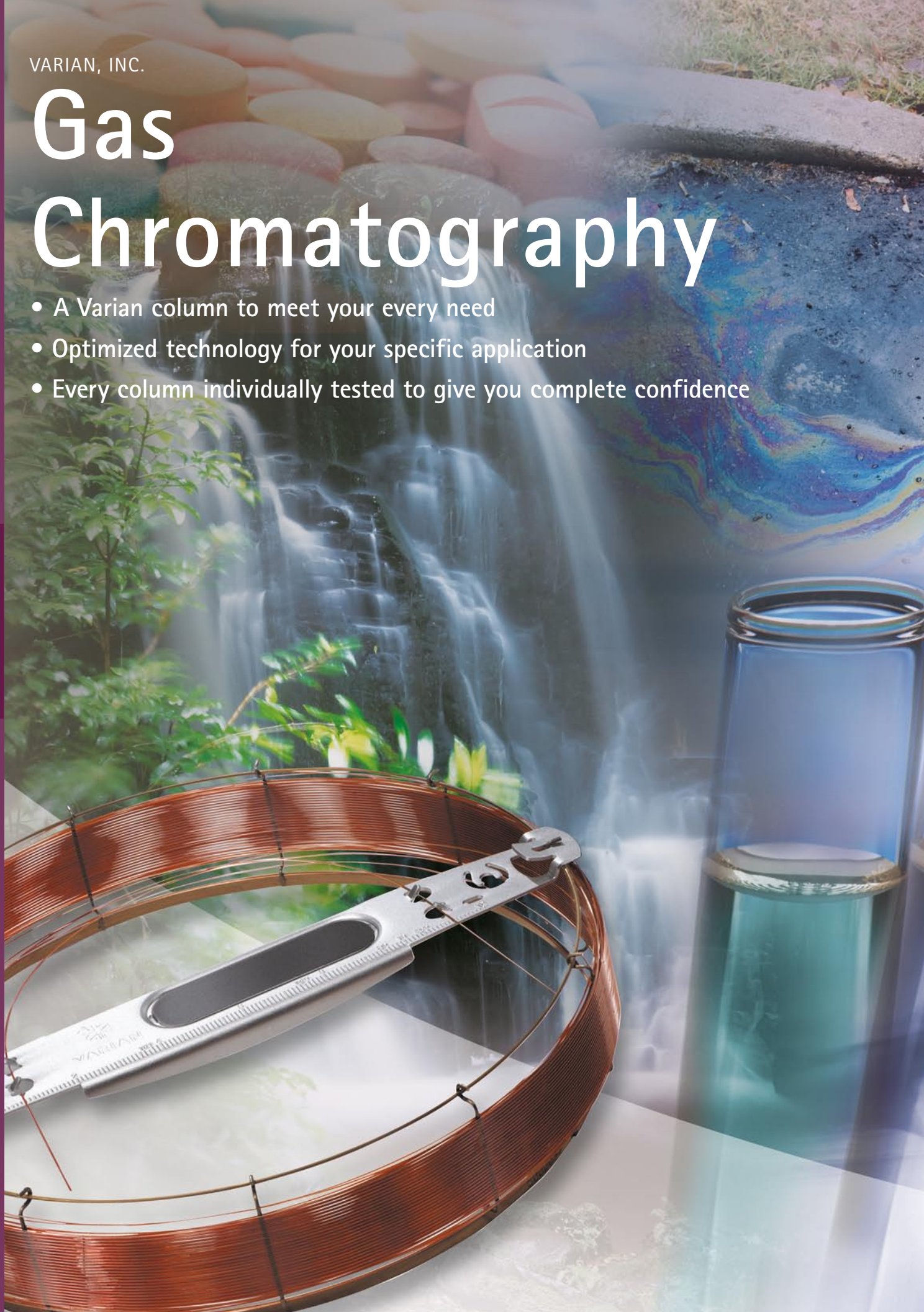
VARIAN, INC.

Gas Chromatography

- A Varian column to meet your every need
- Optimized technology for your specific application
- Every column individually tested to give you complete confidence



Contents

Varian offers the highest quality, most reproducible GC capillary columns with the most demanding quality assurance specifications in the industry. We control the entire process in-house, from design and production of the tubing and stationary phases, to column manufacture, testing and despatch.

Gas chromatogrpahy can characterize and identify the origin of oil spills by producing an "oil fingerprint".

GC Column Cross Reference Guide

GC Column Cross Reference Guide by Column

Varian Column	Phase Composition/Porous Layer	Application
EZ-Guard™	Combination of a FactorFour™ column with a built-in Varian made guard column	
Rapid-MS™		PCBs, arochlor, pesticides (chlorinated, nitrogen, phosphorus), FAME, PAH and drugs
VF-1ms	100% Dimethylpolysiloxane Low bleed, highly inert	Alcohols, aromatic hydrocarbons, esters, flavors and aromas, free fatty acids, glycols, halogenated hydrocarbons, hydrocarbons, ketones, organic acids, oxygenates, PAHs, pesticides, polymers, steroids, solvents, sulfur compounds
VF-5ms	Equivalent to 5% phenyl/95% dimethylpolysiloxane Low bleed, highly inert	Alcohols, amines, hydrocarbons, bile acids, drugs, EPA methods, FAME, flavors and aromas, glycerides, halogenated compounds, PAHs, PCBs, pesticides, steroids, sterols, sugars, sulfur compounds
VF-5ht	Stabilized equivalent of 5% phenyl methyl dimethylpolysiloxane, offering the same polarity as VF-5ms	High-boiling mixtures, including long-chained hydrocarbons, polymers, plastics, waxes, heavy PAHs, tars, triglycerides, motor oils, surfactants, crown ethers, and other compounds requiring high-temperature separation
VF-5 Pesticides and VF-1701 Pesticides	Ultra low bleed and highly inert	Trace levels of pesticide residues in food and environmental samples
VF-5ht UltiMetal™	Stabilized equivalent of 5% phenyl methyl dimethylpolysiloxane, with the same polarity as VF-5ms	Extremely durable stainless steel capillary for operation at high temperatures
VF-WAXms	Ultra low bleed	Trace analysis of polar substances
VF-Xms	High arylene modified Low bleed	Pesticides, herbicides, PCBs, PAHs
VF-624ms	Equivalent of a 6% cyanopropyl-phenyl/ 94% dimethylpolysiloxane Ultra low bleed, highly inert	Purgeable organic volatiles and semi-volatiles, aromatics, halocarbons, solvents
VF-1301ms	Equivalent to a 6% cyanopropyl-phenyl/ 94% dimethylpolysiloxane Ultra low bleed, highly inert	Thin-film version of the VF-624ms suitable for volatile solvents, pesticides, PCBs and other organic compounds requiring thin films
VF-1701ms	14% cyanopropyl-phenyl/86% dimethylpolysiloxane Ultra low bleed, highly inert	Organic compounds in drinking water, base/neutrals and acids, PCBs and chlorinated pesticides, organophosphorus pesticides and herbicides
VF-35ms	Equivalent to 35% phenyl/ 65% dimethylpolysiloxane Low bleed	Aromatic compounds, pesticides and herbicides, sterols and other substituted aromatic compounds
VF-17ms	Equivalent to 50% phenyl/ 50% dimethylpolysiloxane Low bleed	Antidepressants, herbicides and pesticides
VF-200ms	Trifluoropropyl methyl Low bleed	Ketones, aldehydes, nitro- or chloro-containing compounds, PAHs, unsaturated compounds, silanes and CFCs
VF-23ms	High cyanopropyl modified Low bleed	FAME, solvents, sugars
VF-DA	Low bleed	Drugs of abuse confirmation testing
CP-Sil 5 CB Low Bleed/MS	100% dimethylpolysiloxane Low bleed	Alcohols, aromatic hydrocarbons, esters, flavors and aromas, free fatty acids, glycols, halogenated hydrocarbons, hydrocarbons, ketones, organic acids, oxygenates, PAHs, pesticides, polymers, steroids, solvents, and sulfur compounds
CP-Sil 8 CB Low Bleed/MS	5% phenyl/95% dimethylpolysiloxane Low bleed	Antidepressants, herbicides and pesticides

GC Column Cross Reference Guide

GC Column Cross Reference Guide by Column Continued

Varian Column	Phase Composition/Porous Layer	Application
CP-Sil 13 CB	14% phenyl/86% dimethylpolysiloxane, non-cyano	Analysis of medium-polarity compounds where halocarbon-sensitive detectors are used (e.g. ECD) Amines, aromatic hydrocarbons, EPA methods, fungicides, halogenated compounds, herbicides, pesticides, PCBs, phenols, phthalate esters, steroids, sugars and tranquilizers
CP-1301	6% cyanopropyl-phenyl	Herbicides, pesticides and many pharmaceutical products
CP-Sil 19 CB	14% cyanopropyl-phenyl/ 86% dimethylpolysiloxane	Trace levels of pesticide residues in food and environmental samples
CP-Sil 24 CB Low Bleed/MS	50% phenyl/50% dimethylpolysiloxane Low bleed	Antidepressants, herbicides and pesticides
CP-Sil 43CB	25% cyanopropyl-25% phenyl/ 50% dimethylpolysiloxane	FAME, halogenated compounds, phenols and pyridines
CP-Sil 88	Highly substituted, stabilized cyanopropyl	Dioxins, FAME, PCBs, PCDFs, pyridines and sugars
CP-Wax 52 CB	Chemically bonded polyethylene glycol	Alcohols, aldehydes, anesthetics, antidepressants, aromatic hydrocarbons, EPA methods, esters, FAME, flavors and aromas, glycols, halogenated components, ketones, nitro compounds, PAHs, phenols, solvents and sulfur compounds
CP-Wax 57 CB	Chemically bonded polyethylene glycol	Alcohols, aromatic hydrocarbons, esters, FAME, flavors and aromas, free fatty acids, glycols, halogenated compounds, ketones, organic acids and solvents
CP-Wax 58 (FFAP) CB	Nitroterephthalic acid-modified, chemically bonded polyethylene glycol	FAME, flavors and aromas, free fatty acids, organic acids and phenols
CP-PoraBOND Q™		Alcohols, free fatty acids, gases, glycols, halogenated compounds, hydrocarbons, C1-C9, ketones, solvents, sulfur compounds
CP-PoraBOND™ U		Halogenated compounds, hydrocarbons C1-C9, ketones, oxygenated hydrocarbons, permanent gases, solvents
CP-PoraPLOT™ Q		Alcohols, free fatty acids, gases, glycols, halogenated compounds, hydrocarbons, C1-C9, ketones, solvents, sulfur compounds
CP-PoraPLOT Q-HT		Halogenated hydrocarbons, hydrocarbons, solvents
CP-PoraPLOT U		Halogenated compounds, hydrocarbons C1-C6, ketones, oxygenated hydrocarbons, permanent gases and solvents
CP-PoraPLOT S		Hydrocarbons, ketones
CP-PoraPLOT Amines		Amines C1-C6
CP-Al2O3/Na2SO4	Aluminium oxide	Hydrocarbons C1-C10 and impurities in hydrocarbon mainstreams, benzene and toluene
CP-Al2O3/KCl	Aluminium oxide	Hydrocarbons C1-C10 and impurities in hydrocarbon mainstreams, benzene and toluene
CP-SilicaPLOT		COS in ethylene, freons/CFCs, hydrocarbons, propylene and sulfur gases
CP-Lowox™		Ppm oxygenates in C1-C10
CP-Molsieve 5Å	Molecular sieve	He, H_2, O_2, CO, Ne, HD, N_2, NO, Ar, D2, CH_4, KrHT, Xe, DT, CD4, Rn, T2
CP-CarboBOND™		Hydrocarbons in ethylene and traces CO and CO_2 in ethylene and propylene
CP-CarboPLOT P7		He, Xe, CO, Ne, CH_4, CO_2, O_2/Ar, C_2H_6, N_2, C_2H_4, Kr, and C_2H_2
CP-PoraBOND Q		Alcohols, free fatty acids, gases, glycols, halogenated compounds, hydrocarbons, C1-C9, ketones, solvents, sulfur compounds

GC Column Cross Reference Guide

Varian Select™ GC Columns Cross Reference Guide by Application

Application	Specific Application	Varian Select Column
Chemical	C1-C6 alcohols, aromatic C6-C10	CP-TCEP for alcohols in gasoline
	C3-C20 amines, alkanol amines	CP-Sil 8 CB for amines
	C1-C6 amines, alcohols, NH_3, water, solvents, ethanol amines	CP-Volamine
	C3-C8 amines and diamines	CP-Wax for Volatile Amines and Diamines
	C4-C10 amines, diamines and aromatic amines	CP-Wax 51 for amines
	Glycerides	Biodiesel for Glycerides
	FAME	Biodiesel for FAME
	Methanol	Biodiesel for Methanol
	C1-C10 alcohols and solvents	CP-Wax 57 CB for Glycols and Alcohols
	C1-C12 hydrocarbons	CP-Squalane
	C1-C10 hydrocarbons	Select™ Al2O3 MAPD
	Oxygenates and solvents	CP-Select CB for MTBE
	H_2, He, O_2, Av, N_2, CO, CH_4, C_2H_6, CO_2, C_2H_4, C_2H_2	Select Permanent Gases/CO_2
	Paraffins, aromatics, naphthenes and olefins C4-C20	CP-Sil PONA CB
	Volatile oxygenates and halogenated hydrocarbons	CP-Propox
	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
	C5-C100 SimDist	CP-SimDist Fused Silica
	C5-C120 SimDist	CP-SimDist UltiMetal™
	Hydrogen, sulfide, carbonyl sulfide, methanethiol, ethanethiol and thiophenes in LPG	CP-Sil 5 CB for Sulfur
	Xylenes and aromatic compounds up to C11	CP-Xylenes
	Oxygenates in C1-C10 hydrocarbons	CP-Lowox™
	Methanol, formaldehyde and formic acid in water	CP-Sil 5 CB for formaldehyde
Environmental	Cresols, cresylic acids and related compounds	CP-Cresol
	Dioxins and dibenzo furan	CP-Sil 88 for Dioxins
	Halogenated hydrocarbons and solvents	CP-Select 624 CB
	Halogenated hydrocarbons and solvents	CP-Sil 13 CB for Halocarbons
	C5-C40 hydrocarbons, total petroleum hydrocarbons	Select Mineral Oil
	C5-C80, PAH and polar compounds	CP-Sil PAH CB UltiMetal
	High speed PCB screening	CP-Select 28/31
	PCB, detailed analysis	CP-Sil 5/C18 CB for PCB
	PCB	CP-Sil 8 CB for PCB
Food and Beverage	Volatiles	CP-Carbowax 400 for volatiles in alcohol
	FAME up to C26, cis, trans, fast resolution FAME	Select FAME
	Best separation for cis, trans FAME up to 260 °C	CP-Sil 88 for FAME
	Flavors, aromas, free fatty acids C1-C26	CP-FFAP CB
	C5-C40 hydrocarbons	Select Mineral Oil
	Unsaturated triglycerides	CP-TAP CB for triglycerides
Chiral	Amino acids, optical isomers	CP-Chirasil Val
	Optical isomers of acids, alcohols, amino acids, aromatic hydrocarbons, diols, flavor, aromas, ketones, organic acids and phenols	CP-Cyclodextrin-β-2,3,6-M-19 CP-Chirasil-DEX CB

Our columns are fitted with EZ-GRIP™ as standard for easy handling.

Varian Columns for EPA Methods

EPA Method: Drinking Water

EPA Method	Application	Varian Capillary Column	Part No.
501.3	Measurement of trihalomethanes in drinking water GC/MS and selected ion monitoring	1.8 m x 2 mm ID glass packed with 1% SP-1000 on 60/80 mesh Carbopack B* 1.8 m x 2 mm id glass or stainless steel packed with 0.2% Carbowax 1500 on 80/100 mesh Carbopack C* 30 m x 0.53 mm df=3.0 µm VF-624ms 30 m x 0.25 mm df=1.4 µm VF-624ms	 CP9106 CP9102
502.2	Volatile organic compounds in water by purge and trap capillary column GC with photoionization and electrolytic conductivity detectors in series	75 m x 0.53 mm df=3.0 µm VF-624ms 30 m x 0.53 mm df=3.0 µm VF-624ms 30 m x 0.25 mm df=1.4 µm VF-624ms	CP9108 CP9106 CP9102
504.1	1,2-Dibromoethane (EDB) and 1,2-dibromo-3-chloropropane (DBCP), GC, microextraction	30 m x 0.32 mm df=1.0 µm VF-1ms 30 m x 0.32 mm df=1.0 µm VF-1701ms	CP8926 CP9163
505	Analysis of organohalide pesticides and commercial polychlorinated biphenyl (PCB) products in water by microextraction and GC	30 m x 0.32 mm df=1.0 µm VF-1ms 30 m x 0.32 mm df=0.5 µm VF-17ms	CP8926 CP8991
506	Determination of phthalate and adipate esters in drinking water by liquid-liquid extraction or liquid-solid extraction and GC with photoionization detection	30 m x 0.32 mm df=0.25 µm VF-5ms 30 m x 0.32 mm df=0.25 µm VF-1ms	CP8955 CP8924
507	Determination of nitrogen - and phosphorus-containing pesticides in water by GC with a nitrogen-phosphorus detector	30 m x 0.25 mm df=0.25 µm VF-5 Pesticides 30 m x 0.25 mm df=0.25 µm VF-1701 Pesticides	CP9074 CP9070
508	Determination of chlorinated pesticides in water GC with an electron capture detector	30 m x 0.25 mm df=0.25 µm VF-5 Pesticides 30 m x 0.25 mm df=0.25 µm VF-1701 Pesticides	CP9074 CP9070
508.1	Determination of chlorinated pesticides, herbicides, and organohalides by liquid-solid extraction and electron capture GC	30 m x 0.25 mm df=0.25 µm VF-5 Pesticides	CP9074
515.3	Determination of chlorinated acids in drinking water by liquid-liquid extraction, derivatization and GC with electron capture detection	30 m x 0.25 mm df=0.25 µm VF-1701ms 30 m x 0.25 mm df=0.25 µm VF-5ms	CP9151 CP8944
515.4	Determination of chlorinated acids in drinking water by liquid-liquid microextraction, derivatization, and fast GC with electron capture detection	30 m x 0.25 mm df=0.25 µm VF-1701ms 30 m x 0.25 mm df=0.25 µm VF-5ms	CP9151 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)	30 m x 0.25 mm df=1.0 µm VF-5ms	CP8946
524.2	Measurement of purgeable organic compounds in water by capillary GC/MS	30 m x 0.53 mm df=3.0 µm VF-624ms 75 m x 0.53 mm df=3.0 µm VF-624ms 30 m x 0.32 mm df=1.0 µm VF-5ms	CP9106 CP9108 CP8957
525.2	Determination of organic compounds in drinking water by liquid-solid extraction and capillary column GC/MS	30 m x 0.25 mm df=0.25 µm VF-5 Pesticides	CP9074
526	Determination of selected semi-volatile organic compounds in drinking water by solid phase extraction and capillary column GC/MS	30 m x 0.25 mm df=0.25 µm VF-5ms	CP8944
527	Determination of selected pesticides and flame retardants in drinking water by solid phase extraction and capillary column GC/MS	30 m x 0.25 mm df=0.25 µm VF-5ms	CP8944
528	Determination of phenols in drinking water by solid phase extraction and capillary column GC/MS	30 m x 0.25 mm df=0.25 µm VF-5ms	CP8944
529	Determination of explosives and related compounds in drinking water by solid phase extraction and capillary column GC/MS	15 m x 0.25 mm df=0.25 µm VF-5ms	CP8939

Varian Columns for EPA Methods

EPA Method: Drinking Water Continued

EPA Method	Application	Varian Capillary Column	Part No.
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	30 m x 0.25 mm df=1.0 µm VF-1ms 30 m x 0.25 mm df=1.0 µm VF-1301ms	CP8913 CP9054
552.2	Determination of haloacetic acids and dalapon in drinking water by liquid-liquid extraction, derivatization GC with electron capture detection	30 m x 0.25 mm df=0.25 µm VF-1701ms 30 m x 0.25 mm df=0.25 µm VF-5ms	CP9151 CP8944
552.3	Determination of haloacetic acids and dalapon in drinking water by liquid-liquid microextraction, derivatization, and GC with electron capture detection	30 m x 0.25 mm df=0.25 µm VF-1701ms 30 m x 0.25 mm df=0.25 µm VF-5ms	CP9151 CP8944
556	Determination of carbonyl compounds in drinking water by pentafluorobenzylhydroxylamine derivatization and capillary GC with electron capture detection	30 m x 0.25 mm df=0.25 µm VF-1701ms 30 m x 0.25 mm df=0.25 µm VF-5ms	CP9151 CP8944
556.1	Determination of carbonyl compounds in drinking water by fast GC	10 m x 0.1 mm df=0.1 mm VF-5ms 10 m x 0.1 mm df=0.1 mm VF-1701ms	on request

EPA Method: Waste Water

EPA Method	Application	Varian Capillary Column	Part No.
601	Purgeable halocarbons	8 ft x 0.1 in. ID SS or glass, packed with 1% SP-1000 on Carbopack B (60/80 mesh)*	
		6 ft x 0.1 in. ID SS or glass, packed with chemically bonded n-octane on Porasil-C (100/120 mesh)*	
		75 m x 0.53 mm df=3.0 µm VF-624ms	CP9108
		60 m x 0.32 mm df=1.8 µm VF-624ms	CP9105
		30 m x 0.25 mm df=1.4 µm VF-624ms	CP9102
602	Purgeable aromatics	6 ft x 0.082 in. ID SS or glass, packed with 5% didecylphthalate and 1.75% bentone-34 on Chromosorb W HP (100/120 mesh)*	
		8 ft x 0.1 in. ID SS or glass, packed with 5% 1,2,3-TCEP on Chromosorb W AW (60/80 mesh)*	
		75 m x 0.53 mm df=3.0 µm VF-624ms	CP9108
		60 m x 0.32 mm df=1.8 µm VF-624ms	CP9105
		30 m x 0.25 mm df=1.4 µm VF-624ms	CP9102
603	Acrolein and acrylonitrile	10 ft x 2 mm ID glass or stainless steel, packed with Porapak-QS (80/100 mesh)*	
		2- 6 ft x 0.1 in. ID glass or stainless steel, packed with Chromosorb 101 (60/80 mesh)*	
		30 m x 0.25 mm df=1.0 µm VF-WAXms	CP9206
		30 m x 0.25 mm df=1.4 µm VF-624ms	CP9102
604	Phenols	1.8 m x 2 mm ID glass, packed with 1% SP-1240DA on Chromosorb WHP (80/100 mesh) or equivalent*	
		Column for derivatized phenols: 1.8 m x 2 mm ID glass, packed with 5% OV-17 on Chromosorb W-AW-DMCS (80/100 mesh)*	
		60 m x 0.32 mm df=1.8 µm VF-624ms	CP9105
		60 m x 0.25 mm df=1.4 µm VF-624ms	CP9103
606	Phthalate esters	1.8 m x 4 mm ID glass, packed with 1.5% OV-17/1.95% SP-2401 Chromosorb W HP (100/120 mesh)*	
		1.8 m x 4 mm ID glass, packed with 3% OV-1 on Chromsorb W HP (100/120 mesh)*	
		30 m x 0.25 mm df=0.25 µm VF-5ms	CP8944

Varian Columns for EPA Methods

EPA Method: Waste Water Continued

EPA Method	Application	Varian Capillary Column	Part No.
607	Nitrosamines	1.8 m x 4 mm ID glass, packed with 10% Carbowax 20M/2% KOH on Chromosorb W-AW (80/100 mesh)*	
		1.8 m x 4 mm ID glass, packed with 10% OV-17 on Chromosorb W HP (100/120 mesh)*	
		30 m x 0.32 mm df=1.0 µm CP-Sil 8 CB for amines	CP7596
608	Organochlorine pesticides and PCBs	1.8 m x 4 mm ID glass, packed with 1.5% OV-17/1.95% OV-210 Chromosorb W HP (100/120 mesh)*	
		1.8 m x 4 mm ID glass, packed with 3% OV-1 on Chromsorb W HP (100/120 mesh)*	
		30 m x 0.25 mm df=0.25 µm VF-5 Pesticides	CP9074
		30 m x 0.25 mm df=0.25 µm VF-1701 Pesticides	CP9070
		30 m x 0.25 mm df=0.25 µm VF-17ms	CP8982
609	Nitroaromatics and isophorone	1.2 m x 2 or 4 mm ID glass, packed with 1.95% OV-210/1.5% OV-17 on Chromosorb W HP (80/100 mesh)*	
		3.0 m x 2 or 4 mm ID glass, packed with 3% OV-101 on Chromosorb W HP (80/100 mesh)*	
		30 m x 0.53 mm df=1.5 µm VF-5ms	CP8976
		30 m x 0.25 mm df=0.5 µm VF-5ms	CP8945
610	Polynuclear aromatic hydrocarbons	1.8 m x 2 mm ID glass, packed with 3% OV-17 on Chromosorb W-AW-DCMS (100/120 mesh)*	
		30 m x 0.25 mm df=0.25 µm VF-17ms	CP8982
		30 m x 0.25 mm df=0.25 µm VF-5ms	CP8944
611	Haloethers	1.8 m x 2 mm ID glass, packed with 3% OV-351 on Chromosorb W HP (100/120 mesh)*	
		1.8 m x 2 mm ID glass, packed with 2,6-diphenylene oxide polymer (60/80 mesh), Tenax*	
		30 m x 0.53 mm df=1.5 µm VF-5ms	CP8976
		30 m x 0.25 mm df=0.5 µm VF-5ms	CP8945
612	Chlorinated hydrocarbons	1.8 m x 2 mm ID glass, packed with 1% OV-351 on Chromosorb WHP (100/120 mesh)*	
		1.8 m x 2 mm ID glass, packed with 1.5% OV-1/2.4% OV-225 on Chromosorb W HP (80/100 mesh)*	
		30 m x 0.25 mm df=1.0 µm VF-5ms	CP8943
		30 m x 0.25 mm df=0.25 µm VF-35ms	CP8877
		30 m x 0.25 mm df=1.0 µm VF-200ms	CP8860
613	2,3,7,8-Tetrachlorodibenzo-p-dioxin	50 m x 0.25 mm df=0.2 µm CP-Sil 88 for Dioxins	CP7588
		60 m x 0.25 mm df=0.1 µm VF-5ms	CP8948
615	Chlorinated herbicides	1.8 m x 4 mm ID glass, packed with 1.5% OV-17/1.95% OV-210 on Chromosorb W HP(100/120 mesh)*	
		1.8 m x 4 mm ID glass, packed with 5% OV-210 on Chromosorb W HP (100/120 mesh)*	
		30 m x 0.25 mm df=0.25 µm VF-1701 Pesticides	CP9070
		30 m x 0.25 mm df=0.25 µm VF-5 Pesticides	CP9074
619	Triazine pesticides	1.8 m x 2 mm ID glass, packed with 5% Carbowax 20M-TPA on Chromosorb W HP (80/100 mesh)*	
		1.8 m x 4 mm ID glass, packed with 1.0% Carbowax 20M on Chromosorb W HP (100/l20 mesh)*	
		30 m x 0.25 mm df=0.5 µm VF-17ms	CP8983
		30 m x 0.25 mm df=0.25 µm VF-5ms	CP8944
624	Purgeables	6 ft x 0.1 in. ID stainless steel or glass, packed with 1% SP-1000 on Carbopack B (60/80 mesh)*	
		75 m x 0.53 mm df=3.0 µm VF-624ms	CP9108
		60 m x 0.32 mm df=1.8 µm VF-624ms	CP9105
		30 m x 0.25 mm df=1.4 µm VF-624ms	CP9102

Varian Columns for EPA Methods

EPA Method: Waste Water Continued

EPA Method	Application	Varian Capillary Column	Part No.
625	Base/neutrals and acids	1.8 m x 2 mm ID glass, packed with 3% SP-2250 on Chromosorb W HP (100/120 mesh)*	
		Column for acids: 1.8 m x 2 mm ID glass, packed with 1% SP-1240DA on Chromosorb W HP (100/120 mesh)*	
		30 m x 0.25 mm df=0.25 µm VF-5 Pesticides	CP9074
		30 m x 0.25 mm df=0.25 µm VF-1701 Pesticides	CP9070
		30 m x 0.25 mm df=0.25 µm VF-200ms	CP8858
1613	Tetra- through octa-chlorinated dioxins and furans by isotope dilution HRGC/HRMS	60 m x 0.25 mm df=0.25 µm VF-5ms	CP8960
		50 m x 0.25 mm df=0.2 µm CP-Sil 88 for Dioxins	CP7588
1624	Volatile organic compounds by isotope dilution GC/MS	2.8 m x 2 mm ID glass, packed with 1% SP-1000 on Carbopack B, (60/80 mesh)*	
		60 m x 0.25 mm df=1.4 µm VF-624ms	CP9103
1625	Semi-volatile organic compounds by isotope dilution GC/MS	30 m x 0.25 mm df=0.25 µm VF-5ms	CP8944

EPA Method: Solid Waste

EPA method	Application	Varian Capillary Column	Part No.
8011	1,2-Dibromoethane and 1,2-dibromo-3-chloropropane by microextraction and GC	30 m x 0.32 mm 50% dimethylpolysiloxane-50% polyethylene glycol df=0.25 µm	
		30 m x 0.32 mm VF-1ms df=0.25 µm	CP8924
8015c	Nonhalogenated organics by GC	30 m x 0.53 mm VF-WAXms df=1.0 µm	CP9215
		30 m x 0.53 mm CP-Sil 8CB df=1.5 µm	CP8736
8021b	Aromatic and halogenated volatiles by GC	60 m x 0.53 mm VF-624ms df=3.0 µm	CP9107
		60 m x 0.25 mm VF-624ms df=1.4 µm	CP9103**
8031	Acrylonitrile by GC	Porapak Q - 6 ft., 80/100 mesh, glass column, or equivalent	
		25 m x 0.53 mm CP-PoraBOND Q™ df=10 µm	CP7354
8032	Acrylamide by GC	2 m x 3 mm glass column, 5% FFAP on 60-80 mesh acid washed Chromosorb W, or equivalent	
		25 m x 0.53 mm CP-Wax 58 FFAP CB df=1 µm	CP7654
8033	Acetonitrile by GC with nitrogen-phosphorus detection	15 m x 0.53 mm VF-WAXms df=1.0 µm	CP9226
8041a	Phenols by GC	30 m x 0.53 mm VF-5ms df=1.5 µm	CP8976
		30 m x 0.53 mm VF-1701ms df=1.0 µm	CP9171
		30 m x 0.53 mm VF-17ms df=1.0 µm	CP9001
8061	Phthalate esters by GC with electron capture detection (GC/ECD)	30 m x 0.53 mm VF-5ms df=1.5 µm	CP8976
		30 m x 0.53 mm VF-1701ms df=1.0 µm	CP9171
8070a	Nitrosamines by GC	1.8 m x 4 mm glass, packed with Chromosorb W AW, (80/100 mesh) coated with 10% carbowax 20 m/2% KOH or equivalent*	
		30 m x 0.53 mm CP-Sil 8 CB for amines df=1.0 µm	CP7597
		1.8 m x 4 mm glass, packed with Chromosorb (100/120 mesh) coated with 10% SP-2250 or equivalent*	
		30 m x 0.53 mm VF-17ms df=1.5 µm	CP9002
8081	Organochlorine pesticides by GC	30 m x 0.25 mm VF-5ms df=1.0 µm	CP8946
		30 m x 0.25 mm VF-35ms df=1.0 µm	CP8879
		30 m x 0.53 mm VF-35ms df=0.5 µm	CP8887
		30 m x 0.53 mm VF-1701ms df=1.0 µm	CP9171
		30 m x 0.53 mm VF-5ms df=1.5 µm	CP8976

Varian Columns for EPA Methods

EPA Method: Solid Waste Continued

EPA Method	Application	Varian Capillary Column	Part No.
8082a	Polychlorinated biphenyls (PCBs) by GC	30 m x 0.25 mm VF-5ms df=1.0 µm	CP8946
		30 m x 0.25 mm VF-35ms df=1.0 µm	CP8879
		30 m x 0.53 mm VF-35ms df=0.5 µm	CP8887
		30 m x 0.53 mm VF-1701ms df=1.0 µm	CP9171
		30 m x 0.53 mm VF-5ms df=1.5 µm	CP8976
8091	Nitroaromatics and cyclic ketones by GC	30 m x 0.53 mm VF-5ms df=1.5 µm	CP8976
		30 m x 0.53 mm VF-1701ms df=1.0 µm	CP9171
8095	Explosives by GC	15 m x 0.53 mm VF-5ms df=1.5 µm	CP8973
		15 m x 0.53 mm VF-1ms df=1.5 µm	CP8967
		15 m x 0.53 mm VF-200ms df=1.0 µm	CP8866
8100	Polynuclear aromatic hydrocarbons	1.8 m x 2 mm glass colmn packed with 3% OV-17 on Chromosorb W AW DCMS (100/120 mesh) or equivalent*	
		30 m x 0.25 mm VF-5ms df=0.25 µm	CP8944
8111	Haloethers by GC	30 m x 0.53 mm VF-5ms df=1.5 µm	CP8973
		30 m x 0.53 mm VF-1701ms df=1.0 µm	CP9171
8121	Chlorinated hydrocarbons by GC: capillary column technique	30 m x 0.53 mm VF-200ms df=1.0 µm	CP8868
		30 m x 0.53 mm VF-WAXms df=1.0 µm	CP9215
		30 m x 0.53 mm VF-5ms df=1.5 µm	CP8976
		30 m x 0.53 mm VF-1701ms df=1.0 µm	CP9171
8131	Aniline and selected derivatives by GC	30 m x 0.25 mm VF-5ms df=0.25 µm	CP8944
		30 m x 0.25 mm CP-Sil 8 CB for amines df=0.25 µm	CP7598
8141b	Organophosphorus compounds by GC	30 m x 0.53 mm VF-200ms df=1.0 µm	CP8868
		30 m x 0.53 mm VF-35ms df=1.0 µm	CP8888
		30 m x 0.53 mm VF-5ms df=1.0 µm	CP8975
		30 m x 0.53 mm VF-1ms df=1.0 µm	CP8969
8151b	Chlorinated herbicides by GC using methylation or pentafluorobenzylation derivatization	30 m x 0.25 mm VF-5 Pesticides df=0.25 µm	CP9074
		30 m x 0.32 mm VF-5ms df=1.0 µm	CP8957
		30 m x 0.25 mm VF-35ms df=0.25 µm	CP8877
		30 m x 0.25 mm VF-1701ms df=0.25 µm	CP9070
		30 m x 0.53 mm VF-35ms df=1.0 µm	CP8888
		30 m x 0.53 mm Vf-1701ms df=1.0 µm	CP9171
8260b	Volatile organic compounds by GC/MS	75 m x 0.53 mm VF-624ms df=3.0 µm	CP9108
		30 m x 0.25 mm VF-5ms df=1.0 µm	CP8946
		60 m x 0.32 mm VF-624ms df=1.8 µm	CP9105
8261	Volatile organic compounds by vacuum distillation in combination with GC/MS spectrometry (VD/GC/MS)	60 m x 0.53 mm VF-624ms df=3.0 µm	CP9107
		60 m x 0.25 mm VF-624ms df=1.4 µm	CP9103
8270d	Semi-volatile organic compounds by GC/MS	30 m x 0.25 mm VF-5ms df=0.25 µm	CP8944
		30 m x 0.25 mm VF-5ms df=0.5 µm	CP8945
		30 m x 0.25 mm VF-5ms df=1.0 µm	CP8946
8275a	Semi-volatile organic compounds (PAHs and PCBs) in soils/sludges and solid wastes using thermal extraction/ gas chromatography/mass spectrometry (TE/GC/MS)	30 m x 0.25 mm VF-5ms df=0.25 µm	CP8944
		30 m x 0.25 mm VF-5ms df=0.5 µm	CP8945
		30 m x 0.25 mm VF-5ms df=1.0 µm	CP8946
8280b	Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) by high resolution gas chromatography low resolution mass spectrometry (HRGC/LRMS)	60 m x 0.25 mm VF-5ms df=0.1 µm	CP8751
8290b	Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) by high resolution gas chromatography/high resolution mass spectrometry (HRGC/HRMS)	30 m x 0.25 mm VF-5ms df=0.1 µm	CP8751
		50 m x 0.25 mm CP-Sil 88 for Dioxins	CP7588

Varian Columns for EPA Methods

EPA Method: Solid Waste Continued

EPA Method	Application	Varian Capillary Column	Part No.
8410	Gas chromatography/Fourier transform infrared (GC/FT-IR) spectrometry for semi-volatile organics: capillary column	30 m x 0.32 mm VF-5ms df=0.25 µm	CP8955
8430	Analysis of bis(2-chloroethyl) ether and hydrolysis products by direct aqueous injection (GC/FT-IR)	30 m x 0.53 mm VF-WAXms df=1.0 µm	CP9215

* For packed columns please refer to our Web site
** Recommended capillary column if method is run with MS detection

These columns have the dimensions and stationary phases on which the EPA methods were developed, and should work for these applications. For most methods EPA permits other column dimensions and phases that deliver the test requirements as described in the method. For GC/MS applications this means that columns with IDs of 0.25 mm can be used. The wording in most EPA methods is:

The columns listed in this section were the columns used in developing the method. The listing of these columns in this method is not intended to exclude the use of other columns that are available or that may be developed. Laboratories may use these columns or other columns provided that the laboratories document method performance data (e.g., chromatographic resolution, analyte breakdown, and sensitivity) that are appropriate for the intended application.

Varian Columns for ASTM Methods

ASTM Methods

ASTM Method	Application	Varian Capillary Column	Part No.
D 1945	Natural gas	10 m x 0.53 mm df=50 µm CP-Molsieve 5Å 10 m x 0.53 mm df=20 µm CP-PoraPLOT™ Q-HT	CP7537 CP7558
D 1946	Reformed gas	10 m x 0.53 mm df=50 µm CP-Molsieve 5Å 10 m x 0.53 mm df=10 µm CP-PoraBOND Q™	CP7537 CP7353
D 2245	Oils and oil acids in solvent-reducible paints	50 m x 0.25 mm df=0.2 µm CP-Sil 88 for FAME	CP7488
D 5580	Determination of benzene, toluene, ethylbenzene, p/m-xylene, o-xylene, C9 and heavier aromatics, and total aromatics in finished gasoline	50 m x 0.25 mm df=0.40 µm CP-TCEP 30 m x 0.53 mm df=5.0 µm CP-Sil 5 CB	CP7525 CP8775
D 2426	Butadiene and styrene in butadiene concentrates	30 m x 0.53 mm df=1.5 µm CP-Sil 5 CB	CP8735
D 2427	C2-C5 hydrocarbons in gasolines	50 m x 0.53 mm df=10 µm CP-Al2O3/KCl	CP7518
D 2504	Non-condensable gases in C1-C3 hydrocarbons	30 m x 0.53 mm df=15 µm CP-Molsieve 5Å	CP7544
D 2505	Ethylene, hydrocarbons, CO_2 in high purity ethylene	25 m x 0.53 mm df=10 µm CP-CarboBOND™	CP7374
D 2580	Phenols in water	25 m x 0.32 mm df=0.4 µm CP-Sil 8 CB Low Bleed/MS 25 m x 0.53 mm df=1.0 µm CP-FFAP CB	CP5850 CP7486
D 2593	Butadiene purity and hydrocarbon impurity	50 m x 0.32 mm df=5.0 µm CP-Al2O3/KCl 50 m x 0.53 mm df=10 µm CP-Al2O3/KCl	CP7515 CP7518
D 2743	Oil and oil acids	50 m x 0.25 mm df=0.2 µm CP-Sil 88 for FAME	CP7488
D 2804	Purity of methyl ethyl ketone	30 m x 0.32 mm df=0.5 µm CP-Wax 52 CB 30 m x 0.53 mm df=1.0 µm CP-Wax 52 CB	CP8763 CP8738
D 2887	SimDist analysis of petroleum fractions Extended SimDist	5 m x 0.53 mm df=0.88 µm CP-UltiMetal™ SimDist 10 m x 0.53 mm df=2.65 µm CP-UltiMetal SimDist 5 m x 0.53 mm df=0.17 µm CP-UltiMetal SimDist	CP7570 CP7582 CP7532
D 2908	Volatile organics in water	30 m x 0.32 mm df=1.8 µm CP-Select 624 CB 25 m x 0.53 mm df=3.0 µm CP-Select 624 CB 30 m x 0.32 mm df=0.5 µm CP-Wax 52 CB 30 m x 0.53 mm df=1.0 µm CP-Wax 52 CB	CP7414 CP7417 CP8763 CP8738
D 2195	Standard test methods for pentaerythritol	30 m x 0.53 mm df=1.5 µm CP-Sil 5 CB	CP8735
D 6387	Composition of turpentine and related terpene products	30 m x 0.32 mm df=0.5 µm CP-Wax 52 CB 30 m x 0.53 mm df=1.0 µm CP-Wax 52 CB	CP8763 CP8738
D 3168	Polymers in emulsion paints	30 m x 0.32 mm df=1.0 µm CP-Sil 5 CB 30 m x 0.53 mm df=1.5 µm CP-Sil 5 CB	CP8760 CP8735
D 3271	Solvent analysis in paints	25 m x 0.53 mm df=20 µm CP-PoraPLOT Q 30 m x 0.53 mm df=1.0 µm CP-Wax 52 CB	CP7554 CP8738
D 3328	Comparison of waterborne petroleum oils	30 m x 0.32 mm df=3.0 µm CP-Sil 5 CB 30 m x 0.53 mm df=3.0 µm CP-Sil 5 CB	CP8687 CP8677
D 3329	Purity of methyl isobutyl ketone	60 m x 0.53 mm df=1.0 µm CP-Wax 52 CB	CP8798
D 6806	Analysis of halogenated organic solvents and their admixtures	50 m x 0.53 mm df=5.0 µm CP-Sil 5 CB	CP7685
D 3452	Identification of rubber	30 m x 0.53 mm df=1.5 µm CP-Sil 5 CB	CP8735
D 3465	Purity of monomeric plasticizers	25 m x 0.32 mm df=0.52 µm CP-Sil 5 CB 30 m x 0.53 mm df=1.5 µm CP-Sil 5 CB	CP8430 CP8735
D 3524	Diesel fuel in lubricating oil (SAE 30)	10 m x 0.5 mm df=0.5 µm CP-UltiMetal SimDist	CP7592
D 3606	Benzene and toluene in gasoline	15 m x 0.25 mm df=0.1 µm VF-1ms 50 m x 0.25 mm df=0.4 µm CP-TCEP	CP8906 CP7525
D 3687	Volatile organic compounds	30 m x 0.32 mm df=0.5 µm CP-Wax 52 CB 30 m x 0.53 mm df=1.0 µm CP-Wax 52 CB	CP8763 CP8738

Varian Columns for ASTM Methods

ASTM Methods Continued

ASTM Method	Application	Varian Capillary Column	Part No.
D 3710	SimDist analysis of gasoline and gasoline fractions	10 m x 0.53 mm df=0.53 µm CP-UltiMetal™ SimDist	CP7592
D 3749	Vinyl chloride in PVC	10 m x 0.32 mm df=5 µm CP-PoraBOND Q™ 10 m x 0.53 mm df=10 µm CP-PoraBOND Q	CP7350 CP7353
D 3760	Analysis of cumene	50 m x 0.53 mm CP-Xylenes	CP7428
D 3792	Water in water-reducible paints	25 m x 0.32 mm df=5 µm CP-PoraBOND Q 25 m x 0.53 mm df=10 µm CP-PoraBOND Q	CP7351 CP7354
D 3797	Analysis of o-xylene	50 m x 0.53 mm CP-Xylenes	CP7428
D 3798	Analysis of p-xylene impurities	50 m x 0.53 mm CP-Xylenes	CP7428
D 3876	Methoxyl and hydroxypropyl substitution in cellulose ether products	30 m x 0.32 mm df=1.0 µm CP-Sil 5 CB 30 m x 0.53 mm df=1.5 µm CP-Sil 5 CB	CP8760 CP8735
D 5135	Impurities in styrene	60 m x 0.32 mm df=0.5 µm CP-WAX 52 CB	CP8773
D 4059	PCBs in insulating liquids	50 m x 0.25 mm df=0.25 µm CP-Sil 8 CB for PCBs	CP7482
D 4275	Butylated hydroxy toluene in ethylene and ethylenevinylacetate polymers	30 m x 0.32 mm df=3.0 µm CP-Sil 5 CB 30 m x 0.53 mm df=3.0 µm CP-Sil 5 CB	CP8687 CP8677
D 4367	Benzene in hydrocarbon solvent	15 m x 0.25 mm df=0.1 µm VF-1ms 50 m x 0.25 mm df=0.4 µm CP-TCEP	CP8906 CP7525
D 4424	Butylene analysis	25 m x 0.53 mm df=10 µm CP-Al2O3/Na2SO4	CP7567
D 4492	Analysis of benzene	50 m x 0.25 mm df=0.4 µm CP-TCEP	CP7525
D 4735	Thiophene impurities in benzene	25 m x 0.53 mm df=1.0 µm CP-Wax 58 (FFAP) CB	CP7614
D 4768	Phenol and cresol inhibitors in insulating oils	25 m x 0.53 mm df=1.0 µm CP-Wax 58 (FFAP) CB	CP7614
D 5060	Impurities in ethylbenzene	60 m x 0.32 mm df=0.5 µm CP-Wax 52 CB	CP8773
D 5134	Petroleum naphthas through n-nonane	50 m x 0.21 mm df=0.5 µm CP-Sil PONA CB acc. to ASTM 5134	CP7531
D 5135	Analysis of styrene	60 m x 0.32 mm df=0.5 µm CP-Wax 52 CB	CP8773
D 5504	Sulfur compounds in natural gas and gaseous fuels by GC and SCD	30 m x 0.32 mm df=4.0 µm CP-Select CB for Sulfur	CP7529
D 5060	Impurities in ethylbenzene	60 m x 0.32 mm df=0.5 µm CP-Wax 52 CB	CP8773
D 5580	Aromatics in finished gasoline	15 m x 0.25 mm df=0.1 µm VF-1ms 50 m x 0.25 mm df=0.4 µm CP-TCEP	CP8906 CP7525
E 0202	Analysis of glycols	25 m x 0.25 mm C df=0.2 µm P-Wax 57 CB for Glycols and Alcohols	CP7615
D 4275	Butylated hydroxy toluene in ethylene and ethylenevinylacetate polymers	30 m x 0.32 mm df=3.0 µm CP-Sil 5 CB 30 m x 0.53 mm df=3.0 µm CP-Sil 5 CB	CP8687 CP8677
D 4322	Acrylonitrile in styrene-acrylonitrile-copolymers and nitrile rubber	25 m x 0.53 mm df=10 µm CP-PoraBOND Q	CP7354

Varian Columns for ASTM Methods

ASTM Methods Continued

ASTM Method	Application	Varian Capillary Column	Part No.
D 4420	Aromatics in gasoline	15 m x 0.25 mm df=0.1 µm VF-1ms, 50 m x 0.25 mm df=0.4 µm CP-TCEP	CP8906 CP7525
D 4509	Acetaldehyde contents of PET bottles	25 m x 0.32 mm df=5 µm CP-PoraBOND Q™ 25 m x 0.53 mm df=10 µm CP-PoraBOND Q	CP7351 CP7354
D 4534	Benzene content of cyclic products	50 m x 0.25 mm df=0.4 µm CP-TCEP	CP7525
D 5060	Impurities in ethylbenzene	60 m x 0.32 mm df=0.5 µm CP-Wax 52 CB	CP8773
D 6584	Free and total glycerine	15 m x 0.32 mm df=0.1 µm Varian Select Biodiesel for Glycerides + 2 m x 0.53 mm ID retention gap	CP9078

FactorFour™ GC Columns

Highly Inert Capillary Columns with the Lowest Bleed

Varian FactorFour columns deliver greater analytical accuracy to give you the right result first time. They reduce costs and improve instrument uptime to enhance efficiency, so that you can analyze more compounds in less time and boost your productivity.

FactorFour (VF) is a comprehensive line of high performance capillary gas chromatography (GC) columns. These columns are manufactured from the highest quality materials with the most detailed specifications across the product range to ensure reproducibility, ultra low bleed and high inertness for quality chromatography. Such high performance columns can be used routinely and with confidence in all areas of GC and GC/MS analysis.

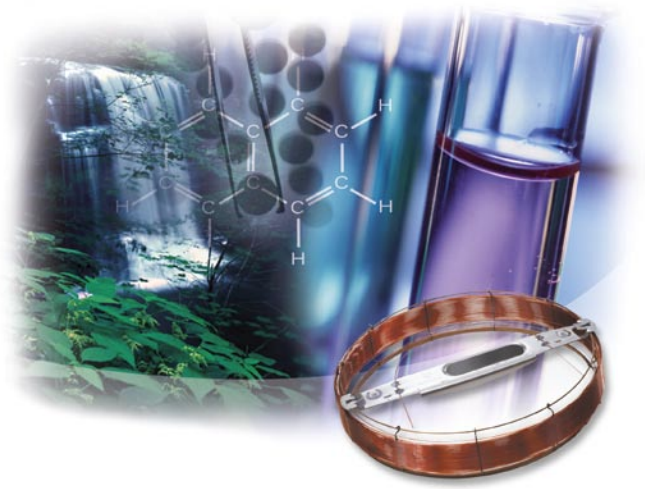
Utilizing advanced proprietary manufacturing techniques, the FactorFour range provides highly inert columns that offer low background and high signal to noise values and minimal peak tailing. These combine to offer superior performance for routine or trace analysis for all GC detectors.

To meet every application and selectivity requirement, FactorFour columns are available in a variety of general and application specific phases. All the benefits of high performance, low bleed and quality inertness are built into every FactorFour column.

The FactorFour Advantage

High quality companion products to the FactorFour range contribute to the superior quality and performance of the columns. These include EZ-Guard™ columns, Gas Clean™ Filters and EZ-GRIP™ for easy column handling.

With over 60 years' experience and expertise in analytical analysis, Varian is the perfect GC column partner, offering quality products, method development, training, applications and product support.



VF 0.15 mm ID – Double your Sample Throughput

In addition to the standard dimensions, FactorFour columns have an extended range of 0.15 mm ID columns designed to reduce run times and increase throughput. When compared to traditional 0.25 and 0.32 mm ID columns, the 0.15 mm FactorFour range lets you at least halve your analysis times while using your existing GC and GC/MS instrumentation. Also, because elution orders remain the same, there is no time-consuming method development.

You benefit from reduced cost per analysis, faster sample turnaround and increased productivity. VF 0.15 mm ID are suitable for all kinds of samples, especially in clinical toxicology, petrochemical, fragrance, and trace component analysis as used in the environmental and pharmaceutical industries.

VF 0.15 mm ID columns come with an EZ-GRIP™, simplifying installation, coupling, and operation of capillary columns. For guaranteed performance, the retention index, efficiency, selectivity and bleed are measured and specified on the test report supplied with each column. VF 0.15 mm ID is available with VF-1ms, VF-5ms, VF-624ms, VF-1201ms, VF-1701ms, VF-35ms, VF-17ms, VF-200ms, VF-23ms and VF-WAXms.

FactorFour™ GC Columns

Varian FactorFour GC Columns Application Guide

Application Area	FactorFour Column	Components	EPA Standard Method (Unless otherwise indicated)
Energy and Fuels Environmental Food and Agriculture	VF-1ms, non-polar low bleed for increased sensitivity, accuracy and instrument uptime	Alcohols, aromatic hydrocarbons, esters, flavors and aromas, free fatty acids, glycols, hydrocarbons, halogenated hydrocarbons, ketones, organic acids, oxygenates, PAHs, pesticides, polymers, steroids, solvents, sulfur compounds	ASTM D 3606, D 4367, D 4420, D 5580
Energy and Fuels Environmental Food and Agriculture	VF-5ms, 5% phenyl-methyl column with higher polarity for improved aromatic compound selectivity	Alcohols, amines, aromatic hydrocarbons, bile acids, drugs, EPA methods, esters, FAME, flavors and aromas, glycerides, halogenated compounds, herbicides, hydrocarbons, organic acids, oxygenates, nitrosamines, PAHs, PCBs, pesticides, phenols, polymers, prostaglandins, solvents, steroids, sterols, sugars, sulfur compounds	507*, 508*, 513*, 515/515.2, 525*, 604, 605, 606, 607, 609, 610, 611, 612, 613, 625, 680, 1625, 1653, 8040, 8041, 8080, 8090, 8091, 8100, 8120, 8121, 8140, 8141, 8150, 8151, 8270, 8280
Environmental	VF-5 Pesticides and VF-1701 Pesticides, individually tested with key pesticides for optimal and consistent results	Pesticide residues in food and environmental samples	625, 8081
Energy and Fuels Environmental Food and Agriculture	VF-5ht, for low bleed and high temperature VF-5ht UltiMetal™, unique and extremely durable up to 450 °C	Long-chained hydrocarbons, polymers, plastics, waxes, heavy PAHs, tars, triglycerides, motor oils, surfactants, crown ethers	
Energy and fuels Food and Agriculture	VF-WAXms, the first low bleed WAX column	Food, beverages, flavors, FAMEs, acids, alcohols, fragrances	
Environmental Food and Agriculture	VF-Xms, designed specifically for low bleed	Pesticides, herbicides, PCBs, PAHs, dioxins	
Energy and Fuels Environmental Food and Agriculture	VF-624ms, cyano based for volatiles VF-1301ms, thin film version for semi-volatiles	Purgeable organic volatiles and semi-volatiles, aromatics, halocarbons, solvents Volatile solvents, pesticides, PCBs and other organic compounds requiring thin films	524, 624, 8260, USP 467
Environmental Food and Agriculture	VF-1701ms, with superior phase technology for improved trace analysis	Organic compounds in drinking water, base/neutrals and acids, PCBs and chlorinated pesticides, organophosphorus pesticides and herbicides	505*, 507, 508, 542.2, 608, 625, 808, 8081, 8082, 8140, 8141, 8151
Environmental Material Sciences	VF-17ms, deactivation technology improves stability	Antidepressants, herbicides and pesticides	619
Environmental Food and Agriculture Material Sciences	VF-35ms, mid-polarity ideal for dual column confirmation analysis	Aromatic compounds, pesticides and herbicides, sterols and other substituted aromatic compounds	
Environmental Material Sciences	VF-200ms, with unique selectivity for polar compounds	Ketones, aldehydes, nitro- or chloro-containing compounds, PAHs unsaturated compounds, silanes, CFCs	
Food and Agriculture	VF-23ms, high polarity and low bleed for very polar analytes	FAMEs, solvents, sugars	
BioSciences	VF-DA, ultra low bleed ensures highest recoveries	Drugs of abuse	

* Recommended capillary column if method is run with MS detection.

Our FactorFour columns are on 7 in. cages. For 5 in. cages, add 15 to the end of the part number, e.g. CPxxxx15. Columns on 5 in. cages fit GCs with small column ovens, and will attach to our 7 in. EZ-GRIP™ cage for dual-column configurations. We manufacture custom columns in virtually any size. For column dimensions not shown here, please contact your nearest Varian, Inc. office or distributor.

EZ-Guard™

Protect Your GC Column

- **No risk of leakage, saving downtime**
- **Easy and fast to install and operate, boosting productivity**
- **Integrated transfer line delivers faster detector stabilization, improving efficiency**

Guard columns (or retention gaps) are often added to the front of the analytical column to protect against contamination, or to act as a band-focusing device for liquid samples introduced by on-column and splitless injection techniques. For these applications, the Varian EZ-Guard column combines a FactorFour™ column with a built-in guard column. The first five or ten meter section of the EZ-Guard column (guard length depends on the column you select) is not coated with stationary phase, but has been deactivated. The lack of a column connection between the guard and analytical sections results in a 100% leak-free column.

Every EZ-Guard column also features a unique uncoated and deactivated outlet section, about 100 cm long, which acts as an integrated transfer line. This provides a shorter stabilization time with all types of detectors. The absence of a stationary phase in the last part of the column significantly reduces background noise. The impact of water, oxygen or other polar or aggressive components that move through the end of the column at high temperature will also be greatly reduced. When resolution or response in the chromatogram diminishes, a coil is removed from the EZ-Guard column so that peak shapes will improve. By removing a coil, the column length is shortened and peaks will elute somewhat faster. For best results, check the integration time windows of your data system.

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

Ordering Information

VF-1ms

ID (mm)	Guard Length (m)	Column Length (m)	df (µm)	Part No.
0.20	5	12	0.33	CP9023
0.25	5	30	0.25	CP9010
0.25	10	30	0.25	CP9011

VF-5ms

ID (mm)	Guard Length (m)	Column Length (m)	df (µm)	Part No.
0.25	5	15	0.25	CP9021
0.25	5	30	0.25	CP9012
0.25	10	30	0.25	CP9013
0.25	5	30	0.50	CP9014
0.25	10	30	0.50	CP9015
0.25	5	60	0.25	CP9016
0.53	10	30	0.25	CP9020

VF-Xms

ID (mm)	Guard Length (m)	Column Length (m)	df (µm)	Part No.
0.25	10	30	0.10	CP9022
0.25	5	30	0.25	CP9018
0.25	10	30	0.25	CP9019

Contact your local Varian office or distributor if you want to benefit from EZ-Guard with other FactorFour phases.

See Also

- VF-1ms, non-polar column for accuracy and sensitivity, page 110
- VF-5ms, for multi-purpose GC, page 112
- VF-Xms, ultimate sensitivity and lowest signal to noise, page 118

Rapid-MS™

GC/MS up to 10x Faster

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

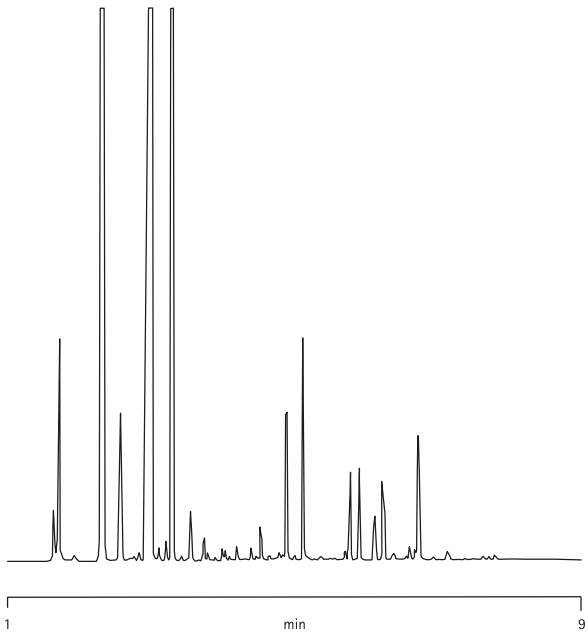
Rapid-MS columns reduce analysis duration by 3-5x for temperature programmed, and up to a 10x for isothermal runs. The film thickness from 0.1 to 1 micron ensures high loadability and the higher sensitivity typically increases the signal to noise ratio by a factor of three or greater.

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

Typical Applications

PCBs and arochlor, pesticides (chlorinated, nitrogen, phosphor), FAME, PAH, drugs

Fast analysis of lemon oil using Rapid-MS



Column:	Rapid MS
Sample Size:	0.3 µL
Sample Conc:	Pure lemon oil
Solvent:	Pure product
Carrier Gas:	He, 100 kPa (1.0 bar, 14 psi)
Temp:	40 °C (2 min) → 200 °C, 20 °C/min
Injector:	Split
Detector:	Varian Ion-trap

Ordering Information

Rapid-MS, Tmax-iso/Tmax-prog 325/325 °C, Tmin –60 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.53	10	0.12	CP8131
0.53	10	0.25	CP8132
0.53	10	0.50	CP8133
0.53	10	1.00	CP8134

Restriction for Rapid-MS – Fused Silica

ID (mm)	Length (m)	Quantity	Part No.
0.1	0.6	5/pk	CP8121

See Also

- VF-5ms, for multi-purpose GC, page 112
- VF Pesticides, tested with key pesticides for improved efficiency, page 114

VF-1ms

The Non-polar Column for Accuracy and Sensitivity

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

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

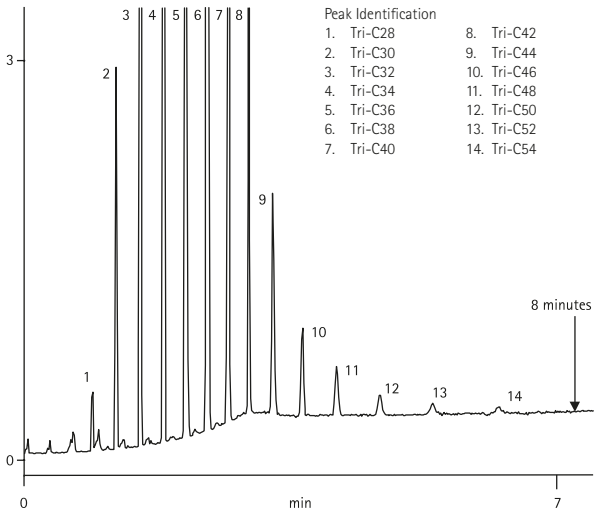
The VF-1ms comes with an EZ-GRIP™ simplifying installation, coupling and operation of capillary columns. For guaranteed performance the retention index, efficiency, selectivity and bleed is measured and specified on the test report supplied with every column.

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

Typical Applications

Alcohols, aromatic hydrocarbons, esters, flavors and aromas, free fatty acids, glycols, hydrocarbons, halogenated hydrocarbons, ketones, organic acids, oxygenates, PAHs, pesticides, polymers, steroids, solvents, sulfur compounds

Triglycerides C28-C54



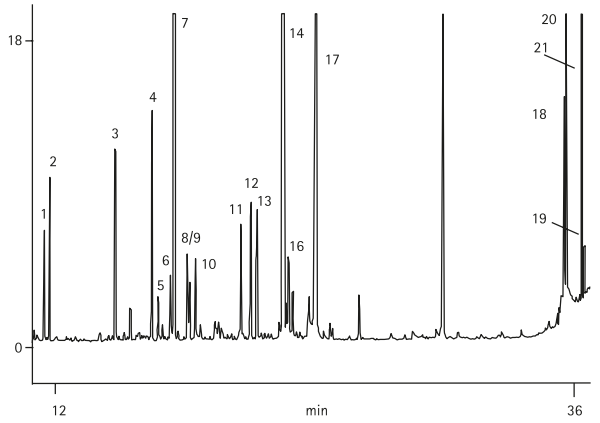
Column: VF-1ms, 15 m x 0.25 mm x 0.25 µm
Carrier Gas: Helium, 2 mL/min
Temp: 250 °C to 375 °C, 35 °C
Injector: Split 1:10, T=340 °C
Detector: MS-1200L Triple Quad operated in single quad mode

VF-1ms

Separation of TMS-derivatized sugars using VF-1ms

Peak Identification

1. Threitol
2. Erythritol
3. Rhamnose 1
4. Rhamnose 2
5. Xylose 1
6. Arabitol
7. Ribitol
8. 3-O-Methylglucose 1
9. Xylose 2
10. Rhamnitol
11. 3-O-Methylglucose 2
12. Glucuron acid-1,5-lacton
13. Ribose 2
14. Manitol
15. Sorbitol (not identified)
16. Galactitol
17. Glucuron acid
18. Lactulose
19. Lactose
20. Sucrose
21. Threhalose



Column: VF-1ms Fused Silica, 30 m x 0.25 mm, df = 0.25 µm
Sample Size: 5 µL, splitless 1 µL
Sample Conc: 40 ppb
Carrier Gas: He, 1.0 mL/min
Temp: 105 °C → 240 °C, 4 °C/min → 300 °C, 20 °C/min
Injector: Split; 1:15
Detector: MS

See Also

- CP-Sil 5 CB, for large volume injection, page 126
- EZ-Guard™, protect your GC column, page 106
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

EZ-Guard columns for VF-1ms

ID (mm)	EZ-Guard Length (m)	Column Length (m)	df (µm)	Part No.
0.20	5	30	0.33	CP9023
0.25	5	30	0.25	CP9010
0.25	10	30	0.25	CP9011

Ordering Information

VF-1ms, Tmax-iso/Tmax-prog 325/350 °C, Tmin –60 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.10	10	0.10	0.50	1.30	8500	CP8900
0.10	10	0.40	0.50	1.10	6750	CP8901
0.10	20	0.10	0.50	1.30	7500	CP8902
0.10	20	0.40	0.50	1.20	6000	CP8903
0.15	10	0.15	0.50	1.20	6050	CP9030
0.15	15	0.15	0.50	1.24	5670	CP5881
0.15	20	0.15	0.50	1.30	6050	CP9031
0.15	20	0.60	1.50	1.10	5100	CP9032
0.20	12	0.33	1.00	1.20	4750	CP8904
0.20	25	0.33	1.25	1.20	4800	CP8905
0.25	15	0.10	0.50	1.30	4100	CP8906
0.25	15	0.25	0.50	1.30	4000	CP8907
0.25	15	1.00	2.00	1.10	3400	CP8908
0.25	25	0.25	1.00	1.30	4000	CP8909
0.25	25	0.40	1.40	1.20	3900	CP8910
0.25	30	0.10	0.75	1.40	4100	CP8911
0.25	30	0.25	1.00	1.30	4000	CP8912
0.25	30	1.00	4.00	1.10	3400	CP8913
0.25	50	0.25	2.00	1.30	4000	CP8914
0.25	50	0.40	2.70	1.20	3900	CP8915
0.25	60	0.25	2.13	1.30	4000	CP8916
0.25	60	1.00	8.00	1.10	3400	CP8917
0.32	15	0.10	0.50	1.30	3200	CP8918
0.32	15	0.25	0.50	1.30	3100	CP8919
0.32	15	1.00	2.60	1.10	2650	CP8920
0.32	25	0.25	1.00	1.30	3100	CP8921
0.32	25	0.40	2.13	1.20	3050	CP8922
0.32	30	0.10	0.75	1.40	3200	CP8923
0.32	30	0.25	1.00	1.30	3100	CP8924
0.32	30	0.50	2.60	1.20	3000	CP8925
0.32	30	1.00	5.00	1.10	2650	CP8926
0.32	50	0.25	2.25	1.30	3100	CP8927
0.32	50	0.40	4.79	1.20	3050	CP8928
0.32	60	0.25	2.25	1.30	3100	CP8929
0.32	60	1.00	10.00	1.10	2650	CP8930
0.53	15	0.50	3.50	1.30	1420	CP8965
0.53	15	1.50	10.00	1.10	1420	CP8967
0.53	30	0.50	7.00	1.30	1700	CP8968
0.53	30	1.00	10.00	1.20	1700	CP8969
0.53	30	1.50	10.00	1.10	1700	CP8970

* Tmax-iso/Tmax-prog 310/335 °C

VF-5ms

The Multi-purpose GC Column

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

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

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

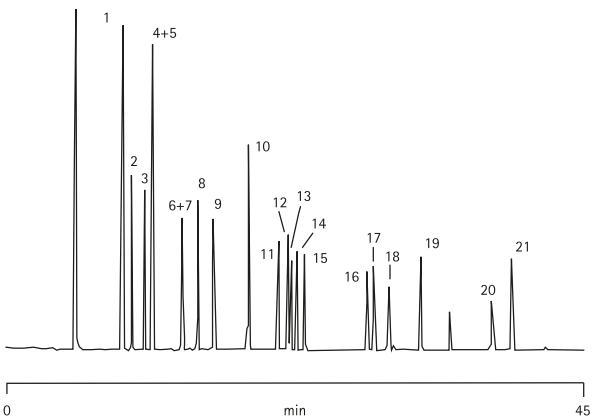
Typical Applications

Alcohols, amines, aromatic hydrocarbons, bile acids, drugs, EPA methods, esters, FAME, flavors and aromas, glycerides, halogenated compounds, herbicides, hydrocarbons, organic acids, oxygenates, nitrosamines, PAHs, PCBs, pesticides, phenols, polymers, prostaglandins, solvents, steroids, sterols, sugars, sulfur compounds

High resolution phenol analysis by GC/MS

Peak Identification

1. Phenol
2. 2-Chlorophenol
3. o-Cresol
4. m-Cresol
5. p-Cresol
6. 2-Nitrophenol
7. 2,4-Dimethylphenol
8. 2,4-Dichlorophenol
9. 2,6-Dichlorophenol
10. 4-Chloro-3-methylphenol
11. 2,3,5-Trichlorophenol
12. 2,4,6-Trichlorophenol
13. 2,4,5-Trichlorophenol
14. 2,3,4-Trichlorophenol
15. 2,3,6-Trichlorophenol
16. 4-Nitrophenol
17. 2,4-Dinitrophenol
18. 2,3,5,6 Tetrachlorophenol
19. 2-Methyl-4,6-dinitrophenol
20. Pentachlorophenol
21. 2-Se-butyl-4,6-dinitrophenol

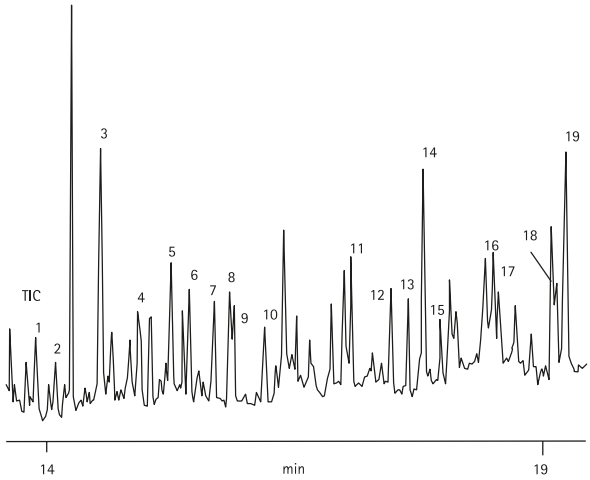


Column: VF-5ms, 0.25 mm x 30 m x 0.25 µm
Sample Conc: Approx. 5-10 ng per component on column
Carrier Gas: Helium, 70 kPa
Injector: Split, 1:200, T=275 °C
Detector: Varian Ion Trap MS

Pesticides in sunflower oil

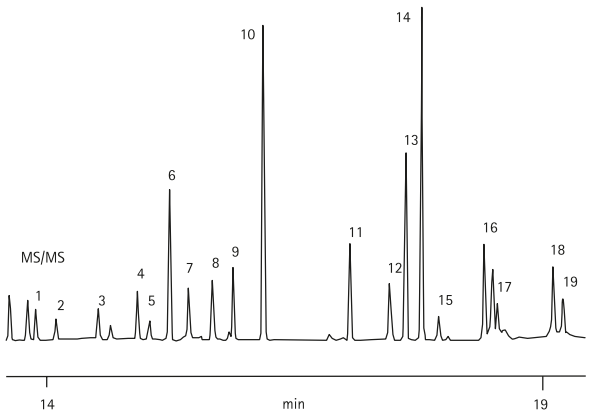
Peak Identification

1. b HCH
2. c HCH
3. d HCH
4. + Vinclozolin
5. Pyrimiphos methyl
6. + Malathion
7. Chloropyrifos
8. Ethyl parathion
9. Pyrimiphos ethyl
10. Bromofos
11. o,p'-DDE
12. a Endosulfan
13. p,p'-DDE
14. o,p'-DDD
15. Dieldrin
16. p,p'-DDD
17. b Endosulfan
18. p,p'-DDT
19. Endosulfan sulfate



Peak Identification

1. b HCH
2. c HCH
3. d HCH
4. + Vinclozolin
5. Methyl parathion
6. Pyrimiphos methyl
7. + +Fenitrothion
8. Chloropyrifos
9. Pyrimiphos ethyl
10. Promofos
11. o,p'-DDE
12. a Endosulfan
13. p,p'-DDE
14. o,p'-DDD
15. Dieldrin
16. p,p'-DDD
17. b Endosulfan
18. p,p'-DDT
19. Endosulfan sulfate



Column: VF-5ms Fused Silica, 60 m x 0.25 mm, df = 0.25 µm
Sample Size: 5 µL, splitless
Sample Conc: 40 ppb
Carrier Gas: He, 1.2 mL/min, constant flow
Temp: 70 °C (3.0 min) → 25 °C, 190 °C/min (0.0 min) → 10 °C/min → 320 °C (10 min)
Injector: 1079 with carbofrit liner
Detector: Varian Ion Trap in MS/MS, full scan (upper chromatogram) MS/MS (lower chromatogram)

VF-5ms

Ordering Information

VF-5ms, Tmax-iso/Tmax-prog 325/350 °C, Tmin –60 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.10	10	0.40	0.50	1.1	6750	CP8934
0.10	20	0.40	0.50	1.1	6750	CP8933
0.15	10	0.15	0.50	1.2	6050	CP9034
0.15	15	0.15	0.50	1.2	6050	CP9035
0.15	20	0.15	0.50	1.2	6050	CP9036
0.15	20	0.30	0.75	1.1	5700	CP9037
0.15	20	0.60	1.50	1.1	5500	CP9038
0.15	40	0.15	0.75	1.2	5625	CP9039
0.15	40	0.60	3.00	1.1	5500	CP9040
0.20	12	0.33	0.75	1.1	4750	CP8935
0.20	25	0.33	1.00	1.1	4800	CP8936
0.20	50	0.33	1.25	1.3	4500	CP8937
0.25	15	0.10	0.50	1.3	4100	CP8938
0.25	15	0.25	0.63	1.2	3900	CP8939
0.25	15	0.50	1.00	1.2	3800	CP8963
0.25	15	1.00	2.00	1.1	3500	CP8940
0.25	25	0.25	1.00	1.0	3900	CP8941
0.25	25	0.40	1.40	1.1	3850	CP8942
0.25	30	0.10	0.63	1.4	4100	CP8943
0.25	30	0.25	1.00	1.0	3900	CP8944
0.25	30	0.50	2.00	1.1	3800	CP8945
0.25	30	1.00	4.00	1.1	3500	CP8946
0.25	50	0.25	1.75	1.0	3900	CP8947
0.25	60	0.10	1.25	1.5	4100	CP8948
0.25	60	1.00	8.00	1.1	3500	CP8949
0.25	60	0.25	2.00	1.0	3900	CP8960
0.32	15	0.10	0.50	1.3	3200	CP8950
0.32	15	0.25	0.63	1.2	3050	CP8951
0.32	15	1.00	2.60	1.1	2700	CP8952
0.32	25	0.52	2.20	1.1	2950	CP8953
0.32	30	0.10	0.63	1.4	3200	CP8954
0.32	30	0.25	1.00	1.0	3050	CP8955
0.32	30	0.50	2.60	1.1	2950	CP8956
0.32	30	1.00	5.00	1.1	2700	CP8957
0.32	50	0.25	2.00	1.0	3050	CP8958
0.32	50	0.40	4.79	1.1	3000	CP8959
0.32	60	0.25	2.00	1.0	3050	CP8961
0.32	60	1.00	10.00	1.1	2700	CP8962
0.53	15	0.50	2.50	1.2	1800	CP8971
0.53	15	1.00	4.00	1.1	1800	CP8972

Ordering Information

VF-5ms, Tmax-iso/Tmax-prog 325/350 °C, Tmin –60 °C continued

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.53	15	1.50	8.00	1.1	1700	CP8973
0.53	30	0.50	5.00	1.0	1800	CP8974
0.53	30	1.00	8.00	1.1	1800	CP8975
0.53	30	1.50	8.00	1.1	1700	CP8976*

* Tmax-iso/prog 310/335 °C

EZ-Guard™ columns for VF-5ms

ID (mm)	EZ-Guard Length (m)	Column Length (m)	df (µm)	Part No.
0.25	5	15	0.25	CP9021
0.25	5	30	0.25	CP9012
0.25	10	30	0.25	CP9013
0.25	5	30	0.50	CP9014
0.25	10	30	0.50	CP9015
0.25	5	60	0.25	CP9016
0.25	10	60	0.25	CP9017
0.53	10	30	0.50	CP9020

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172
- EZ-Guard, protect your GC column, page 108

VF-5 Pesticides and VF-1701 Pesticides

Trace Analysis of Pesticides

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

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

See Also

- CP-Sil 8 CB for Pesticides, guaranteed for DDT and endrin, page 128
- CP-Sil 19 CB for Pesticides, guaranteed for DDT and endrin, page 131
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

VF-5 Pesticides, Tmax-iso/Tmax-prog 325/350 °C, Tmin –60 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry p,p'-DDT	N/M	Part No.
0.25	30	0.25	1.00	1.25	3500	CP9074
0.25	50	0.25	1.75	1.45	3500	CP9073
0.32	30	0.25	1.00	1.25	2667	CP9075

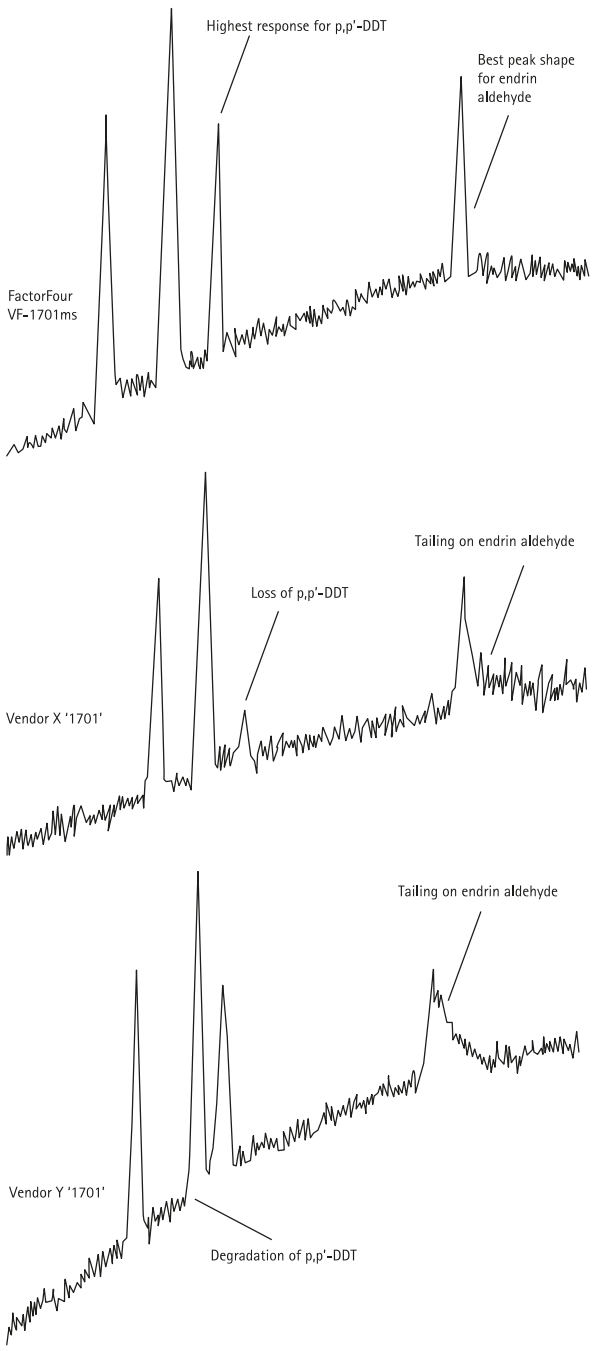
VF-1701 Pesticides, Tmax-iso/Tmax-prog 280/300 °C, Tmin –20 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry p,p'-DDT	N/M	Part No.
0.25	30	0.25	1.00	1.25	3500	CP9070
0.25	50	0.25	1.00	1.25	3500	CP9072
0.32	30	0.25	1.00	1.25	2667	CP9071

Typical Applications

Pesticide residues in food and environmental samples

EPA 625 halogenated pesticides on "1701" type phases



Column: VF-1701, 0.25 mm x 30 m x 0.25 µm
Temp: 150 °C, 5 °C/min to 275 °C
Injector: Split, T=275 °C ECD: T=275 °C, 2 pg

For more information, please visit www.varianinc.com/factorfour.html or visit www.varianinc.com/products.html to place an order.

VF-5ht Fused Silica and VF-5ht UltiMetal™

For High Temperature GC up to 450 °C

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

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

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

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

EZ-GRIP™ is fitted as standard, simplifying installation, coupling, and operation of capillary columns. For guaranteed performance, the retention index, efficiency, selectivity and bleed are measured and specified on the test report supplied with each column.

Tip

Use Varian Gas Clean™ Filters to prevent the stationary phase from degrading at higher temperatures due to traces of oxygen and water in the carrier gas.

Ordering Information

VF-5ht Fused Silica, Tmax-iso/Tmax-prog 400/400 °C, Tmin –60 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	N/M	Part No.
0.25	15	0.1	5	4100	CP9045
0.25	30	0.1	5	4100	CP9046
0.32	10	0.1	5	3200	CP9044
0.32	15	0.1	5	3200	CP9047
0.32	30	0.1	5	3200	CP9048

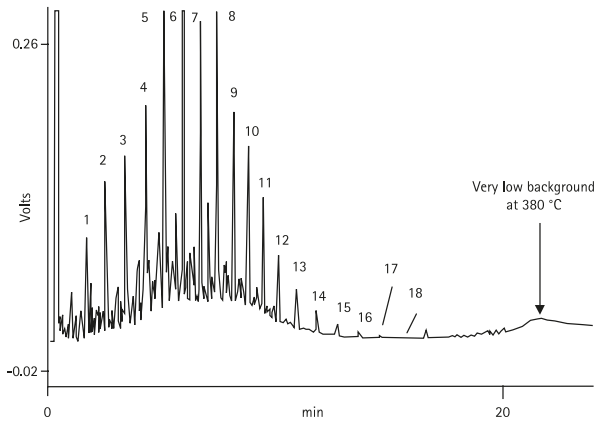
Typical Applications

Long-chained hydrocarbons, polymers, plastics, waxes, heavy PAHs, tars, triglycerides, motor oils, surfactants, crown ethers

Diesel analysis

Peak Identification

1. C10
2. C11
3. C12
4. C13
5. C14
6. C15
7. C16
8. C17
9. C18
10. C19
11. C20
12. C21
13. C22
14. C23
15. C24
16. C25
17. C26
18. C27



Column: VF-5ht, 0.32 mm x 15 m x 0.10 µm
Carrier Gas: H_2, 60 kPa, 0.6 bar, 8.6 psi
Temp: 50 °C (1 min), 15 °C to 180 °C, 7 °C to 230 °C, 30 °C to 380 °C
Detector: FID

See Also

- VF-5ms, for multi-purpose GC, page 112
- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

VF-5ht UltiMetal, Tmax-iso/Tmax-prog 430/450 °C, Tmin –60 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.25	15	0.1	4.0	1.14	3500	CP9090
0.25	15	0.1	4.0	1.14	2500	CP9091*
0.25	30	0.1	7.5	1.14	3500	CP9092
0.25	30	0.1	7.5	1.14	2500	CP9093*
0.32	15	0.1	6.0	1.14	2700	CP9094
0.32	15	0.1	6.0	1.14	2500	CP9095*
0.32	30	0.1	12.0	1.14	2700	CP9096
0.32	30	0.1	12.0	1.14	2500	CP9097*

* Retention gap 2 x 0.53 mm ID

VF-WAXms

For Very Polar Compounds

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

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

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

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

Tip

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.

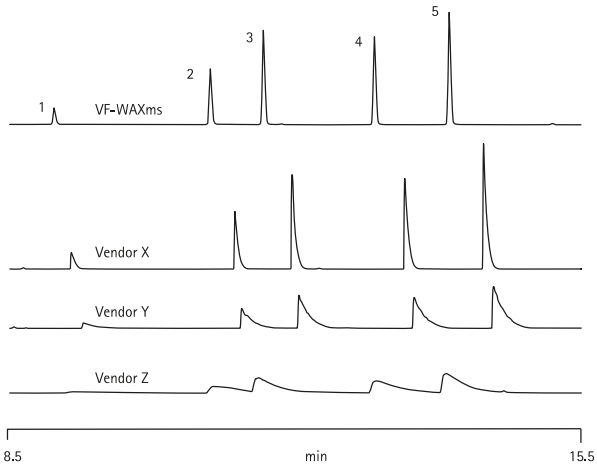
Typical Applications

Food, beverages, flavors, FAMEs, acids, alcohols, fragrances

Acids

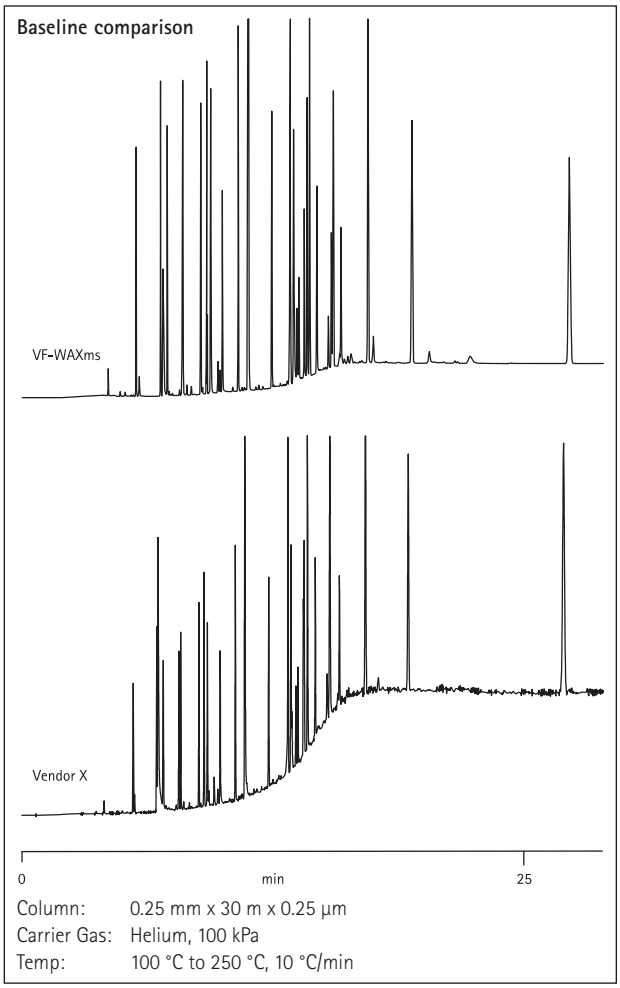
Peak Identification

1. Acetic acid
2. Propionic acid
3. Iso-butyric acid
4. Butyric acid
5. Iso-valeric acid



Column:	0.25 mm x 30 m x 0.25 µm
Sample:	Acid sample, 0.1% (Cyclohexane)
Sample Size:	0.1 µL
Carrier Gas:	Hydrogen, 75 kPa
Temp:	60 °C to 200 °C, 5 °C/min
Injector:	250 °C, split 100 mL/min

VF-WAXms



Column: 0.25 mm x 30 m x 0.25 µm
Carrier Gas: Helium, 100 kPa
Temp: 100 °C to 250 °C, 10 °C/min

Ordering Information

VF-WAXms, Tmax-iso/Tmax-prog 250/260 °C, Tmin 20 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.10	10	0.10	0.6	1.24	7500	CP9219
0.10	10	0.20	0.6	1.34	7500	CP9218
0.10	20	0.10	1.2	1.74	7000	CP9229
0.15	10	0.15	1.0	1.34	5800	CP9200
0.15	15	0.15	1.0	1.24	5800	CP9201
0.15	20	0.15	1.0	1.34	5800	CP9220
0.15	30	0.15	1.0	1.24	5800	CP9202
0.25	15	0.25	1.5	1.24	3800	CP9203
0.25	15	0.50	3.0	1.14	3500	CP9221
0.25	25	0.20	2.0	1.34	3800	CP9204
0.25	30	0.25	3.0	1.34	3800	CP9205
0.25	30	0.50	6.0	1.24	3500	CP9222
0.25	30	1.00	7.0	1.24	3000	CP9206*
0.25	60	0.25	6.0	1.44	3800	CP9207
0.25	60	0.50	9.0	1.34	3500	CP9223*
0.32	15	0.25	3.0	1.24	2950	CP9209
0.32	15	0.50	4.0	1.14	2750	CP9224
0.32	15	1.00	12.0	1.14	2350	CP9208
0.32	30	0.25	6.0	1.34	2950	CP9212
0.32	30	0.50	8.0	1.24	2750	CP9210
0.32	30	1.00	9.0	1.24	2350	CP9211*
0.32	60	0.25	10.0	1.44	2950	CP9214
0.32	60	0.50	10.0	1.34	2750	CP9225*
0.32	60	1.00	15.0	1.34	2350	CP9213**
0.53	15	1.00	20.0	1.14	1600	CP9226
0.53	15	2.00	22.0	1.14	1267	CP9227*
0.53	30	1.00	21.0	1.24	1600	CP9215*
0.53	30	2.00	14.0	1.14	1267	CP9216**
0.53	60	2.00	24.0	1.14	1400	CP9217***
0.53	60	1.00	14.0	1.24	1600	CP9228**

* Tmax-iso/Tmax-prog 240 °C
** Tmax-iso/Tmax-prog 230 °C
*** Tmax-iso/Tmax-prog 220 °C

See Also

- CP-WAX 52 CB higher sensitivity for low boiling point, page 134
- CP WAX 57 CB, for alcohols in wines and spirits, page 135
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

VF-Xms

Ultimate Sensitivity and Lowest Signal to Noise Ratio

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

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

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

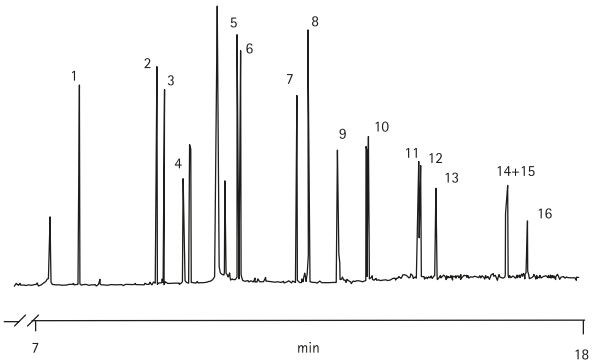
Typical Applications

Pesticides, herbicides, PCBs, PAHs, dioxins

Analysis of polycyclic aromatic hydrocarbons

Peak Identification

1. Naphthalene
2. Acenaphthylene
3. Acenaphthene
4. Fluorene
5. Phenanthrene
6. Anthracene
7. Fluoranthene
8. Pyrene
9. Chrysene
10. Benzo(a)anthracene
11. Benzo(k)fluoranthene
12. Benzo(b)fluoranthene
13. Benzo(a)pyrene
14. Indeno(1,2,3-cd)pyrene
15. Dibenz(a,h)anthracene
16. Benzo(g,h,i)perylene



Sample: 1 µL ca. 3 ng per component on column
Column: VF-Xms, 0.25 mm x 30 m x 0.10 µm
Carrier Gas: Helium, 60 kPa
Injector: Split, Injection temp 275 °C
Detection: Varian Ion Trap MS

Ordering Information

VF-Xms, Tmax-iso/Tmax-prog 340/360 °C, Tmin 30 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.15	20	0.15	0.75	1.2	6050	CP9041
0.20	12	0.33	0.80	1.1	4750	CP8800
0.20	25	0.33	1.50	1.1	4800	CP8801
0.25	15	0.10	0.60	1.3	4333	CP8802
0.25	15	0.25	1.00	1.2	4200	CP8803
0.25	30	0.10	1.00	1.4	4333	CP8805
0.25	30	0.25	2.00	1.2	4167	CP8806
0.25	30	0.50	4.50	1.1	3800	CP8807
0.25	30	1.00	9.00	1.1	3500	CP8808
0.25	60	0.25	4.00	1.3	4167	CP8809
0.32	15	0.25	1.50	1.2	3333	CP8810
0.32	15	1.00	6.00	1.1	2667	CP8811
0.32	30	0.10	2.00	1.4	3333	CP8812
0.32	30	0.25	3.00	1.2	3333	CP8813
0.32	30	0.50	6.00	1.1	3000	CP8814
0.32	30	1.00	12.00	1.1	2667	CP8815
0.32	60	0.25	6.00	1.3	3333	CP8816
0.53	15	1.50	10.00	1.1	1667	CP8817*
0.53	30	1.50	20.00	1.2	1667	CP8818*

* Tmax-iso/Tmax-prog 325/340 °C, Tmin 30 °C

See Also

- VF-5ms, for multi-purpose GC, page 112
- EZ-Guard™, protect your GC column, page 108
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

EZ-Guard columns for VF-Xms

ID (mm)	EZ-Guard Length (m)	Column Length (m)	df (µm)	Part No.
0.25	5	30	0.25	CP9018
0.25	10	30	0.10	CP9022
0.25	10	30	0.25	CP9019

For more information, please visit www.varianinc.com/factorfour.html or visit www.varianinc.com/products.html to place an order.

VF-624ms and VF-1301ms

Cyano-based for Volatiles

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

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

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

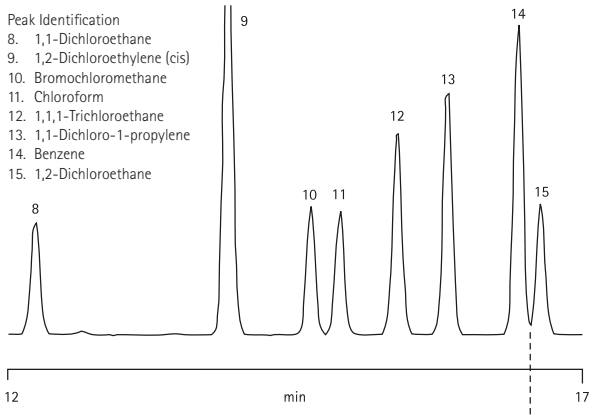
VF-624ms and VF-1301ms are also available with 0.15 mm ID for fast GC and GC/MS that can boost sample throughput when compared to 0.25 and 0.32 mm ID columns.

Typical Applications

VF-624ms: Purgeable organic volatiles and semi-volatiles, aromatics, halocarbons, solvents

VF-1301ms: Volatile solvents, pesticides, PCBs and other organic compounds requiring thin films

FactorFour™ cyano columns eliminate unstable baselines



Column: VF-624ms, 0.32 mm x 60 m x 1.8 µm
Carrier Gas: Helium 1 mL/min
Temp: Trap 150 °C, Manifold 40 °C, Transfer line 185 °C
Injector: Split 1:100, Injection temp 250 °C
Detector: Varian Ion Trap MS

GC

See Also

- CP-Select 624 CB, for EPA and USP methods, page 154
- CP-1301, for herbicides, pesticides and USP methods, page 130

Ordering Information

VF-624ms, Tmax-iso/Tmax-prog 280/300 °C, Tmin -40 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.15	15	0.84	1.0	1.1	4500	CP9101
0.15	20	0.84	1.3	1.1	4500	CP9100
0.15	30	0.84	1.5	1.1	4166	CP9109
0.15	40	0.84	2.0	1.1	4000	CP9110
0.25	30	1.40	2.5	1.1	2883	CP9102
0.25	60	1.40	5.0	1.1	2883	CP9103
0.32	30	1.80	3.0	1.1	2167	CP9104
0.32	60	1.80	6.0	1.1	2167	CP9105
0.53	30	3.00	8.0	1.1	1333	CP9106
0.53	60	3.00	8.0	1.1	1333	CP9107*
0.53	75	3.00	10.0	1.1	1333	CP9108*

* Tmax-iso/Tmax-prog 265/280 °C

Ordering Information

VF-1301ms, Tmax-iso/prog 280/300 °C, Tmin -40 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.10	10	1.00	0.5	1.2	8000	CP9066
0.15	15	0.15	0.5	1.2	6000	CP9050
0.15	20	0.15	0.5	1.2	6000	CP9051
0.25	15	1.00	1.0	1.1	3000	CP9052
0.25	30	0.25	0.5	1.2	4000	CP9053
0.25	30	1.00	2.0	1.1	3000	CP9054
0.25	60	0.25	2.0	1.2	4000	CP9055
0.25	60	1.00	4.0	1.1	3000	CP9056
0.32	15	0.25	0.5	1.2	3167	CP9057
0.32	15	1.00	1.0	1.2	2333	CP9058
0.32	30	0.25	1.0	1.2	3167	CP9059
0.32	30	1.00	2.0	1.1	2333	CP9060
0.32	60	1.00	4.0	1.1	2333	CP9061
0.53	15	1.00	2.0	1.1	1667	CP9062
0.53	30	1.00	4.0	1.1	1667	CP9063
0.53	30	1.50	9.0	1.1	1333	CP9064

VF-1701ms

Trace Analysis of Semi-volatile Organics

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

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

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

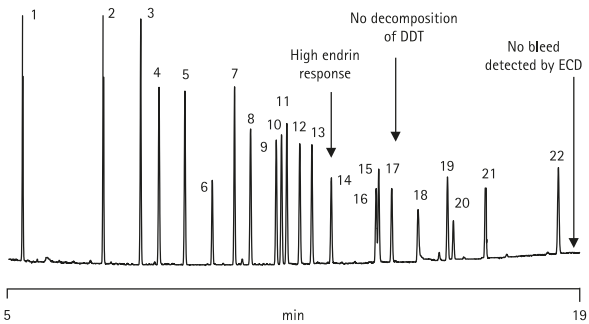
Typical Applications

Organic compounds in drinking water, base/neutrals and acids, PCBs and chlorinated pesticides, organophosphorus pesticides, herbicides

Analysis of pesticides using EPA 8081 with ECD

Peak Identification

1. 2,4,5,6-Tetrachloro m-Xylene
2. α-BHC
3. γ-BHC
4. Heptachlor
5. Aldrin
6. β-BHC
7. δ-BHC
8. Heptachlor epoxide
9. Endosulfan I
10. γ-Chlordane
11. α-Chlordane
12. 4,4'-DDE
13. Dieldrin
14. Endrin
15. 4,4'-DDD
16. Endosulfan II
17. 4,4'-DDT
18. Endrin aldehyde
19. Endosulfan sulfate
20. Methoxychlor
21. Endrin ketone
22. Decachlorobiphenyl



Column: VF-1701 Pesticides, 30 m x 0.32 mm x 0.25 µm
Sample Size: 0.5 µL, 6 ng/mL
Carrier Gas: Helium, 150 kPa
Temp: 60 °C (hold 30 sec) → 150 °C @ 50 °C/min → 275 °C @ 8 °C/min
Injector: Split/splitless, in splitless mode, T=250 °C
Detector: ECD, T=325 °C

See Also

- VF-Pesticides, ultra-low bleed for trace analysis, page 114
- CP-Sil 19 CB for Pesticides, guaranteed for DDT and endrin, page 153

Ordering Information

VF-1701ms, Tmax-iso/Tmax-prog 280/300 °C, Tmin –20 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.10	10	0.20	0.5	1.20	8000	CP9140
0.10	10	0.40	0.5	1.20	6500	CP9141
0.10	20	0.10	0.5	1.20	8000	CP9142
0.15	15	0.10	0.5	1.20	6000	CP9175
0.15	15	0.15	0.5	1.20	6000	CP9143
0.15	15	0.60	0.5	1.20	4250	CP9144
0.15	20	0.15	0.5	1.20	6000	CP9145
0.15	20	0.60	0.5	1.20	4250	CP9146
0.25	15	0.15	0.5	1.20	4000	CP9147
0.25	15	0.25	0.5	1.10	4000	CP9148
0.25	15	1.00	1.0	1.10	3000	CP9149
0.25	30	0.15	0.6	1.20	4000	CP9150
0.25	30	0.25	1.0	1.20	4000	CP9151
0.25	30	1.00	2.0	1.20	3000	CP9152
0.25	60	0.15	1.2	1.30	4000	CP9153
0.25	60	0.25	2.0	1.30	4000	CP9154
0.25	60	0.50	4.0	1.30	3333	CP9155
0.25	60	1.00	4.0	1.30	3000	CP9156
0.32	15	0.15	0.5	1.20	3100	CP9157
0.32	15	0.25	0.5	1.10	3100	CP9158
0.32	15	1.00	1.0	1.10	2500	CP9159
0.32	30	0.10	0.5	1.20	3100	CP9160
0.32	30	0.15	0.5	1.20	3100	CP9161
0.32	30	0.25	1.0	1.20	3100	CP9162
0.32	30	1.00	2.0	1.20	2500	CP9163
0.32	60	0.15	1.2	1.20	3100	CP9164
0.32	60	0.25	2.0	1.30	2833	CP9165
0.32	60	1.00	4.0	1.30	2333	CP9166
0.53	15	1.00	2.5	1.20	1666	CP9167
0.53	30	0.10	0.5	1.20	2000	CP9168
0.53	30	0.25	1.5	1.20	2000	CP9169
0.53	30	0.50	3.0	1.20	2000	CP9170
0.53	30	1.00	5.0	1.20	1666	CP9171
0.53	30	1.50	7.5	1.20	1333	CP9172
0.53	60	1.00	5.0	1.34	1666	CP9173
0.53	60	1.50	7.5	1.30	1333	CP9174*

* Tmax-iso/Tmax-prog 265/280 °C

- CP-Sil 19 CB, medium polarity for many applications, page 131
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

VF-35ms

The Multi-purpose GC Column

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

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

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

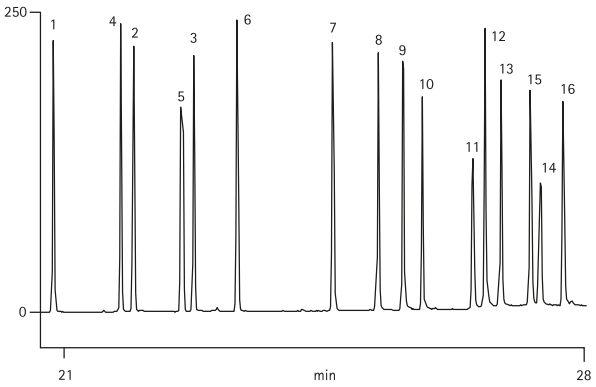
Typical Applications

Aromatic compounds, pesticides and herbicides, sterols and other substituted aromatic compounds

Organochlorine pesticides to EPA 625 via GC/MS

Peak Identification

1. α-BHC
2. β-BHC
3. δ-BHC
4. γ-BHC (lindane)
5. Heptachlor
6. Aldrin
7. Heptachlorepoxide
8. Endosulfan I
9. 4,4'-DDE
10. Dieldrin
11. Endrin
12. 4,4'-DDD
13. Endosulfan II
14. Endrin aldehyde
15. 4,4'-DDT
16. Endosulfan sulfate



Column: VF-35ms, 0.25 mm x 30 m x 0.25 µm
Carrier Gas: Helium, approx. 1.0 mL/min, 60 kPa
Temp: 45 °C + 10 °C/min to 325 °C
Injector: Split/splitless, in split mode, 1:100
Detector: Varian Ion Trap MS

Ordering Information

VF-35ms, Tmax-iso/Tmax-prog 340/360 °C, Tmin 40 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.15	10	0.15	0.50	1.2	6500	CP5887
0.15	15	0.15	0.75	1.2	6500	CP5888
0.15	20	0.15	1.00	1.2	6500	CP5889
0.20	15	0.33	2.00	1.2	4667	CP8872
0.20	25	0.33	3.00	1.2	4667	CP8873
0.25	15	0.25	1.50	1.4	3900	CP8874
0.25	30	0.10	2.00	1.3	3900	CP8875
0.25	30	0.15	2.00	1.2	3900	CP8876
0.25	30	0.25	3.00	1.2	3900	CP8877
0.25	30	0.50	6.00	1.2	3667	CP8878
0.25	30	1.00	12.00	1.2	3000	CP8879
0.25	60	0.25	6.00	1.2	4000	CP8880
0.32	15	0.25	2.00	1.2	3050	CP8881
0.32	30	0.25	3.00	1.2	3050	CP8882
0.32	30	0.50	6.00	1.2	2950	CP8883
0.32	30	1.00	12.00	1.2	2500	CP8884
0.32	60	0.25	7.00	1.2	3050	CP8885
0.53	15	1.00	6.00	1.2	1667	CP8886*
0.53	30	0.50	8.00	1.2	1667	CP8887*
0.53	30	1.00	12.0	1.2	1500	CP8888*

* Tmax-iso/Tmax-prog 325/350 °C

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

VF-17ms

The Column for Medium Polarity Applications

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

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

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

Ordering Information

VF-17ms, Tmax-iso/Tmax-prog 330/360 °C, Tmin 40 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.10	10	0.20	0.5	1.3	7800	CP8977
0.15	10	0.15	0.5	1.4	6000	CP5882
0.15	15	0.15	0.5	1.6	6000	CP5883
0.15	20	0.15	0.7	1.8	6000	CP5884
0.25	15	0.25	1.0	1.2	3333	CP8979
0.25	15	0.50	2.0	1.2	3000	CP8980
0.25	30	0.15	1.2	1.5	3667	CP8981
0.25	30	0.25	2.0	1.4	3333	CP8982
0.25	30	0.50	4.0	1.3	3000	CP8983
0.25	60	0.25	4.0	1.6	3167	CP8984
0.32	15	0.15	0.7	1.4	3333	CP8986
0.32	15	0.25	1.3	1.3	2667	CP8987
0.32	30	0.25	2.5	1.4	2667	CP8990
0.53	15	0.25	2.6	1.4	1833	CP8994
0.53	15	1.00	10.0	1.2	1400	CP8996
0.53	15	1.50	5.0	1.2	1200	CP8998*
0.53	30	0.50	10.0	1.4	1667	CP9000
0.53	30	1.00	7.0	1.3	1400	CP9001*
0.53	30	1.50	10.0	1.2	1167	CP9002*

* Tmax-iso/Tmax-prog 310/340 °C

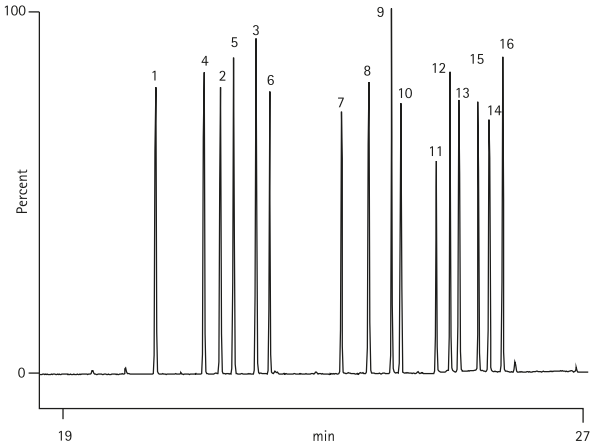
Typical Applications

Antidepressants, herbicides, pesticides

Organochlorine pesticides

Peak Identification

1. α-BHC
2. β-BHC
3. δ-BHC
4. γ-BHC (lindane)
5. Heptachlor
6. Aldrin
7. Heptachlorepoxide
8. Endosulfan I
9. 4,4'-DDE
10. Dieldrin
11. Endrin
12. 4,4'-DDD
13. Endosulfan II
14. Endrin aldehyde
15. 4,4'-DDT
16. Endosulfan sulfate



Column: VF-17ms, 0.25 mm x 30 m x 0.25 µm
Sample Size: 1 µL
Sample Conc: 200 µg/mL
Carrier Gas: Helium, 70 kPa
Injector: Splitter, 1:100
Detector: MS, Varian Ion Trap, TIC

See Also

- CP-Sil 24 CB, ideal for use with ECD, page 132
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

VF-200ms

Unique Selectivity for Polar Compounds

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

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

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

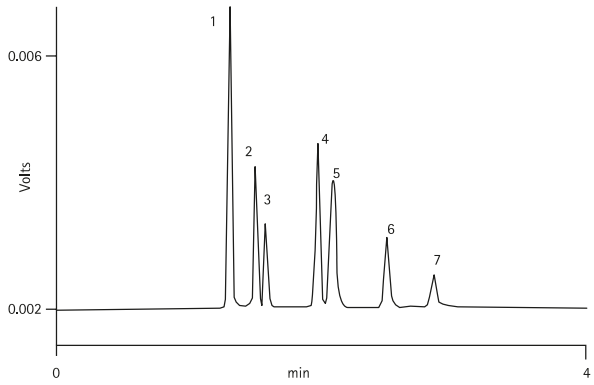
Typical Applications

Ketones, aldehydes, nitro- or chloro-containing compounds, PAHs unsaturated compounds, silanes, CFCs

Fast separation of silanes

Peak Identification

1. Vinyl-trimethyl silane
2. Dichloromethyl silane
3. Dichloromethane
4. Trimethylchloro silane
5. Pentamethyl disiloxane
6. Trichloromethyl silane
7. Dichlorodimethyl silane



Column: VF-200ms, 0.25 mm x 30 m x 1 µm
Carrier Gas: Hydrogen, ca 1.0 mL/min, 60 kPa
Temp: 50 °C
Injector: Split/splitless, in split mode, 1:100
Detector: FID

Ordering Information

VF-200ms, Tmax-iso/Tmax-prog 325/350 °C, Tmin 0 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.15	10	0.15	2.0	1.2	6500	CP5893
0.15	20	0.15	0.5	1.6	6500	CP5891
0.15	20	0.60	3.0	1.2	6000	CP5892
0.25	15	0.25	1.0	1.2	3900	CP8855
0.25	15	0.50	2.0	1.2	3500	CP8856
0.25	30	0.10	1.0	1.5	4100	CP8857
0.25	30	0.25	2.0	1.2	3900	CP8858
0.25	30	0.50	4.0	1.2	3800	CP8859
0.25	30	1.00	8.0	1.2	3500	CP8860
0.25	60	0.25	4.0	1.2	4000	CP8861
0.32	15	0.25	1.0	1.2	3050	CP8863
0.32	30	0.25	2.0	1.2	3050	CP8863
0.32	30	0.50	4.0	1.2	2950	CP8864
0.32	30	1.00	8.0	1.2	2700	CP8865
0.53	15	1.00	3.0	1.2	1667	CP8866*
0.53	30	0.50	3.0	1.2	1667	CP8867*
0.53	30	1.00	6.0	1.2	1667	CP8868*

* Tmax-iso/Tmax-prog 300/325 °C

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

VF-23ms

For Very Polar Compounds

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

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

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

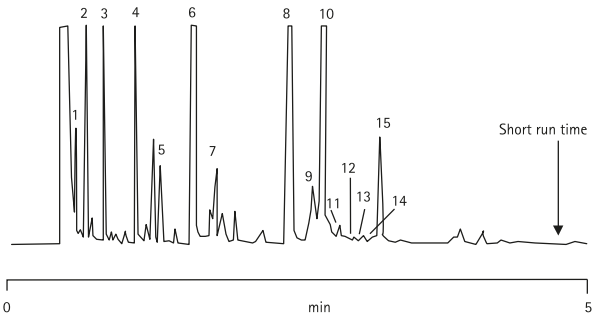
Typical Applications

FAMEs, solvents, sugars

Fast screening of FAME isomers in butter

Peak Identification

1. C8:0
2. C10:0
3. C12:0
4. C14:0
5. C14:1
6. C16:0
7. C16:1 9-cis
8. C18:0
9. C18:1 trans
10. C18:1 9-cis
11. C18:1 13-cis
12. C18:2 9-trans, 12-trans
13. C18:2 9-cis, 12-trans
14. C18:2 9-trans,12-cis
15. C18:2 9-cis, 12-cis



Column: VF-23ms, 0.25 mm x 30 m x 0.25 µm
Sample: 0.5 µL ca. 5 ng per component on column
Carrier Gas: Hydrogen, 70 kPa
Temp: 185 °C
Injector: Split, 1:100 T=275 °C
Detector: FID

Ordering Information

VF-23ms, Tmax-iso/Tmax-prog 260/260 °C, Tmin 40 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.10	10	0.10	1.0	1.5	5500	CP8819
0.15	15	0.15	1.0	1.5	3665	CP5886
0.15	20	0.15	1.0	1.5	3750	CP9042
0.15	40	0.15	1.0	1.5	3750	CP5885
0.25	15	0.25	2.0	1.4	2333	CP8820
0.25	30	0.15	2.0	2.0	2833	CP8821
0.25	30	0.25	3.0	1.5	2333	CP8822
0.25	60	0.15	4.0	2.5	2667	CP8823
0.25	60	0.25	6.0	1.7	2167	CP8824
0.32	15	0.25	2.5	1.4	1867	CP8825
0.32	30	0.15	2.5	2.0	2500	CP8826
0.32	30	0.25	4.0	1.5	1833	CP8827
0.32	60	0.15	5.0	2.5	2333	CP8828
0.32	60	0.25	8.0	1.7	1750	CP8829
0.53	15	0.50	4.0	1.3	800	CP8830*
0.53	30	0.50	8.0	1.5	733	CP8831*

* TMax-Iso/Prog 245/245 °C

See Also

- VF-WAXms, high performance wax column, page 116
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

VF-DA

Optimized for Drugs of Abuse Testing

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

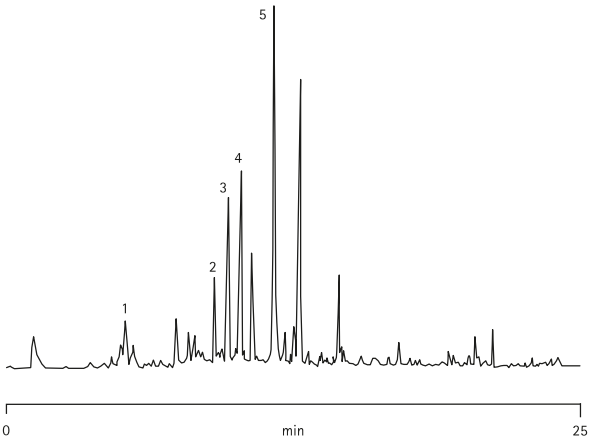
VF-DA is a unique, guaranteed low bleed FactorFour™ GC column for drugs of abuse confirmation testing. The VF-DA column has high recovery for trace components and excellent resistance to direct methanol injections. Drugs of abuse are measured in a variety of matrices. In urine, most general screenings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

Typical Applications

Drugs of abuse

Analysis of drugs of abuse in urine via GC–MS

Peak Identification
1. Amphetamine
2. MDA 3,4-methylenedioxyamphetamine
3. MDA 3,4-methylenedioxymethamphetamine
4. MDA 3,4-methylenedioxy-ethylamphetamine
5. Cotinine



Column:	VF-DA, 12 m x 0.20 mm df = optimized
Sample Size:	1 µL
Solvent:	Methanol
Carrier Gas:	He, ca 1.0 mL/min
Temp:	70 °C, 1.2 min → 200 °C, 20 °C/min, → 270 °C, 7 °C/min, → 320 °C, 20 °C/min
Pressure:	58.7 kPa, 2.2 min → 97 kPa, 58 kPa/min → 132 kPa, 3 kPa/min → 180 kPa, 12 kPa/min
Injector:	Splitless
Detector:	MS
Derivatization:	Acetic acid anhydride to form acetates

Ordering Information

VF-DA, Tmax-iso/Tmax-prog 325/350 °C, Tmin –60 °C

ID (mm)	Length (m)	df (µm)	Bleed (pA)	Asymmetry	N/M	Part No.
0.2	12	Optimized	0.75	1.1	4750	CP8964

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

CP-Sil 5 CB

Applications Across the Temperature Range

- **Extended column lifetimes to reduce replacement costs**
- **Wide application range to improve productivity**
- **Available in Fused Silica or UltiMetal™ to maximize choice**

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

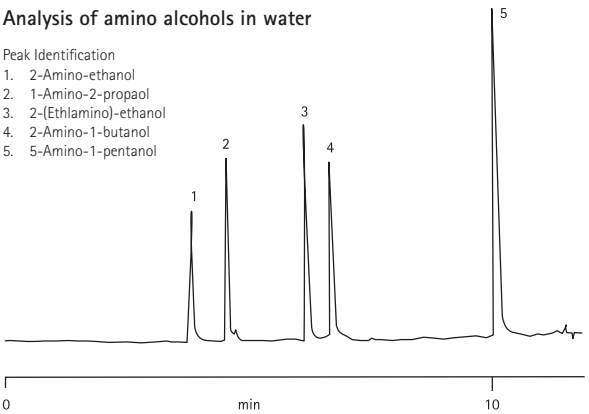
Varian's FactorFour™ columns are ultra low bleed, delivering superior responses for routine trace analysis, lower detection limits and longer column lifetimes. Selectivity of the FactorFour phases can be slightly different to standard CP-Sil polysiloxane phases.

Typical Applications

Alcohols, aromatic hydrocarbons, esters, flavors and aromas, free fatty acids, glycols, halogenated hydrocarbons, hydrocarbons, ketones, organic acids, oxygenates, PAHs, pesticides, polymers, steroids, solvents, sulfur compounds

Analysis of amino alcohols in water

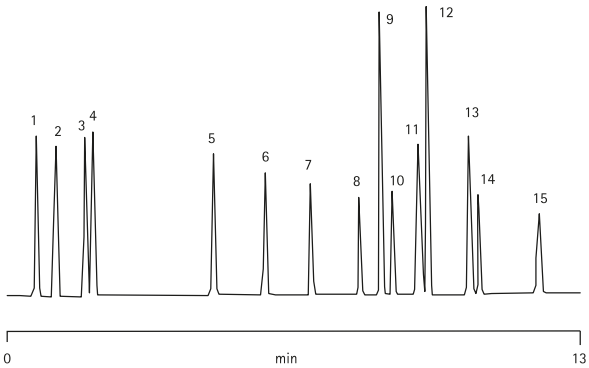
Peak Identification
1. 2-Amino-ethanol
2. 1-Amino-2-propaol
3. 2-(Ethlamino)-ethanol
4. 2-Amino-1-butanol
5. 5-Amino-1-pentanol



Column: CP-Sil 5 CB Fused Silica WCOT, 50 m x 0.53 mm, df = 2 µm
Sample Size: 0.2 µL
Sample Conc: 1 ppm
Solvent: Water
Carrier Gas: He, 0.7 mL/min, 70 kPa (0.7 bar, 9 psi)
Temp: 65 °C → 100 °C, 10 °C/min
Injector: Splitless
Detector: MS
Courtesy: Victor Berezkin and Aleksey B. Lapin, Institute of Petrochemical Synthesis, Russian academy of science, Moscow, Russia.

Fast separation of pesticides using a short 0.15 mm capillary column

Peak Identification
1. α-Hexachloro cyclohexane
2. β-Hexachloro cyclohexane
3. γ-Hexachloro cyclohexane
4. δ-Hexachloro cyclohexane
5. Heptachlor
6. Aldrin
7. Heptachlor epoxide
8. α-Endosulfan
9. p,p'-DDE
10. Dieldrin
11. β-Endosulfan
12. p,p'-DDT
13. Endosulfan sulfate
14. p,p'-DDT
15. Methoxychlor



Column: CP-Sil 5 CB Fused Silica WCOT, 5 m x 0.15 mm, df = 2 µm
Sample Size: 1.0 µL
Sample Conc: 1 ppm
Solvent: Hexane
Carrier Gas: He, 0.7 mL/min, 70 kPa (0.7 bar, 9 psi)
Temp: 110 °C (2.5 min) → 190 °C, 30 °C/min, 190 °C (0 min) → 200 °C, 5 °C/min, 200 °C (0 min) → 290 °C, 15 °C/min
Injector: Splitless
Detector: MS
Courtesy: Victor Berezkin and Aleksey B. Lapin, Institute of Petrochemical Synthesis, Russian academy of science, Moscow, Russia.

Ordering Information

CP-Sil 5 CB UltiMetal™, ID 0.53 mm, Tmax-iso/Tmax-prog 325/350 °C, Tmin –60 °C

Length (m)	df (µm)	Part No.
10	1.0	CP7120
10	2.0	CP7150
10	5.0	CP6666
25	0.5	CP7135
25	2.0	CP7160
25	5.0	CP6670
50	0.5	CP7195
50	1.0	CP7140
50	2.0	CP7170
50	5.0	CP6671

For more information, please visit www.varianinc.com/cp-sil.html or visit www.varianinc.com/products.html to place an order.

CP-Sil 5 CB

Ordering Information

CP-Sil 5 CB, Tmin –60 °C

ID (mm)	Length (m)	df (µm)	Tmax-iso (°C)	Tmax-prog (°C)	N/M	Part No.
0.10	5	0.12	330	350	8500	CP7300
0.10	10	0.10	330	350	8500	CP7311
0.10	20	0.10	330	350	7500	CP7313
0.15	10	0.12	330	350	6350	CP7684
0.15	10	2.00	325	350	4000	CP7682
0.15	25	0.12	330	350	6350	CP7694
0.15	25	1.20	325	350	5400	CP7693
0.15	25	2.00	325	350	4000	CP7692
0.20	12	0.33	325	350	4800	CP7602
0.20	15	0.20	330	350	4000	CP7604
0.20	25	0.33	325	350	4800	CP7622
0.20	30	0.80	325	350	4000	CP7633
0.20	50	0.11	330	350	5000	CP7642
0.25	10	0.12	330	350	4100	CP7700
0.25	15	0.25	330	350	4000	CP8510
0.25	25	0.25	330	350	4000	CP7441
0.25	25	0.40	325	350	3900	CP7709
0.25	25	1.20	325	350	3450	CP7670
0.25	25	0.12	330	350	4100	CP7710
0.25	30	0.10	330	350	4100	CP8710
0.25	30	0.25	330	350	4000	CP8741
0.25	30	1.00	325	350	3550	CP8770
0.25	50	0.25	330	350	4000	CP7443
0.25	50	0.40	325	350	3900	CP7719
0.25	50	0.12	330	350	4100	CP7720
0.25	60	0.25	330	350	4000	CP8743
0.25	60	1.00	325	350	3550	CP8780
0.32	10	0.12	330	350	3200	CP7730
0.32	10	1.20	325	350	2700	CP7758
0.32	15	0.10	330	350	3200	CP8529
0.32	15	0.25	325	350	3100	CP8530
0.32	15	1.00	325	350	2750	CP8540
0.32	15	5.00	300	325	1500	CP8560
0.32	25	0.12	330	350	3200	CP7740
0.32	25	0.25	325	350	3100	CP7442
0.32	25	0.40	325	350	3050	CP7739
0.32	25	0.52	325	350	3000	CP8430
0.32	25	1.20	325	350	2700	CP7760
0.32	25	5.00	300	325	1500	CP7680
0.32	30	0.25	325	350	3100	CP8742
0.32	30	1.00	325	350	2750	CP8760

Ordering Information

CP-Sil 5 CB, Tmin –60 °C continued

ID (mm)	Length (m)	df (µm)	Tmax-iso (°C)	Tmax-prog (°C)	N/M	Part No.
0.32	30	3.00	310	335	2000	CP8687
0.32	30	5.00	300	325	1500	CP8688
0.32	50	0.12	330	350	3200	CP7750
0.32	50	0.25	325	350	3100	CP7444
0.32	50	0.40	325	350	3050	CP7749
0.32	50	1.20	325	350	2700	CP7770
0.32	50	5.00	300	325	1500	CP7690
0.32	60	0.10	330	350	3200	CP8734
0.32	60	0.25	325	350	3100	CP8744
0.32	60	3.00	310	335	2000	CP8689
0.32	60	1.00	325	350	2750	CP8870
0.32	60	5.00	300	325	1500	CP8690
0.53	10	1.00	315	340	1800	CP7625
0.53	10	2.00	305	330	1600	CP7620
0.53	10	5.00	290	325	1100	CP7645
0.53	15	0.15	330	350	2000	CP8673
0.53	15	1.50	305	330	1700	CP8674
0.53	15	3.00	300	325	1400	CP8675
0.53	15	5.00	290	325	1100	CP8676
0.53	20	5.00	290	325	1100	CP8774
0.53	25	1.00	315	340	1800	CP7635
0.53	25	2.00	305	330	1600	CP7630
0.53	25	5.00	290	325	1100	CP7675
0.53	30	1.50	305	330	1700	CP8735
0.53	30	2.00	305	330	1600	CP8730
0.53	30	3.00	300	325	1400	CP8677
0.53	30	5.00	290	325	1100	CP8775
0.53	50	1.00	315	340	1800	CP7695
0.53	50	2.00	305	330	1600	CP7640
0.53	50	5.00	290	325	1100	CP7685
0.53	60	1.50	305	330	1700	CP8799
0.53	60	5.00	290	325	1100	CP8685
0.53	100	0.50	325	350	1900	CP7608
0.53	100	2.00	305	330	1600	CP7650
0.53	100	5.00	290	325	1100	CP7688

See Also

- VF-1ms, the non-polar column for accuracy and sensitivity, page 110
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

CP-Sil 8 CB

For Generic Applications

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

By incorporating 5% phenyl groups in the dimethylpolysiloxane polymer, the CP-Sil 8 CB column has a slightly higher polarity than CP-Sil 5 CB columns. This results in a better selectivity for aromatic compounds and is generally the best choice when developing a method. CP-Sil 8 CB shows excellent column-to-column reproducibility and very high column efficiencies. We recommend the UltiMetal™ column for the highest operating temperatures, and when working in rugged environments with process or portable instruments.

Varian's FactorFour™ columns are ultra low bleed, delivering superior responses for routine trace analysis, lower detection limits and longer column lifetimes. Selectivity of the FactorFour phases is comparable to standard CP-Sil polysiloxane phases.

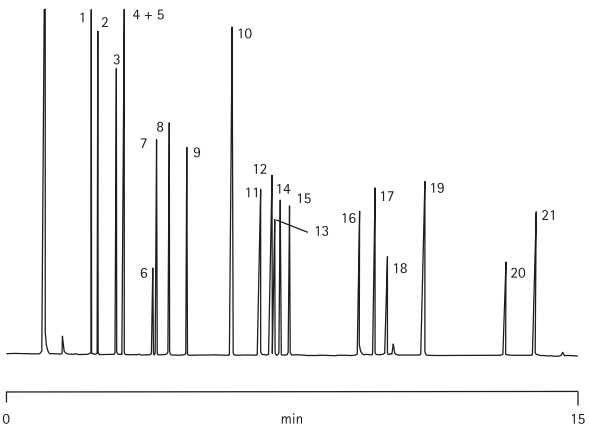
Typical Applications

Antidepressants, herbicides, pesticides

Phenols according to EPA method 8040

Peak Identification

1. Phenol
2. 2-Chlorophenol
3. o-Cresol
4. m-Cresol
5. p-Cresol
6. 2-Nitrophenol
7. 2,4-Dimethylphenol
8. 2,4-Dichlorophenol
9. 2,6-Dichlorophenol
10. 4-Chloro-3-methylphenol
11. 2,3,5-Trichlorophenol
12. 2,4,6-Trichlorophenol
13. 2,4,5-Trichlorophenol
14. 2,3,4-Trichlorophenol
15. 2,3,6-Trichlorophenol
16. 4-Nitrophenol
17. 2,4-Dinitrophenol
18. 2,3,5,6-Tetrachlorophenol
19. 2-Methyl-4,6-dinitrophenol
20. Pentachlorophenol
21. 2-Sec-butyl-4,-dinitrophenol (Dinoseb)

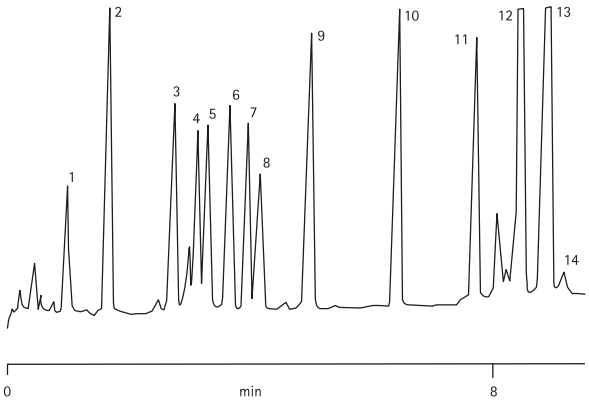


Column: CP-Sil 8 CB Fused Silica WCOT, 50 m x 0.32 mm, df = 0.2 µm
Sample Conc: 1 ppm
Carrier Gas: H_2, 150 kPa (1.5 bar, 21 psi)
Temp: 80 °C → 200 °C, 8 °C/min
Injector: Split 100 mL/min
Detector: FID

Emergency toxicology plasma extracts

Peak Identification

1. Nicotine
2. Barbital (IS)
3. Butabarbital
4. Amobarbital
5. Pentobarbital
6. Secobarbital
7. Caffeine
8. Glutethimide
9. Phenobarbital
10. Methaqualone
11. Oxazepam
12. Diazepam
13. Nordiazepam
14. Norpropoxyphene



Column: CP-Sil 8 CB Fused Silica WCOT, 10 m x 0.53 mm, df = 5 µm
Sample Size: 1 µL
Sample Conc: 1 ppm
Solvent: Methanol
Carrier Gas: He, 15 mL/min
Temp: 150 °C (0.1 min) → 300 °C, 10 °C/min
Injector: Direct
Detector: NPD
Courtesy: Robert F. Foery, DABCC Reference Laboratory, Newbury Park, California.

CP-Sil 8 CB

Ordering Information

CP-Sil 8 CB, Tmin –60 °C

ID (mm)	Length (m)	df (µm)	Tmax-iso (°C)	Tmax-prog (°C)	N/M	Part No.
0.10	20	0.10	330	350	7500	CP7319
0.15	10	0.12	330	350	6350	CP7884
0.15	10	1.20	325	350	5400	CP7885
0.15	25	0.12	330	350	6350	CP7894
0.20	12	0.33	325	350	4800	CP7900
0.20	25	0.33	325	350	4800	CP7921
0.20	50	0.33	325	350	4500	CP7941
0.20	60	0.20	330	350	4150	CP7950
0.25	15	0.25	330	350	4000	CP8511
0.25	15	1.00	325	350	3550	CP8521
0.25	25	0.25	330	350	4000	CP7451
0.25	25	1.20	325	350	3450	CP7671
0.25	25	0.12	330	350	4100	CP7711
0.25	25	0.40	325	350	3900	CP7759
0.25	30	0.25	330	350	4000	CP8751
0.25	30	1.00	325	350	3550	CP8771
0.25	50	0.25	330	350	4000	CP7453
0.25	50	0.12	330	350	4100	CP7721
0.25	50	0.40	325	350	3900	CP7769
0.25	60	0.10	325	350	1700	CP8750
0.25	60	0.25	330	350	4000	CP8753
0.25	60	1.00	325	350	3550	CP8781
0.32	10	0.12	330	350	3200	CP7731
0.32	10	5.00	300	325	1450	CP8014
0.32	15	0.25	325	350	3100	CP8531
0.32	15	1.00	325	350	2750	CP8541
0.32	25	0.25	325	350	3100	CP7452
0.32	25	5.00	300	325	1500	CP7681
0.32	25	0.12	330	350	3200	CP7741
0.32	25	1.20	325	350	2700	CP7761
0.32	25	0.40	325	350	3050	CP7779
0.32	25	0.52	325	350	3000	CP8431
0.32	30	0.25	325	350	3100	CP8752
0.32	30	1.00	325	350	2750	CP8761
0.32	30	0.10	330	350	3200	CP8791
0.32	50	0.25	325	350	3100	CP7454
0.32	50	5.00	300	325	1500	CP7691
0.32	50	0.12	330	350	3200	CP7751
0.32	50	1.20	325	350	2700	CP7771
0.32	50	0.40	325	350	3050	CP7789

Ordering Information

CP-Sil 8 CB, Tmin –60 °C continued

ID (mm)	Length (m)	df (µm)	Tmax-iso (°C)	Tmax-prog (°C)	N/M	Part No.
0.32	60	0.25	325	350	3100	CP8754
0.32	60	1.00	325	350	2750	CP8871
0.53	10	2.00	305	330	1600	CP7621
0.53	15	1.50	305	330	1700	CP8678
0.53	25	2.00	305	330	1600	CP7631
0.53	25	0.15	325	350	1800	CP7634
0.53	25	1.00	315	340	1800	CP7636
0.53	25	5.00	290	325	1100	CP7656
0.53	30	0.50	325	350	1800	CP8716
0.53	30	1.50	305	330	1700	CP8736
0.53	30	5.00	290	325	1100	CP8756
0.53	50	2.00	305	330	1600	CP7641
0.53	50	5.00	290	325	1100	CP7666
0.53	50	1.00	315	340	1800	CP7696
0.53	60	5.00	290	325	1100	CP7646
0.53	60	5.00	290	325	1100	CP7676
0.53	60	1.50	305	330	1700	CP8796

CP-Sil 8 CB UltiMetal, ID 0.53 mm, Tmax-iso/Tmax-prog 325/350 °C, Tmin –60 °C

Length (m)	df (µm)	Part No.
25	5	CP6680
50	5	CP7196

See Also

- VF-5ms, the high performance non-polar column for accuracy, page 112
- CP-Sil 5 CB, for applications across the temperature range, page 126
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

GC

CP-13 CB

Analysis of Medium Polarity Compounds With Halocarbon-sensitive Detectors

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

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

Typical Applications

Analysis of medium-polarity compounds where halocarbon-sensitive detectors are used (e.g. ECD) amines, aromatic hydrocarbons, EPA methods, fungicides, halogenated compounds, herbicides, pesticides, PCBs, phenols, phthalate esters, steroids, sugars and tranquilizers

See Also

- VF-5 Pesticides, page 114
- VF-1701 Pesticides, page 120
- Gas Clean™ Filters, page 172

Ordering Information

CP-13 CB, Tmax-iso 300 °C/Tmax-prog 330 °C, Tmin –25 °C

ID (mm)	Length (m)	df (µm)	N/M	Part No.
0.15	25	0.4	6200	CP7813
0.25	25	0.2	4100	CP7906
0.25	25	0.4	4000	CP7916
0.25	25	1.2	3500	CP7977
0.25	50	0.2	4100	CP7907
0.25	50	0.4	4000	CP7917
0.32	25	0.2	3200	CP7926
0.32	25	0.4	3100	CP7936
0.32	25	1.2	2750	CP7946
0.32	50	0.2	3200	CP7927
0.32	50	0.4	3100	CP7937
0.32	50	1.2	2750	CP7947
0.53	10	1.0	1900	CP7609
0.53	25	1.0	1900	CP7619
0.53	25	2.0	1600	CP7649
0.53	50	1.0	1900	CP7629
0.53	50	2.0	1600	CP7659
0.53	100	2.0	1600	CP7669

CP-1301

For Herbicides, Pesticides and USP Methods

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

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

Varian's FactorFour™ columns are ultra low bleed, delivering superior responses for routine trace analysis, lower detection limits and longer column lifetimes. Selectivity of the FactorFour phases can be slightly different to standard CP-Sil polysiloxane phases.

Typical Applications

Herbicides, pesticides, many pharmaceutical products

See Also

- VF-624ms, ultra low bleed for solvents, EPA and USP methods, page 119
- VF-1301ms, ultra low bleed for solvents, PCBs and pesticides, page 119
- CP-Select 624 CB, for volatile organic compounds, EPA and USP, page 154
- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-1301, Tmin –25 °C

ID (mm)	Length (m)	df (µm)	Tmax-iso (°C)	Tmax-prog (°C)	Part No.
0.25	30	1.00	265	280	CP8604
0.25	60	0.25	280	280	CP8602
0.25	60	1.00	265	280	CP8605
0.32	30	0.25	280	280	CP8607
0.32	30	1.00	265	280	CP8610
0.32	60	0.25	280	280	CP8608
0.32	60	1.00	265	280	CP8611
0.53	30	1.00	265	280	CP8613

For more information, please visit www.varianinc.com/cp-sil.html or visit www.varianinc.com/products.html to place an order.

CP-Sil 19 CB

Cyano Functional Groups Provide Alternative Selectivity

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

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

Varian's FactorFour™ columns are ultra low bleed, delivering superior responses for routine trace analysis, lower detection limits and longer column lifetimes.

Typical Applications

Trace levels of pesticide residues in food and environmental samples

Ordering Information

CP-Sil 19 CB, Tmax-iso/Tmax-prog 275/300 °C, Tmin –25 °C

ID (mm)	Length (m)	df (µm)	N/M	Part No.
0.10	10	0.20	8500	CP7331
0.15	25	0.50	4800	CP7340
0.20	25	0.20	4800	CP7360
0.20	30	1.00	3000	CP8562
0.25	10	0.20	3950	CP7702
0.25	15	0.15	4000	CP8502
0.25	25	0.20	3950	CP7712
0.25	25	0.40	3650	CP7809
0.25	25	1.20	2800	CP7672
0.25	30	0.25	3850	CP8712
0.25	50	0.20	3950	CP7722
0.25	60	0.15	4000	CP8592
0.25	60	0.25	3850	CP8722
0.32	10	0.20	3050	CP7732
0.32	25	0.20	3050	CP7742
0.32	25	0.40	2850	CP7829
0.32	25	1.20	2100	CP7762
0.32	30	0.25	3000	CP8842
0.32	30	1.00	2300	CP8762
0.32	50	0.20	3050	CP7752
0.32	50	0.40	2850	CP7839
0.32	50	1.20	2100	CP7772
0.32	60	0.15	3100	CP8662
0.32	60	0.25	3000	CP8852
0.32	60	1.00	2300	CP8772
0.53	10	2.00	1200	CP7647
0.53	15	0.50	1700	CP8663
0.53	25	1.00	1500	CP7637
0.53	25	2.00	1200	CP7657
0.53	30	1.00	1500	CP8737
0.53	50	2.00	1200	CP7667
0.53	50	1.00	1500	CP7697

See Also

- VF-Pesticides, pesticides residue analysis at pico gram levels, page 114
- VF-1701ms, trace analysis of semi-volatile organic compounds, page 120
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

CP-Sil 24 CB

The Most Polar Phenyl Column

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

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

Varian's FactorFour™ columns are ultra low-bleed, delivering superior responses for routine trace analysis, lower detection limits and longer column lifetimes.

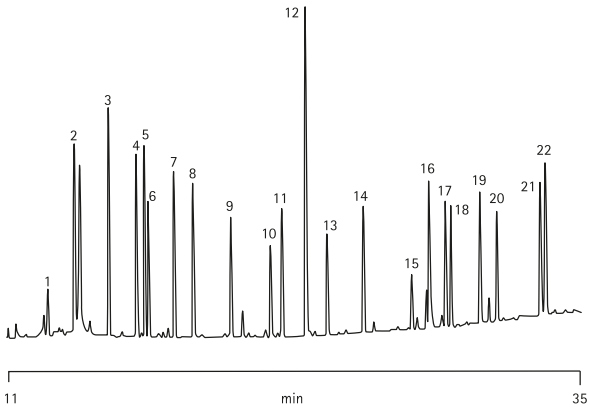
Typical Applications

Antidepressants, herbicides, pesticides

Methylated chlorophenoxycarboxylic acids

Peak Identification

1. Dibromobenzoic acid
2. 2,4-Dichlorobenzoic acid
3. Clofibric acid
4. 4-Chlorophenoxyacetic acid
5. MCPP
6. Dicamba
7. MCPA
8. 2,4-DP (dichlorprop)
9. 2,4-D
10. Triclopyr
11. 2,4,5-TP
12. MCPB + naphthylacetic acid
13. 2,4,5-T
14. 2,4-DB
15. Fluroxypur
16. Indoleacetic acid
17. Bentazon
18. Fluazifop
19. Flurenol
20. Haloxyfop
21. Benazolin
22. 3-Indolebutyric acid



Column:	CP-Sil 24 CB Fused Silica WCOT, 30 m x 0.32 mm x 0.25 µm
Carrier Gas:	H_2
Temp:	60 °C (2 min) to 150 °C, 15 °C/min, 150 °C to 280 °C, 3.5 °C/min
Injector:	Splitless 60 s followed by split of 50 mL/min, T=275 °C
Inj Vol:	<1 ng per compound
Detector:	FID, T=325 °C

Ordering Information

CP-Sil 24 CB, Tmax-iso/Tmax-prog 280/300 °C, Tmin 40 °C

ID (mm)	Length (m)	df (µm)	N/M	Part No.
0.25	15	0.25	3600	CP7820
0.25	30	0.25	3600	CP7821
0.25	30	0.50	3100	CP7824
0.25	60	0.25	3100	CP7822
0.32	30	0.25	2900	CP7831
0.32	60	0.25	2900	CP7832
0.53	15	1.00	1400	CP7870*
0.53	30	0.50	2550	CP7834
0.53	30	1.00	1400	CP7871*
0.53	60	1.00	1400	CP7872*

* Tmax-iso/Tmax-prog 265/290 °C

See Also

- VF-17ms, for medium polarity applications, page 122
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

CP-Sil 43 CB

Ideal for Derivatized Compounds

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

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

Typical Applications

FAME, halogenated compounds, phenols, pyridines

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Sil 43 CB, Tmax-iso/Tmax-prog 200/225 °C, Tmin 25 °C

ID (mm)	Length (m)	df (µm)	N/M	Part No.
0.25	25	0.2	3800	CP7715
0.25	50	0.2	3800	CP7725
0.32	10	0.2	3000	CP7735
0.32	25	0.2	3000	CP7745

CP-Sil 88

Separations of Analytes With Similar Boiling Point and Polarity

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

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

Typical Applications

Dioxins, FAME, PCBs, PCDFs, pyridines, sugars

See Also

- CP-Sil 88 for Dioxins, designed for dioxin isomers, page 152
- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Sil 88, Tmax-iso/Tmax-prog 225/240 °C, Tmin 50 °C

ID (mm)	Length (m)	df (µm)	N/M	Part No.
0.25	25	0.2	2800	CP6172
0.25	50	0.2	3800	CP6173
0.32	25	0.2	2200	CP6174
0.32	50	0.2	2200	CP6175

CP-Wax 52 CB

Higher Sensitivity for Low Boiling Point Compounds

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

The backbone of this series of wax columns is a stationary phase of polyethylene glycol. By using different functional groups, the selectivity of the polyethylene glycol is optimized. The CP-Wax family has a CP-Index of 52-58 and so the columns are relatively polar.

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

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

Typical Applications

Alcohols, aldehydes, anesthetics, antidepressants, aromatic hydrocarbons, EPA methods, esters, FAME, flavors and aromas, glycols, halogenated components, ketones, nitro compounds, PAHs, phenols, solvents, sulfur compounds

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Wax 52 CB UltiMetal, ID 0.53 mm, Tmax-iso/Tmax-prog 250/275 °C, Tmin 20 °C

Length (m)	df (µm)	Part No.
10	0.5	CP7128
10	1.0	CP7148
10	2.0	CP7177
25	0.5	CP7138
25	1.0	CP7158
25	2.0	CP7178
50	0.5	CP7198
50	1.0	CP7168
50	2.0	CP7179

Ordering Information

CP-Wax 52 CB, Tmin 20 °C

ID (mm)	Length (m)	df (µm)	Tmax-iso (°C)	Tmax-prog (°C)	Part No.
0.10	10	0.20	250	265	CP7335
0.15	15	0.15	250	265	CP7791
0.15	25	0.25	250	265	CP7792
0.20	25	0.20	250	265	CP7765
0.20	30	0.20	250	265	CP7775
0.20	50	0.20	250	265	CP7785
0.25	10	0.20	250	265	CP7703
0.25	15	0.25	250	265	CP8513
0.25	25	0.20	250	265	CP7713
0.25	25	1.20	250	265	CP7673
0.25	30	0.15	250	265	CP8745
0.25	30	0.25	250	265	CP8713
0.25	30	0.50	250	265	CP8746
0.25	50	0.20	250	265	CP7723
0.25	60	0.25	250	265	CP8723
0.25	60	0.50	250	265	CP8748
0.32	15	0.15	250	265	CP8533
0.32	15	0.25	250	265	CP8543
0.32	15	0.50	250	265	CP8553
0.32	25	0.20	250	265	CP7743
0.32	25	0.40	250	265	CP7879
0.32	25	1.20	250	265	CP7763
0.32	30	0.25	250	265	CP8843
0.32	30	0.50	250	265	CP8763
0.32	50	0.20	250	265	CP7753
0.32	50	0.40	250	265	CP7889
0.32	50	1.20	250	265	CP7773
0.32	60	0.25	250	265	CP8853
0.32	60	0.50	250	265	CP8773
0.32	60	1.20	250	265	CP8073
0.53	10	1.00	240	260	CP7628
0.53	10	2.00	230	250	CP7648
0.53	15	1.00	240	260	CP8718
0.53	25	1.00	240	260	CP7638
0.53	25	2.00	230	250	CP7658
0.53	30	1.00	240	260	CP8738
0.53	50	1.00	240	260	CP7698
0.53	50	2.00	230	250	CP7668
0.53	60	1.00	240	260	CP8798
0.53	100	2.00	230	250	CP7678

CP-Wax 57 CB

For Alcohols in Wines and Spirits

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

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

Typical Applications

Alcohols, aromatic hydrocarbons, esters, FAME, flavors and aromas, free fatty acids, glycols, halogenated compounds, ketones, organic acids, solvents

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Wax 57 CB, Tmax-iso/Tmax-prog 200/225 °C, Tmin 20 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.15	30	0.12	CP97721
0.25	25	0.20	CP97713
0.25	50	0.20	CP97723
0.25	60	0.40	CP8120
0.32	25	0.20	CP97743
0.32	25	1.20	CP97763
0.32	50	0.20	CP97753
0.32	50	1.20	CP97773
0.53	25	1.00	CP97638
0.53	25	2.00	CP97658

CP-Wax 58 FFAP CB

Analysis of Acidic Compounds

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

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

Typical Applications

FAME, flavors and aromas, free fatty acids, organic acids, phenols

See Also

- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Wax 58 FFAP CB, Tmax-iso/Tmax-prog 250/275 °C, Tmin 20 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.20	25	0.3	CP7787
0.20	50	0.3	CP7797
0.25	25	0.2	CP7717
0.25	50	0.2	CP7727
0.32	25	0.2	CP7747
0.32	25	1.2	CP7767
0.32	50	0.2	CP7757
0.32	50	0.5	CP7778
0.32	50	1.2	CP7777
0.53	15	0.5	CP7665
0.53	25	1.0	CP7614
0.53	25	2.0	CP7654
0.53	50	1.0	CP7624
0.53	50	2.0	CP7664

PLOT Columns

The Best Choice for GC Analysis of Gases and Volatiles

Varian's PLOT GC columns give you high retention for separation of gases and volatiles, delivering the best productivity. They are also available as bonded PLOT columns for enhanced column lifetime and a broader application range.

CP-PoraBOND and CP-PoraPLOT™

In Porous Layer Open Tubular (PLOT) columns the stationary phase is based on an adsorbent or porous polymer. This provides high resolution capillary gas chromatography when analyzing a wide range of gases and volatiles. Varian's PLOT columns deliver superior mechanical and temperature stability and allow for increasingly fast methods.

These styrene/divinylbenzene-based columns are ideal for the analysis of solvents and volatile compounds in the chemical, petrochemical, environmental, and pharmaceutical industries. The porous polymer exhibits unique retention characteristics, including the near perfect elution of polar and non polar volatile compounds, as well as hydrocarbons, alcohols, esters, and ketones.

Polar compounds such as methanol, acetaldehyde and ethylene oxide have very short retention times in gas or liquid chromatography but do not elute from alumina or molecular sieve adsorbents. Varian's CP-PoraBOND and CP-PoraPLOT columns elute these polar compounds as perfectly symmetrical peaks, allowing them to be analyzed together with light hydrocarbons or permanent gases. Since retention is not influenced by water in the sample, retention times are repeatable.

CP-PoraBOND and CP-PoraPLOT columns have slightly different characteristics to maximize the application range.

- Q alcohols and water, polar solvents, hydrocarbons, gases
- S ketones, esters, halogenated compounds, hydrocarbons
- U all polar volatiles, nitriles/nitro-compounds, alcohols/aldehydes, ethane/ethylene, sulfur gases, oxygen in air, ppm water in gases
- Amines ammonia, very volatile amines

EZ-GRIP™

All capillary columns from Varian are fitted with EZ-GRIP for enhanced ease-of-use. Varian's EZ-GRIP capillary column cage makes installation, coupling and operation of capillary columns user-friendly, less time-consuming, and also improves method reliability.

Bonded PLOT Application Guide

PLOT Column	Typical Applications
CP-PoraBOND Q™ CP-PoraPLOT Q	Halogenates, hydrocarbons C1-C9, oxygenated hydrocarbons, solvents. permanent gases, alcohols, glycols, fatty acids, sulfur compounds
CP-PoraPLOT Q-HT	Halogenated hydrocarbons, hydrocarbons, solvents
CP-PoraBOND U CP-PoraPLOT U	Alcohols, gases, halogenates, hydrocarbons C1-C9, ketones, solvents, sulfur compounds, halogenated compounds, hydrocarbons C1-C6, ketones, solvents
CP-PoraPLOT S	Hydrocarbons, ketones
CP-PoraPLOT Amines	Amines C1-C6
CP-Al2O3	Hydrocarbons C1-C5 and impurities in hydrocarbon mainstreams, benzene and toluene
CP-Lowox™	Trace level oxygenate impurities in gas and liquid hydrocarbon streams, prevention of catalyst contamination by oxygenates, process/on-line applications or portable GC applications (ASTM D 7059)
CP-Molsieve 5Å	Permanent gases such as H_2, O_2, CO, Ne, HD, N_2, NO, Ar, D2, CH_4, KrHT, Xe, DT, CD4, Rn, T2
CP-SilicaPLOT	COS in ethylene, freons/CFCs, hydrocarbons, propylene and sulfur gases
CP-CarboBOND™	Hydrocarbons in ethylene and trace gases in ethylene and propylene, He, Xe, CO, Ne, CH_4, CO_2, O_2/Ar, N_2, Kr, hydrocarbons C2 and C3 (ASTM D 2505)
CP-CarboPLOT P7	Separation of N_2, O_2, CO, CO_2, He, Xe, Ne, CH_4, O_2/Ar, Kr and C1-C2 hydrocarbons such as C_2H_6, C_2H_4, and C_2H_2

CP-PoraPLOT™ Q and CP-PoraPLOT Q-HT

Polar and Non-polar Volatile Compounds

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

CP-PoraPLOT Q is recommended for column switching systems that analyze polar and apolar volatile compounds. Water elutes as a sharp and quantifiable peak. In addition, retention times are repeatable, as retention is not influenced by water in the sample. CP-PoraPLOT Q-HT is the high temperature version, offering the same benefits but operating up to 290 °C.

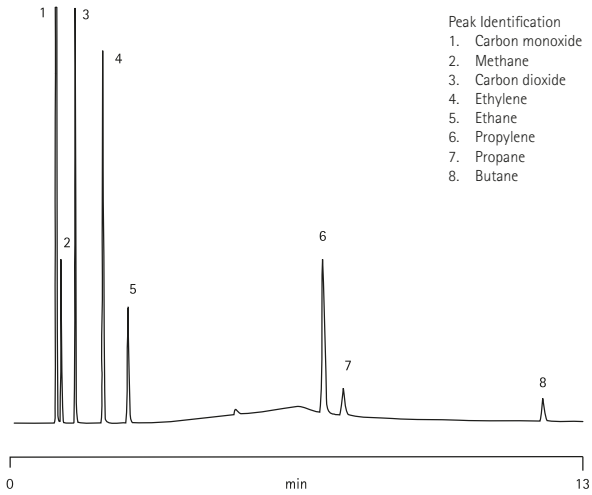
CP-PoraBOND Q™ replaces CP-PoraPLOT Q in over 95% of applications, offering higher column performance.

Typical Applications

CP-PoraPLOT Q: Halogenates, hydrocarbons C1-C9, oxygenated, hydrocarbons, solvents. permanent gases, alcohols, glycols, fatty acids, sulfur compounds

CP-PoraPLOT Q-HT: Halogenated hydrocarbons, hydrocarbons, solvents

Analysis of gases C1 to C4



Column: CP-PoraPLOT Q, 25 m x 0.53 mm, df = 20 µm
Sample Size: 50 µL
Carrier Gas: He, 65 kPA (0.65 bar, 8 psi)
Temp: 40 °C (3 min) to 150 °C, 10 °C/min
Injector: Split, 1:50, T=225 °C
Detector: TCD, T=250 °C

Ordering Information

CP-PoraPLOT Q, Tmax-iso/Tmax-prog 250/250 °C, Tmin -100 °C

ID (mm)	Length (m)	df (µm)	Tubing Material	Part No.
0.25	10	8	Fused Silica	CP7548
0.25	25	8	Fused Silica	CP7549
0.32	10	10	Fused Silica	CP7550
0.32	25	10	Fused Silica	CP7551
0.32	50	10	Fused Silica	CP7552
0.53	10	20	Fused Silica	CP7553
0.53	25	20	Fused Silica	CP7554
0.53	50	20	Fused Silica	CP7555
0.53	10	20	UltiMetal™	CP6953
0.53	25	20	UltiMetal	CP6954
0.53	50	20	UltiMetal	CP6955

CP-PoraPLOT Q-HT, Tmax-iso/Tmax-prog 290/290 °C, Tmin -100 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.32	10	10	CP7556
0.32	25	10	CP7557
0.53	10	20	CP7558
0.53	25	20	CP7559

See Also

- CP-PoraBOND Q, analysis of halogenates and hydrocarbons, page 148
- Particle traps, eliminate detector spiking, page 141
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

CP-PoraBOND Q™

Analysis of Halogenates and Hydrocarbons C1 – C9

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

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

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

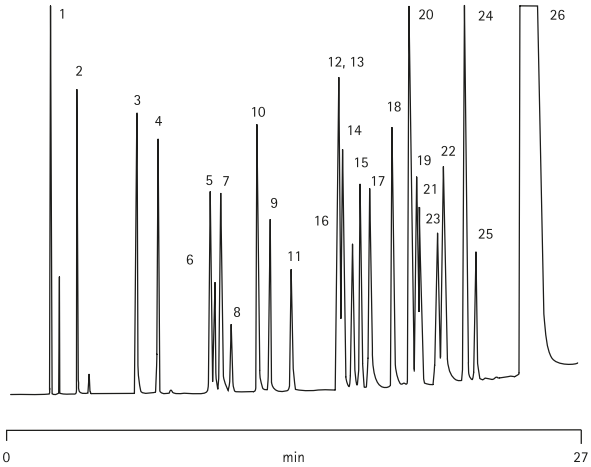
Typical Applications

Halogenates, hydrocarbons C1-C9, oxygenated hydrocarbons, solvents, permanent gases, alcohols, glycols, fatty acids, sulfur compounds

Analysis of solvents

Peak Identification

1. Methane
2. Methanol
3. Ethanol
4. Acetonitrile
5. Acetone
6. Dichloromethane
7. 2-Propanol
8. Dimethyl sulfide
9. Diethyl ether
10. 1-propanol
11. Pentane
12. 2-Butanone
13. Trichloromethane
14. Tetrahydofuran
15. Ethyl acetate
16. 2-Methoxyethanol
17. Isobutanol
18. Butanol
19. Hexane
20. Benzene
21. Trichloroethylene
22. Cyclohexane
23. 1,4-Dioxane
24. Pyridine
25. N,N-dimethylformamide
26. Dimethyl sulfoxide



Column: CP-PoraBOND Q, 25 m x 0.53 mm, df = 10 µm
Sample Size: 5 µL
Sample Conc: 0.1% per compound
Carrier Gas: He, 25 kPa (0.25 bar, 3.5 psi)
Solvent: DMSO
Temp: 100 °C (2 min) to 300 °C, 5 °C/min
Injector: Split, T=250 °C
Detector: FID, T=250 °C

Ordering Information

CP-PoraBOND Q, Tmax-iso/Tmax-prog 300/320 °C, Tmin –100 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	10	3	CP7347
0.25	25	3	CP7348
0.32	10	5	CP7350
0.32	25	5	CP7351
0.32	50	5	CP7352
0.53	10	10	CP7353
0.53	25	10	CP7354
0.53	50	10	CP7355

CP-PoraBOND Q replaces CP-PoraPLOT™ Q in more than 95% of applications, offering higher column performance.

See Also

- CP-PoraPLOT Q, for analysis of polar and non-polar compounds, page 147
- CP-PoraBOND U, for analysis of polar compounds, page 149
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

CP-PoraBOND U

For Polar Volatile Compound Analysis

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

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

Tip

Did you know that the lifetime of your column is twice as long if you work 20 °C below the maximum temperature rating?

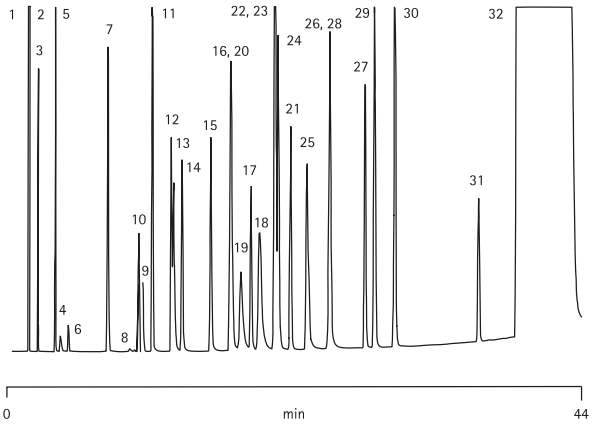
Typical Applications

Alcohols, gases, halogenates, hydrocarbons C1-C9, ketones, solvents, sulfur compounds

Residual solvents to USP467

Peak Identification

1. Methane
2. Ethane
3. Propane
4. Isobutane
5. Methanol
6. Butane
7. Ethanol
8. Isopentane
9. Pentane
10. Dichloromethane
11. Diethylethter
12. Acetonitrile
13. Isopropanol
14. Acetone
15. Propanol
16. Tetrahydrofurane
17. Hexane
18. Cyclohexane
19. Methyl-isobutyl ketone
20. Trichloromethane
21. 2-Butanone
22. Ethylacetate
23. Benzene
24. Trichloroethylene
25. Isobutanol
26. 1,4-Dioxane
27. Heptane
28. Butanol-1
29. Pyridine
30. Toluene
31. N,N-dimethylformamide
32. Dimethylsulfoxide



Column: CP-PoraBOND U, 25 m x 0.32 mm, df = 7µm
Sample Size: 1 µL
Sample Conc: 0.05% per compound
Solvent: DMSO
Carrier Gas: He, 70 kPa (0.7 bar, 10 psi)
Temp: 100 °C (2 min) to 300 °C, 5 °C/min
Injector: Split, T=250 °C
Detector: FID, T=250 °C

Ordering Information

CP-PoraBOND U, Tmax-iso/Tmax-prog 300/300 °C, Tmin –100 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	10	3	CP7347

See Also

- CP-PoraPLOT™ Q, for analysis of polar and non-polar compounds, page 147
- CP-PoraBOND Q™, for analysis of polar compounds, page 148
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

CP-PoraPLOT™ U and CP-PoraPLOT S

For Halogenates, Hydrocarbons and Ketones

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

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

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

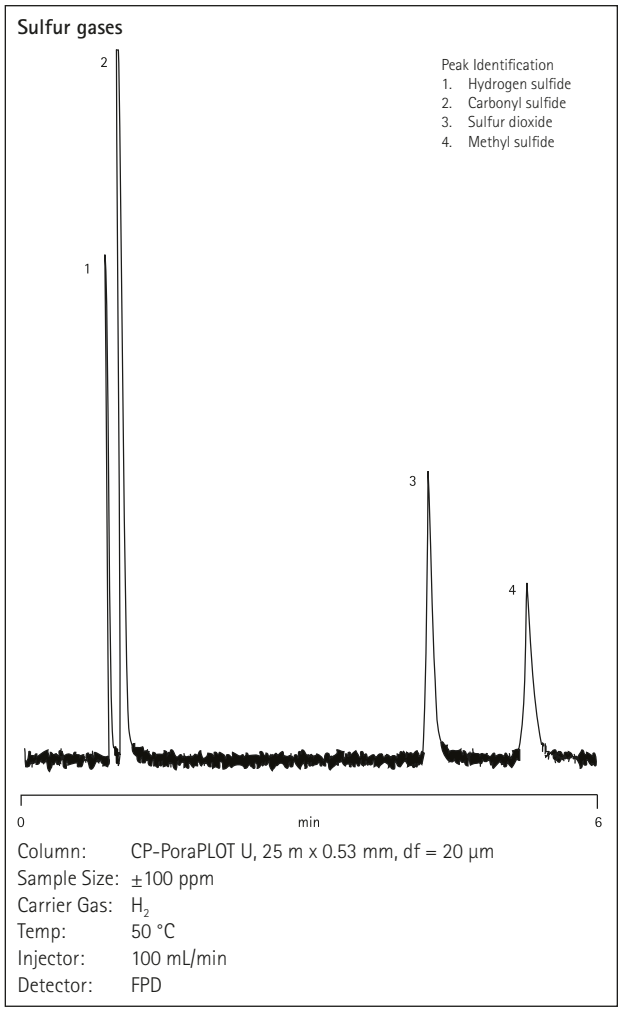
Tip

Did you know that pressure pulses can damage PLOT columns?

Typical Applications

CP-PoraPLOT U: Alcohols, gases, halogenates, hydrocarbons C1-C9, ketones, solvents, sulfur compounds, halogenated compounds, hydrocarbons C1-C6, ketones, solvents

CP-PoraPLOT S: Hydrocarbons, ketones



Ordering Information

CP-PoraPLOT U, Tmax-iso/Tmax-prog 190/190 °C, Tmin -100 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	25	8	CP7579
0.32	10	10	CP7580
0.32	25	10	CP7581
0.53	10	20	CP7583
0.53	25	20	CP7584

CP-PoraPLOT S, Tmax-iso/Tmax-prog 250/250 °C, Tmin -100 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.53	25	20	CP7574

See Also

- CP-PoraBOND U, higher Tmax and lower bleed, page 149
- Particle traps, eliminate detector spiking, page 141
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

CP-PoraPLOT™ Amines and Particle Traps

CP-PoraPLOT: For High Retention of Very Volatile Amines

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

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

See Also

- Particle traps, eliminate detector spiking, page 141
- CP-Volamine, optimized for separation of volatile amines, page 159
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-PoraPLOT Amines, Tmax-iso/Tmax-prog 220/220 °C, Tmin -100 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.32	25	10	CP7591
0.32	25	20	CP7594

Particle Traps: Protect Your Investment

- **Eliminate detector spiking to preserve performance**
- **Easy connection between column and detector**
- **Available for Fused Silica and UltiMetal™ columns for many applications**

Fit a high performance particle trap between your PLOT column and detector to prevent detector spiking and increase column lifetime.

See Also

- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

Particle Traps for PLOT Columns, 2.5 m long

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

* Includes CP-UltiMetal Connector

Particle Trap Connectors for PLOT Columns

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

CP-Al2O3

For Impurities in C1 – C5 Main Streams

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

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

Selectivity Through KCl or Na_2SO_4 Deactivation

Aluminum oxide PLOT columns are deactivated using very small salt crystals, providing a reproducible and stable deactivation up to 200 °C. Depending on the type of deactivation salt, the CP-Al2O3 PLOT Column will show a particular selectivity. The KCl salt results in a relatively apolar Al_2O_3 surface, while Na_2SO_4 deactivation provides a polar surface. Unsaturated compounds such as ethylene and acetylene (ethyne) are retained for longer.

Available in Fused Silica and UltiMetal™

UltiMetal columns are especially suited for applications in rugged environments, such as field or process, and where higher temperatures are needed.

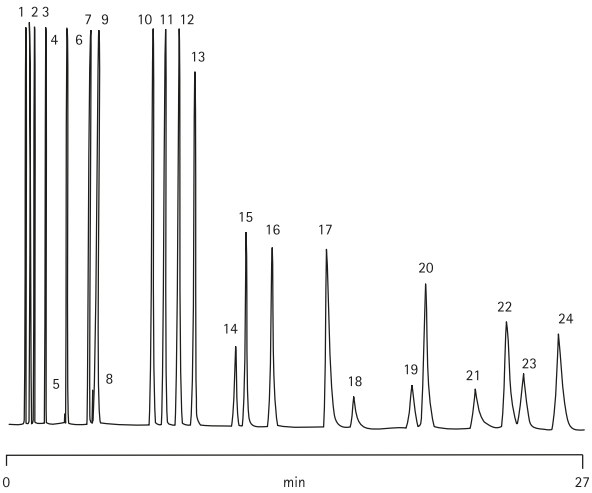
Typical Applications

Hydrocarbons C1-C5 and impurities in hydrocarbon mainstreams, benzene and toluene

Analysis of solvents

Peak Identification

1. Methane
2. Ethane
3. Ethylene
4. Propane
5. Cyclopropane
6. Propylene
7. Isobutane
8. Propadine
9. n-Butane
10. *Trans*-2-butane
11. 1-butane
12. Isobutane
13. *Cis*-2-butane
14. Cyclopentane
15. Isopentane
16. n-Pentane
17. 1.3-Butane
18. Propyne
19. Cyclopentene
20. *Trans*-2-pentene
21. 2-Methyl-2-butene
22. 1-Pentene
23. 2-Methyl-1-butene
24. *Cis*-2-pentene



Column: CP-Al2O3/Na2SO4, 25m x 0.32 mm, df = 10 µm
Sample Conc: 0.05% per compound
Carrier Gas: He, 50 kPa (0.5 bar, 7 psi) 23 cm/s
Temp: 120 °C
Injector: Split, T=225 °C
Detector: FID, T=250 °C

See Also

- Particle traps, eliminate detector spiking, page 141
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Al2O3/KCl, Tmax-iso/Tmax-prog 200/200 °C, Tmin –100 °C

ID (mm)	Length (m)	Df (µm)	Tubing Material	Part No.
0.25	25	4	Fused Silica	CP7586
0.25	50	4	Fused Silica	CP7587
0.32	10	5	Fused Silica	CP7561
0.32	50	5	Fused Silica	CP7565
0.53	25	10	Fused Silica	CP7567
0.53	50	10	Fused Silica	CP7568
0.53	50	10	UltiMetal	CP6968

Ordering Information

CP-Al2O3/Na2SO4, Tmax-iso/Tmax-prog 200/200 °C, Tmin –100 °C

ID (mm)	Length (m)	Df (µm)	Tubing Material	Part No.
0.25	25	4	Fused Silica	CP7576
0.25	50	4	Fused Silica	CP7577
0.32	10	5	Fused Silica	CP7511
0.32	25	5	Fused Silica	CP7515
0.32	50	5	Fused Silica	CP7519
0.53	25	10	Fused Silica	CP7516
0.53	10	10	Fused Silica	CP7517
0.53	25	10	Fused Silica	CP7518
0.53	50	10	UltiMetal	CP6918

CP-Lowox™

Measurement of Oxygenated Compounds

- **Unique selectivity for a wide range of oxygenates maximizes flexibility**
- **No particle loss preserves detector performance**
- **Suitable for process applications – take the lab to the sample**

CP-Lowox offers a unique solution to the chemical and petrochemical industries. It is now possible to analyze trace level oxygenate impurities in gas and liquid hydrocarbon streams. It is this high polarity that makes the column ideal for the measurement of oxygenated compounds. CP-Lowox can be used for the prevention of catalyst contamination by oxygenates, process/on-line applications or portable GC applications (ASTM D 7059).

CP-Lowox is designed for the accurate analysis of ppm/ppb level oxygenates in C1-C10 hydrocarbons. It has extremely high polarity and column stability, with a Tmax of 350 °C, and high selectivity for a wide range of oxygenates from methanol to butyl hydroxide. Varian's PLOT technology delivers very high column stability and so CP-Lowox is ideal for valve switching and on-line process applications.

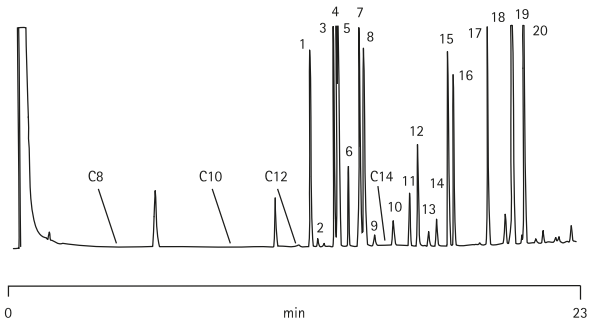
Typical Applications

Trace level oxygenate impurities in gas and liquid hydrocarbon streams, prevention of catalyst contamination by oxygenates, process/on-line applications or portable GC applications (ASTM D 7059)

Analysis of oxygenates in a C1 to C5 hydrocarbon mix

Peak Identification

1. Acetaldehyde
2. Diethyl ether
3. Ethyl tert-butyl ether
4. Methyl tert-butyl ether
5. Diisopopyl ether
6. Propionaldehyde (propanol)
7. Tert-amyl methyl ether
8. Dipropyl ether
9. Isobutyraldehyde
10. Butyraldehyde
11. Methanol
12. Acetone
13. Isovaleraldehyde
14. Valeraldehyde
15. 2-Butanone
16. Ethanol
17. 1-Propanol
18. 2-Methyl-1-propanol (isobutanol)
19. 2-Methyl-2-propanol (tert-butanol)
20. 1-Butanol



Column: CP-Lowox, 10 m x 0.53 mm, df = 10 µm
Sample Size: 1 µL
Sample Conc: 0.01% per compound
Solvent: Cyclohexane
Carrier Gas: He, 28.8 kPa (0.288 bar, 4.1 psi)
Temp: 50 °C (5 min) to 240 °C, 10 °C/min
Injector: Split, T - 250 °C
Detector: FID, T=250 °C

Ordering Information

CP-Lowox, Tmax-iso/Tmax-prog 350/350 °C, Tmin 0 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.53	10	10	CP8587

See Also

- Particle traps, eliminate detector spiking, page 141
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

CP-Molsieve 5Å

Fast Analysis of Permanent Gases

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

This molecular-sieve coated capillary column is especially valuable when separating permanent gases. Analysis times are reduced by up to 75% compared to packed columns. On the CP-Molsieve 5Å, baseline separation of Ar/O_2 is achieved at ambient temperatures. The column's thin layer dimensions produce fast elution of CO with symmetrical peaks. High resolution analysis of permanent gases is assured.

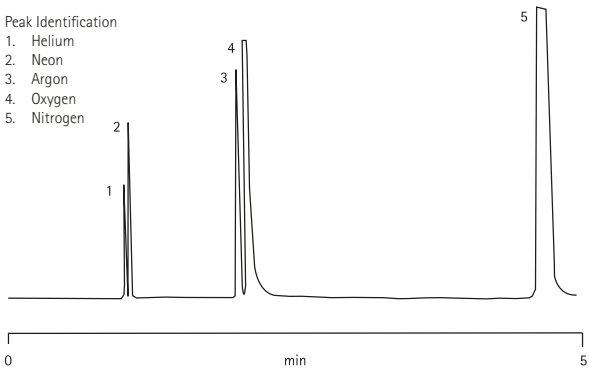
Available in Fused Silica and UltiMetal™

UltiMetal columns are especially suited for applications in rugged environments, such as field or process, and where higher temperatures are needed.

Typical Applications

Permanent gases such as H_2, O_2, CO, Ne, HD, N_2, NO, Ar, D2, CH_4, KrHT, Xe, DT, CD4, Rn, T2

Permanent gases on a thick film Molsieve column



Column: CP-Molsieve 5A Fused Silica PLOT, 25 m x 0.53 mm; df = 50 µm
Sample Size: 10 µL
Sample Conc: % range
Carrier Gas: H_2
Temp: 30 °C
Injector: Split, 100 mL/min
Detector: TCD

Ordering Information

CP-Molsieve 5Å, Tmax-iso/Tmax-prog 350/350 °C, Tmin –200 °C

ID (mm)	Length (m)	df (µm)	Tubing Material	Part No.
0.25	25	30	Fused Silica	CP7533
0.32	10	30	Fused Silica	CP7535
0.32	25	30	Fused Silica	CP7536
0.32	30	10	Fused Silica	CP7534
0.32	50	30	Fused Silica	CP7540
0.53	10	50	Fused Silica	CP7537
0.53	15	15	Fused Silica	CP7543
0.53	25	50	Fused Silica	CP7538
0.53	30	15	Fused Silica	CP7544
0.53	50	50	Fused Silica	CP7539
0.53	10	50	UltiMetal	CP6937
0.53	25	50	UltiMetal	CP6938

See Also

- Select Permanent Gases, single run solution for CO_2, page 157
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

For more information, please visit www.varianinc.com/plot.html or visit www.varianinc.com/products.html to place an order.

CP-SilicaPLOT

High Selectivity of C1–C4 Isomers in Water

- **No influence of water on retention times for robust methodology**
- **Elution of CO_2 and sulfur gases at ppm levels for improved productivity**
- **Separates cyclopropane from propylene for accurate results**

CP-Silica PLOT brings the benefits of capillary PLOT columns (higher efficiency and faster analysis time) to many applications that previously could only be done by packed columns. It is ideal for COS in ethylene, freons/CFCs, hydrocarbons, propylene and sulfur gases. The column offers high selectivity of C1-C4 isomers in the presence of water, with water having no influence on retention times. CP-SilicaPLOT elutes CO_2 and sulfur gases at ppm levels and separates cyclopropane from propylene. Decomposition of pentadienes or CFCs is absent.

Examples of new application areas include process/on-line, portable GC and hydrocarbon samples containing water or other polar compounds. The stable retention times of CP-SilicaPLOT make it ideal for laboratory and process methods.

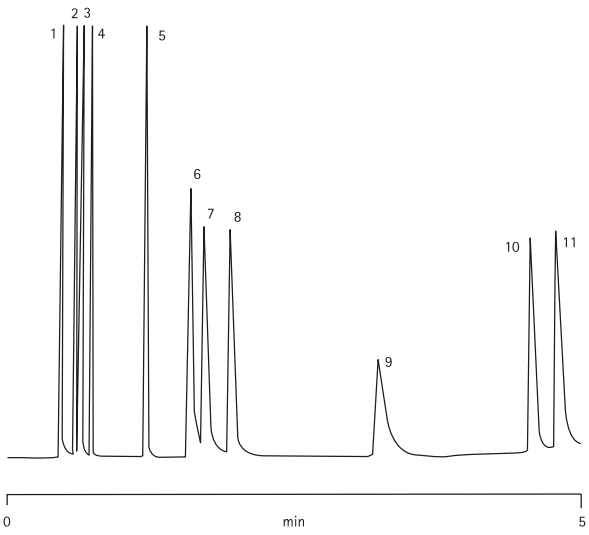
Typical Applications

COS in ethylene, freons/CFCs, hydrocarbons, propylene, sulfur gases

Halogenated hydrocarbons C1 – C2

Peak Identification

1. Unretained
2. CFC 116
3. CFC 13
4. CFC 23
5. CFC 32
6. CFC 125
7. CFC 143A
8. CFC 22
9. CFC 134A
10. CFC 152A
11. CFC 124



Column: CP-SilicaPLOT Fused Silica PLOT, 30 m x 0.53 mm; df = 6 µm
Sample Size: 500 µL
Sample Conc: 2 vol. % in air
Carrier Gas: He, 40 kPa (0.4 bar, 7.2 pe)
Temp: 50 °C (15 min) → 120 °C, 10 °C/min
Injector: Splitter, split flow 53 mL/min (split ratio 1:14)
Detector: TCD
Courtesy: J. Stoel, Dupont de Nemours Nederland, Dordrecht, The Netherlands.

Ordering Information

CP-SilicaPLOT, Tmax-iso/Tmax-prog 225/225 °C, Tmin -80 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	30	3	CP8564
0.25	60	3	CP8565
0.32	10	4	CP8574
0.32	15	4	CP8566
0.32	30	4	CP8567
0.32	60	4	CP8568
0.53	30	6	CP8570
0.53	60	6	CP8571

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

CP-CarboBOND™ and CP-CarboPLOT P7

Simplified Solutions for ASTM D 2505

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

These are carbon-based PLOT columns. Both offer a simplified solution for ASTM D 2505, which describes the measurement of ppm CO and CO_2 in ethylene and propylene streams. Compared to a multi-packed column system, the analysis is performed on a single column, providing higher sample throughputs and reduced system maintenance.

CP-CarboBOND

For hydrocarbons in ethylene and trace gases in ethylene and propylene, He, Xe, CO, Ne, CH_4, CO_2, O_2/Ar, N_2, Kr, and hydrocarbons C2 and C3 (ASTM D 2505). The bonded CP-CarboBOND offers significant improvement in column stability with a Tmax of 300 °C. This means that cycle times can be reduced by speeding up the elution of high boiling contaminants. Retention times are repeatable because water has no influence on retention. The high stability of this bonded PLOT column means that it is equally suited for both laboratory and online applications.

CP-CarboPLOT P7

For the separation of N_2, O_2, CO, CO_2, He, Xe, Ne, CH_4, O_2/Ar, Kr and C1-C2 hydrocarbons such as C_2H_6, C_2H_4, and C_2H_2. CP-CarboPLOT is recommended in cases where air or oxygen are present. The high separation efficiency of the column is revealed in the separation of CO from the nitrogen peak, allowing CO to be determined at ppm levels. Because the CP-CarboPLOT P7 column exhibits a specific retention for CO and CO_2, it is possible to analyze both compounds in one run in the presence of air, saving time and improving productivity.

Typical Applications

CP-CarboBOND: Hydrocarbons in ethylene and trace gases in ethylene, propylene, He, Xe, CO, Ne, CH_4, CO_2, O_2/Ar, N_2, Kr, hydrocarbons C2, C3 (ASTM D 2505)

CP-CarboPLOT P7: Separation of N_2, O_2, CO, CO_2, He, Xe, Ne, CH_4, O_2/Ar, Kr and C1-C2 hydrocarbons such as C_2H_6, C_2H_4, C_2H_2

Ordering Information

CP-CarboBOND, Tmax-iso/Tmax-prog 200/300 °C, Tmin -100 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.53	25	5	CP7371
0.53	25	10	CP7374
0.53	50	5	CP7372
0.53	50	10	CP7375

CP-CarboPLOT P7, Tmax-iso/Tmax-prog 115/115 °C, Tmin -200 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.53	10	25	CP7513
0.53	25	25	CP7514

See Also

- Particle filters, protect your PLOT column, page 141
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Varian Select™ GC Columns

GC Columns for Specific Applications

Our Select application-specific phases make it easy to optimize your choice of column. They provide excellent reproducibility that delivers consistent results for more reliable data. Varian Select is an ever expanding range that continues to meet new application challenges.

Varian's Select line complements our ultra low bleed FactorFour™ and PLOT columns. Our Select columns provide separation solutions and offer guaranteed performance for specific methods and applications. All Varian application-specific columns are manufactured and tested using stringent quality assurance to ensure they meet the exact demands for their specific application. Due to these strict specifications, column-to-column reproducibility is high, ensuring consistent results. Varian's Select columns are designed to meet the needs of scientists working with environmental, food and fragrance, chemical, and chiral applications.

We also make custom capillary columns with the lengths and film thicknesses you need. If you have questions about one of Varian's Select columns, or which one to select for your specific application, please feel free to contact your local Varian office.

Our columns are fitted with EZ-GRIP™ as standard for easy handling.

Varian Select GC Columns for Specific Applications

Environmental Applications	Varian Select Column	Components & Range	Standard Method
Cresylic acids	CP-Cresol	Cresols, cresylic acids and related compounds	
Dioxin isomers	CP-Sil 88 for Dioxins	Dioxins and dibenzo furan	DIN 51277
Halocarbons	CP-Select 624 CB	Halogenated hydrocarbons and solvents	EPA 624
Halocarbons	CP-Sil 13 CB for Halocarbons	Halogenated hydrocarbons and solvents	EPA 2, EPA 524, EPA 624, EPA 8015
Total petroleum hydrocarbons, mineral oil	Select Mineral Oil	C5-C40 hydrocarbons, total petroleum hydrocarbons	
PAH	CP-Sil PAH CB UltiMetal™	C5-C80, PAH and polar compounds	DIN 453, DIN-EN-ISO 93377-2, EPA 610
PCB	CP-Select 28/31	High speed PCB screening	DIN 51527
Pesticides	CP-Sil 5/C18 CB for PCB	PCB, detailed analysis	DIN 51527

Chiral Applications	Varian Select Column	Components and Range	Standard Method
Amino acid enantiomers	CP-Chirasil Val	Amino acids, optical isomers	
Optical isomers	CP-Cyclodextrin-β-2,3,6-M-19	Optical isomers of acids, alcohols, amino acids, aromatic hydrocarbons, diols, flavor, aromes, ketones, organic acids and phenols	
Optical isomers	CP-Chirasil-DEX CB	Optical isomers of acids, alcohols, amino acids, aromatic hydrocarbons, diols, flavor, aromes, ketones, organic acids and phenols	

Varian Select™ GC Columns

Varian Select GC Columns for Specific Applications Continued

Chemical Applications	Varian Select Column	Components and Range	Standard Method
Alcohols in gasoline	CP-TCEP for Alcohols in Gasoline	C1-C6 alcohols, aromatic C6-C10	
Amines	CP-Sil 8 CB for amines	C3-C20 amines, alkanol amines	
Amines	CP-Volamine	C1-C6 amines, alcohols, NH3, water, solvents, ethanol amines	
Amines	CP-Wax for Volatile Amines and Diamines	C3-C8 amines & diamines	
Amines	CP-Wax 51 for Amines	C4-C10 amines, diamines and aromatic amines	
Biodiesel	Biodiesel for Glycerides	Glycerides	ASTM D 6584, EN-14105, EN-14103,
Biodiesel	Biodiesel for FAME	FAME	EN-14106, EN-14110
Biodiesel	Biodiesel for Methanol	Methanol	
Glycols, diols and alcohols	CP-Wax 57 CB for Glycols and Alcohols	C1-C10 alcohols and solvents	EPA 607
Hydrocarbons	CP-Squalane	C1-C12 hydrocarbons	
Methyl acetylene and propadiene	Select Al2O3 MAPD	C1-C10 hydrocarbons	
MTBE in reformulated gasolines	CP-Select CB for MTBE	Oxygenates and solvents	
Permanent gases and CO_2	Select Permanent Gases/CO_2	H_2, He, O_2, Av, N_2, CO, CH_4, C_2H_6, CO_2, C_2H_4, C_2H_2	EPA 601, EPA 602
PONA	CP-Sil PONA CB	Paraffins, aromatics, naphthenes and olefins C4-C20	ASTM D 5134-90
Propylene oxide	CP-Propox	Volatile oxygenates and halogenated hydrocarbons	
Silanes	Select Silanes	Polar and non-polar volatile compounds, especially chlorosilanes with different substituents such as alkyl groups, or groups with ether, hydroxy and nitrile bonds	
Simulated distillation	CP-SimDist Fused Silica	C5-C100 SimDist	ASTM D 2887
Simulated distillation	CP-SimDist UltiMetal™	C5-C120 SimDist	ASTM D 2887, extended SimDist methods
Volatile sulfur compounds	CP-Sil 5 CB for Sulfur	Hydrogen, sulfide, carbonyl sulfide, methanethiol, ethanethiol and thiophenes in LPG	
Xylene isomers	CP-Xylenes	Xylenes & aromatic compounds up to C11	
Oxygenates	CP-Lowox™	Oxygenates in C1-C10 hydrocarbons	
Formaldehyde	CP-Sil 5 CB for formaldehyde	Methanol, formaldehyde and formic acid in water	

Food & Beverage Applications	Varian Select Column	Components and Range	Standard Method
Volatiles in alcoholic beverages	CP-Carbowax 400 for volatiles in alcohol	Volatiles	
FAME	Select FAME	FAME up to C26, cis, trans, fast resolution FAME	
FAME	CP-Sil 88 for FAME	Best separation for cis, trans FAME up to 260 °C	
Free fatty acids in dairy products	CP-FFAP CB	Flavors, aromas, free fatty acids C1-C26	
Mineral oil	Select Mineral Oil	C5-C40 hydrocarbons	
Triglycerides	CP-TAP CB for triglycerides	Unsaturated triglycerides	

Columns are on 7 in. cages. For 5 in. cages, add 15 to the end of the part number, e.g. CPxxxx15. Columns on 5 in. cages fit GCs with small column ovens, and will attach to our 7 in. EZ-GRIP™ cage for dual-column configurations. We manufacture custom columns in virtually any size. For column dimensions not shown here, please contact your nearest Varian, Inc. office or distributor.

Select Biodiesel

Dedicated for Biodiesel Analysis

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

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

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

Ordering Information

Description	ID (mm)	Length (m)	df (µm)	Part No.
Select Biodiesel for Glycerides UltiMetal with Retention Gap	0.32	15	0.10	CP9078
Select Biodiesel for Glycerides UltiMetal	0.32	15	0.10	CP9079
Select Biodiesel for Glycerides UltiMetal with Retention Gap	0.32	10	0.10	CP9076
Select Biodiesel for Glycerides UltiMetal	0.32	10	0.10	CP9077
Select Biodiesel for FAME Fused Silica	0.32	30	0.25	CP9080
Select Biodiesel for Methanol Fused Silica	0.32	30	3.00	CP9083
UltiMetal Retention Gap, (methyl deactivated)	0.53	2		CP6530

Technical Specifications

Method	Analytes	Varian Column	Injector Type	Varian GC	Analysis Time (min)
ASTM D 6584	Free and total glycerine	Select Biodiesel for Glycerides	On-column	450-GC	32
EN-14103	Ester and linoleic acid methyl esters	Select Biodiesel for FAME	Split/splitless	430-GC or 450-GC	30
EN-14105	Free and total glycerine; mono, di and tri-glycerides	Select Biodiesel for Glycerides	On-column	450-GC	35
EN-14106	Free glycerol	Select Biodiesel for Glycerides	Split/splitless	430-GC or 450-GC	10
EN-14110	Methanol	Select Biodiesel for Methanol	Headspace with split/splitless	430-GC or 450-GC	10

See also

- VF-5ht UltiMetal, high temperature GC up to 450 °C, page 115
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Select Al2O3 MAPD

For Acetylene, Methyl Acetylene and Propadiene

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

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

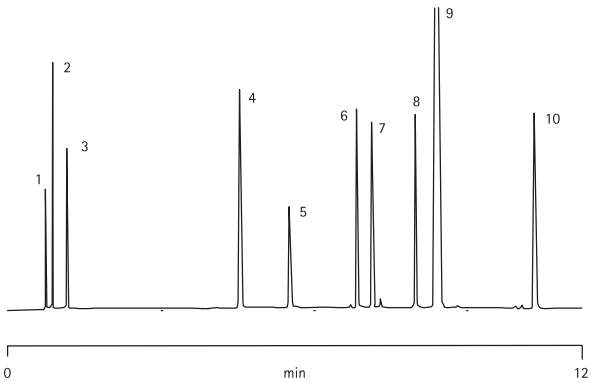
Tip

To minimize the effects of water, use Varian Gas Clean™ Filters and condition the column for 20 minutes at 200 °C.

Analysis of acetylenes mixture

Peak Identification

1. Methane
2. Ethane
3. Ethylene
4. n-Butane
5. Propadiene
6. 1-Butene
7. Iso-butene
8. 1,2-Butadiene
9. 1,3-Butadiene
10. Ethyl acelytene



Column: Select Al2O3 MAPD, Fused Silica, 50 m x 0.53 mm
Sample Conc: Approx 100 ppm in nitrogen, synthetic standard
Carrier Gas: Helium, 4 psig, 4 min → 11 psig, 0.5 psig/min, 2 min
Temp: 40 °C, 5 min → 160 °C, 10 °C/min → 200 °C, 20 °C/min, hold 1 min
Injector: Split 60 mL/min
Detector: FID
Courtesy: J. Luong, Dow Chemical Canada.

Ordering Information

Select Al2O3 MAPD, Tmax-iso/Tmax-prog 200/200 °C

ID (mm)	Length (m)	Part No.
0.32	50	CP7431
0.53	25	CP7433
0.53	50	CP7432

See also

- Gas Clean Filters, for ultimate column performance and longevity, page 172

For more information, please visit www.varianinc.com/select.html or visit www.varianinc.com/products.html to place an order.

Select Silanes

Optimized for Silane Analysis

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

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

See also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

Select Silanes, Tmax-iso/Tmax-prog 270/300 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.32	30	1.8	CP7434
0.32	60	1.8	CP7435
0.53	60	3.0	CP7437

Select Mineral Oil

Optimized for Total Petroleum Hydrocarbons

- **Optimized selectivity for more reliable results**
- **Low bleed for better accuracy**
- **Available in UltiMetal™ for ultimate longevity**

Total petroleum hydrocarbons analysis is a routine technique in many environmental laboratories, with many samples needing to be screened. A simple and reliable method is required that provides the shortest analysis time. Select Mineral Oil is designed to meet this need, with a stabilized non-polar bonded phase specifically for fast mineral oil analysis. The column is temperature stable up to 375/400 °C and provides speedy analyses according to DIN H53 and DIN-EN-ISO 9377-2 methods. Thanks to the temperature stability of Select Mineral Oil, your C4-C40 hydrocarbons can be analyzed in less then ten minutes. The high temperature stability of the column permits faster bake-out. For optimal injection performance be sure to use the special four meter retention gap. Select Mineral Oils are available in economical three- and six-packs.

See Also

- Retention Gaps, protect columns and optimize peaks, page 184
- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

Select Mineral Oil Fused Silica, Tmax-iso/Tmax-prog 325/350 °C, Tmin –60 °C

ID (mm)	Length (m)	df (µm)	Quantity/ pk	Part No.
0.32	15	0.1	1	CP7491
0.32	60	0.1	3	CP749103
0.32	60	0.1	6	CP749106

Select Mineral Oil UltiMetal , Tmax-iso/Tmax-prog 325/350 °C, Tmin –60 °C

ID (mm)	Length (m)	df (µm)	Quantity/ pk	Part No.
0.32	15	0.1		CP7493

Retention Gap

ID (mm)	Length (m)	df (µm)	Quantity/ pk	Part No.
0.53	4		3	CP8015

CP-Sil 88 for Dioxins

Designed for Dioxin Isomers

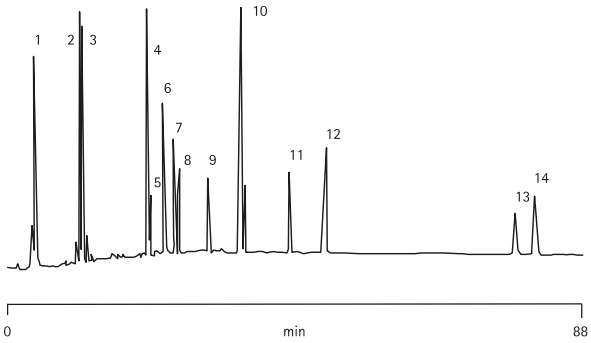
- **Integrated retention gap – guaranteed leak free and extends column lifetime**
- **2,3,7,8-TCDD can be determined at low concentrations for ease-of-use**
- **Guaranteed analysis of dioxin isomers for complete confidence in results**

The CP-Sil 88 column has a very high polarity and a specific selectivity for dioxins and dibenzofuran separations. The column is supplied with an integrated retention gap to avoid problems with solvent condensation, thus allowing repeated splitless injections without phase deterioration, extending column life. In addition, because of the integrated retention gap, data quality is considerably improved. For the shortest analysis times, a series of thin-film coated columns is available that allow applications up to 270 °C in temperature programmed mode.

Dioxins and dibenzofurans

Peak Identification

1. 2,3,7-8-TCDD
2. 2,3,7,8-TCDF
3. 1,2,3,7,8-PeCDF
4. 1,2,3,4,7,8-HxCDF
5. 1,2,3,6,7,8-HxCDF
6. 2,3,4,7,8-PeCDF
7. 1,2,3,4,7,8-HxCDD + 1,2,3,7,8-PeCDD
8. 1,2,3,6,7,8-HxCDD
9. 1,2,3,7,8,9-HxCDD
10. 1,2,3,4,6,7,8-HxCDF
11. 2,3,4,6,7,8-HpCDD
12. 1,2,3,4,6,7,8-HpCDD
13. 1,2,3,4,6,7,8,9-OCDF
14. 1,2,3,4,6,7,8,9-OCDD



Column: CP-Sil 88 CB for Dioxins Fused Silica WCOT, 50 m x 0.25 mm, df = 0.2 µm
Sample Size: 1.0 µL Toluene
Sample Conc: 100 – 400 pg/µL
Carrier Gas: Helium, 170 kPa (1.7 bar, 24 psi)
Temp: 100 °C → 180 °C → 230 °C, 3 °C/min
Injector: Splitless
Detector: MSD

Ordering Information

CP-Sil 88 for Dioxins, Tmax-iso/Tmax-prog 250/270 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	30	0.10	CP7497
0.25	50	0.10	CP7588*
0.25	60	0.10	CP7498
0.32	60	0.13	CP7499

* Tmax-iso/Tmax-prog 225/240 °C

See Also

- CP-Sil 88, for analytes with similar boiling point and polarity, page 133
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

CP-Sil 8 CB and CP-Sil 19 CB for Pesticides

Guaranteed for Pesticide Analysis

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

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

See Also

- VF-Pesticides, ultra low bleed pesticide trace analysis, page 114
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Sil 8 CB for Pesticides, Tmax-iso/Tmax-prog 300/325 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	50	0.12	CP7481
0.53	50	0.25	CP7504

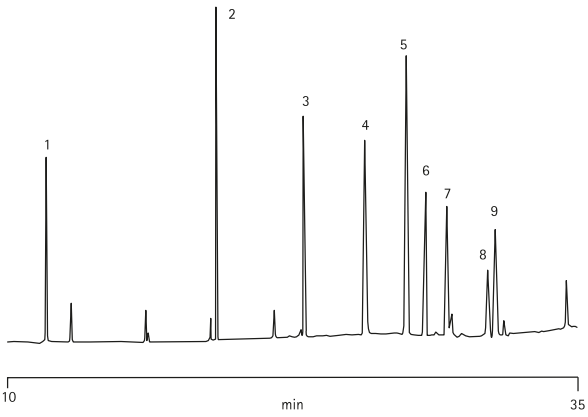
Guaranteed for Pesticide Analysis

- **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**

Varian's FactorFour™ columns are ultra low bleed, delivering superior responses for routine trace analysis, lower detection limits and longer column lifetimes.

Analysis of pesticides

Peak Identification
1. Dichlorvos
2. HCB
3. Lindane
4. Aldrin + Chloropyrphos methyl
5. Pirimiphos
6. Beta HCH
7. Methyl-parathion
8. Malathion
9. Fenitrothion



Column: CP-Sil 19 CB Low-bleed/MS for Pesticides, 30 m x 0.25 mm, df = 0.2 µm
Sample Size: 1.0 µL
Sample Conc: 1 ppm
Solvent: Ethylacetate
Carrier Gas: Helium, 1.0 mL/min
Temp: 60 °C, 2 min → 200 °C, 7 °C/min, 10 min, → 280 °C, 20 °C/min
Injector: Splitless, splitless time 2 min
Detector: Varian Ion Trap (selected ions)
Courtesy: M. Daguin and Mme Beguin, Girpa, Beaucouze, France.

See Also

- VF-Pesticides, ultra low bleed pesticide trace analysis, page 114
- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Sil 19 CB for Pesticides, Tmax-iso/Tmax-prog 275/300 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	30	0.25	CP7406
0.25	50	0.20	CP7407
0.32	30	0.25	CP7408
0.53	30	1.00	CP7409

CP-Select 624 CB

Halogenated Compounds and Residual Solvents

- **Guaranteed for EPA volatiles with methods 524.2, 624 and 8015 for maximum confidence**
- **Excellent peak shape for polar and basic compounds for accurate results**
- **Specified by Pharmacopoeia method V.3.3.9 for residual solvent analysis, providing compliancy**

The CP-Select 624 CB is a highly reproducible version of the popular 624 phase and has 2-3 times lower bleed (bleed specification for a 30 m, 0.53 mm, df = 3.00 µm is <9 pA) than conventional columns. The Select 624 CB, a 6% cyanopropyl-phenyl, 94% dimethylsiloxane phase is synthesized by Varian and fully characterized to ensure maximum column-to-column reproducibility. For an even lower bleed performance we recommend the VF-624ms.

Varian's FactorFour™ columns are ultra-low bleed, delivering superior responses for routine trace analysis, lower detection limits and longer column lifetimes.

See Also

- VF-624ms, ultra low bleed, cyano-based for volatiles, page 119
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Select 624 CB, Tmax-iso/Tmax-prog 265/280 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.15	25	0.84	CP7411
0.25	30	1.40	CP7512
0.25	60	1.40	CP7413
0.32	30	1.80	CP7414
0.32	60	1.80	CP7415
0.53	30	3.00	CP7416
0.53	75	3.00	CP7417
0.53	105	3.00	CP7418

CP-Sil 13 CB

Guaranteed Performance for EPA Halocarbons

- **Minimum bleeding with ECD for the highest sensitivity**
- **Separates at high flow rates for improved productivity**
- **Guaranteed analysis according EPA 601, 602 and 624**

CP-Sil 13 CB for halocarbons delivers guaranteed analysis of halocarbons according to EPA methods 601, 602 and 624. With minimum bleeding with ECD due to the absence of cyano groups, and separations at high flow rates, the column offers unique sensitivity and productivity.

See Also

- VF-Xms, high performance mid-polar GC column, page 118
- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Sil 13 CB for halocarbons, Tmax-iso/Tmax-prog 250/260 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.32	25	1.2	CP7506
0.53	25	2.0	CP7508

For more information, please visit www.varianinc.com/select.html or visit www.varianinc.com/products.html to place an order.

CP-Sil 5/C18 CB

High Resolution PCB Analysis

- **Guaranteed for very high resolution PCB analysis for ultimate confidence**
- **100 m column separates critical isomer pairs for accurate results**
- **Use with high sensitivity ECD detection for enhanced productivity**

CP-Sil 5/C18 CB for PCB has a lower polarity than 100% polydimethylsiloxane due to its C18 substitutions. Due to the absence of cyano groups it provides high signal to noise ratios for ECD detectors. The 100 m column separates critical isomer pairs: 28/31, 56/60, 149/118, 105/153/132 and 170/190.

See Also

- VF Pesticides, for pesticides analysis at trace level, page 114
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Sil 5/C18 CB for PCB, Tmax-iso/Tmax-prog 275/300 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	50	0.1	CP7477
0.25	100	0.1	CP7476
0.32	100	0.1	CP7478

CP-Sil 8 CB for PCB

PCBs to DIN 51527

- **Guaranteed for the analysis of PCBs according to DIN Method 51527 for confidence in results**
- **Suitable for high sensitivity ECD detection for low detection limits**
- **High temperature stability provides extended lifetime and enhanced productivity**

CP-Sil 8 CB has high temperature stability and is resistant for continuous splitless injections. Due to the absence of cyano groups the column provides high signal to noise ratios on ECD.

Varian's FactorFour™ columns are ultra low-bleed, delivering superior responses for routine trace analysis, lower detection limits and longer column lifetimes.

See Also

- VF Pesticides, for pesticides analysis at trace level, page 114
- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Sil 8 CB for PCB, Tmax-iso/Tmax-prog 300/325 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	50	0.25	CP7482

CP-Sil PAH CB UltiMetal™

Guaranteed for PAHs According to EPA 610

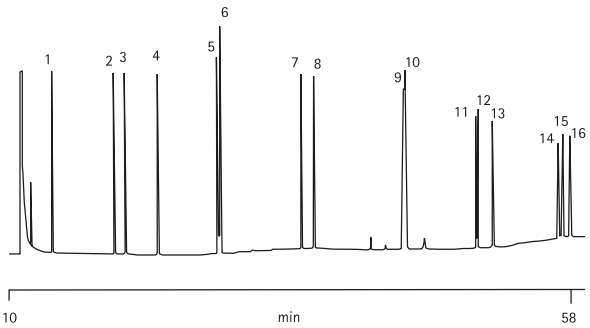
- **High temperature, low bleed phase for extended lifetime**
- **Virtually unbreakable, inert UltiMetal capillary column, reducing replacement costs**
- **Maximum temperature 400/425 °C for enhanced productivity**

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

Polyaromatic hydrocarbons according to EPA 610

Peak Identification

1. Naphthalene
2. Acenaphthylene
3. Acenaphthene
4. Fluorene
5. Phenanthrene
6. Anthracene
7. Fluoranthene
8. Pyrene
9. Benzo[a]anthracene
10. Chrysene
11. Benzo[b]fluoranthene
12. Benzo[k]fluoranthene
13. benzo[a]pyrene
14. Indeno[1,2,3-cd]pyrene
15. Dibenzo[a,h]anthracene
16. Benzo[g,h,i]perylene



Column: CP-Sil PAH CB UltiMetal WCOT, 25 m x 0.25 mm, df = 0.12 µm
Sample Size: 0.5 µL
Sample Conc: 1 ppm
Solvent: Methanol
Carrier Gas: H_2, 100 kPa (1 bar, 14.3 psi), 30 cm/s
Temp: 70 °C → 300 °C, 3 °C/min
Injector: Splitter, 100 mL/min
Detector: FID

GC

Ordering Information

CP-Sil PAH UltiMetal, Tmax-iso/Tmax-prog 400/425 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	25	0.12	CP7440

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Select Permanent Gases

Single-run Solution for CO_2 and Permanent Gases

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

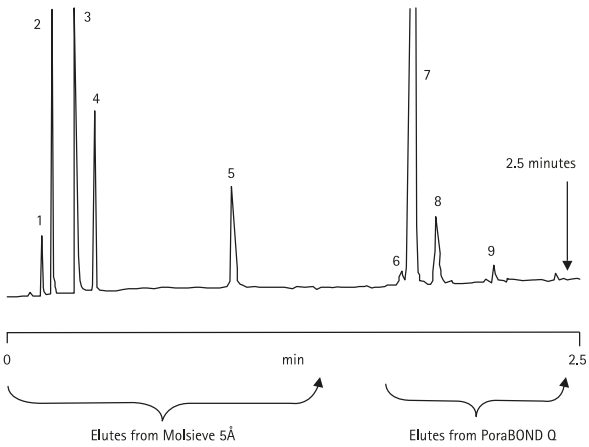
Varian's Select Permanent Gases/CO_2 is a set of two parallel columns that combine CP-Molsieve 5Å for permanent gas analysis and CP-PoraBOND Q™ for CO_2 analysis. The selection of column dimensions accords with your need for fast separation, lowest level analysis, and quantification of argon/oxygen. The Varian Select Permanent Gases column separates permanent gases and CO_2 in a single run, and columns are coupled, tested, and securely mounted on the EZ-GRIP™ column mounting system.

The CP7429 Select Permanent Gases/CO_2 column is designed for fast analysis of permanent gases and CO_2. For resolution of the difficult-to-separate argon/oxygen and helium/neon pairs, use our CP7430 Select Permanent Gases/HR (High Resolution) column.

Fast analysis of permanent gases and CO_2 using tandem PLOT columns

Peak Identification

1. He (from ms-5A)
2. O_2 (from ms-5A)
3. N_2 (from ms-5A)
4. Methane (from ms-5A)
5. CO (from ms-5A)
6. He (from PBQ)
7. $N_2 + O_2 + CO$ (from PBQ)
8. Methane (from PBQ)
9. CO_2 (from PBQ)



Column: Varian Select Permanent Gases/CO_2, Fused Silica
Sample Size: 10 µL
Sample Conc: % Level
Carrier Gas: H_2, 60 kPA
Temp: 45 °C
Injector: Split 50 mL/min
Detector: µ -TCD

Ordering Information

CP-Sil PAH UltiMetal, Tmax-iso/Tmax-prog 400/425 °C

Description	Tmax-iso (°C)	Tmax-prog (°C)	Part No.
Select Permanent Gases/CO_2	300	320	CP7429
Select Permanent Gases/HR	300	325	CP7430

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

CP-SimDist Fused Silica and UltiMetal™

Simulated Distillation up to C120

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

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

Varian's CP-SimDist CB is the most stable non-polar stationary phase based on 100% polydimethylsiloxane. It is available in Fused Silica and UltiMetal™ column materials.

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-SimDist Fused Silica, Tmax-iso/Tmax-prog 375/400 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.32	10	0.10	CP7521
0.53	5	0.17	CP7522
0.53	10	0.10	CP7541

Simulated Distillation up to C120

- **Conforms to ASTM D 2887 and the extended D 2887 method for compliancy**
- **Lower bleed rate than Fused Silica, best column lifetime and accurate results**
- **UltiMetal tubing for extreme durability**

Due to the virtually unbreakable inert UltiMetal tubing it performs extended analysis to C120, and is guaranteed to a Tmax of 450 °C. The internal diameter of UltiMetal tubing is the same as for Fused Silica 0.53 mm ID (wide bore) columns, providing trouble-free automation of on-column injection. Retention time repeatability is better than that of any other high temperature column, due to the special deactivation applied to the UltiMetal surface.

See Also

- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-SimDist UltiMetal, 0.53 mm ID, Tmax-iso/Tmax-prog 450/450 °C

Length (m)	df (µm)	Part No.
5	0.09	CP7569
5	0.17	CP7532
5	0.88	CP7570
5	2.65	CP7571*
10	0.17	CP7542
10	0.06	CP6540
10	0.53	CP7592
10	0.88	CP7512
10	1.20	CP7562
10	2.65	CP7582*
10	5.00	CP7572*
20	0.11	CP7593
25	0.06	CP6550
50	0.06	CP6560

*Tmax-iso/Tmax-prog 400/400 °C

CP-Volamine

Optimized for Volatile Amines

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

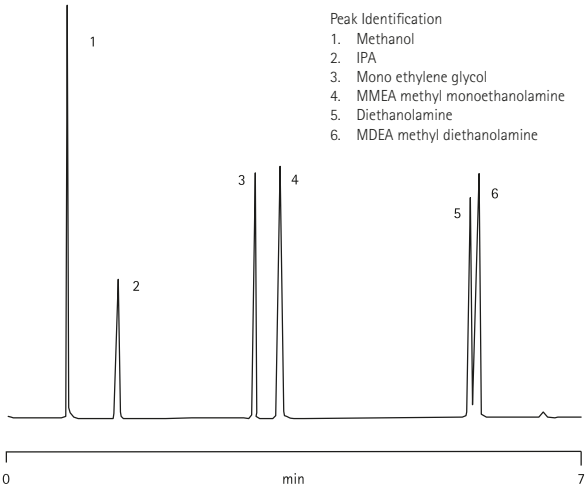
CP-Volamine is optimized for the separation of volatile amines. The column is coated with a non-polar stationary phase and produces symmetrical peaks due to MPD (Multi-Purpose Deactivation) technology. CP-Volamine is the most stable column for analyzing volatile amines even when the sample contains high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

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

Tip

Did you know that the selectivity of polar phases changes with oven temperature, and that this can change compound elution order?

Amines and alcohols



Column: CP-Volamine Fused Silica 15 m x 0.32 mm, optimized film thickness. Restriction at inlet, 20 cm x 0.10 mm methyl deactivated
Sample Size: 0.5 µL
Sample Conc: 1000 ppm, approx. 5 ng per component on the column
Solvent: Methanol
Carrier Gas: Helium, 50 pKa, 55 cm/s
Temp: 35 °C (0.5 min) → 240 °C, 30 °C/min
Injector: Split
Detector: MS
Courtesy: J. Luong, Dow Chemical Canada.

Ordering Information

CP-Volamine, 0.32 mm ID, Tmax-iso/Tmax-prog 265/300 °C

Length (m)	Part no.
15	CP7446
30	CP7447
60	CP7448*

* Tmax-iso/Tmax-prog 265/275 °C

See Also

- CP-Sil 8 CB for Amines, well suited to C3-C20 and alkanol, page 160
- CP-WAX for Volatile Amines and Diamines, separates C3-C8, page 160
- CP-WAX 51 for Amines, conforms to EPA 607, page 160
- CP-PoraPLOT™ Amines, for high retention of very volatile amines, page 141
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

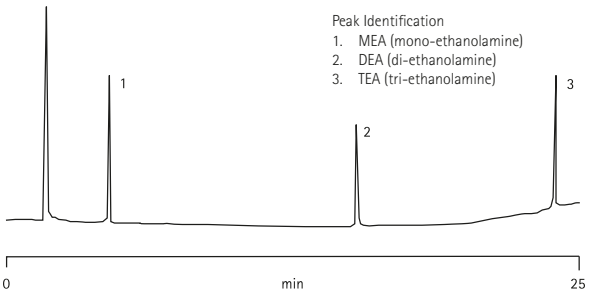
CP-Sil 8 CB and CP-Wax for Amines

Optimized for a Range of Amines

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

CP-Sil 8 CB for Amines is a base-deactivated 5% phenyl polydimethylsiloxane column that can be used for a wide range of amines, particularly C3-C20 and alkanol amines. Due to a thermal stability up to 350 °C, it analyzes a broad range of amines up to C20, as well as alkanolamines.

Analysis of ethanolamines



Column:	CP-Sil 8 CB for Amines, Fused Silica WCOT 30 m x 0.32 mm, df = 1.0 µm
Sample Conc:	5-10 ng per component on the column
Solvent:	Methanol
Temp:	60 °C (5 min) → 220 °C, 6 °C/min
Carrier Gas:	Helium, 50 kPa (0.5 bar, 7 psi)
Injector:	Split
Detector:	FID

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Sil 8 CB for Amines, Tmax-iso/Tmax-prog 325/350 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.15	25	2.00	CP7599
0.25	30	0.25	CP7598
0.25	30	0.50	CP7595
0.32	30	1.00	CP7596
0.53	30	1.00	CP7597

CP-Wax for Volatile Amines and Diamines: Separates C3-C8 Amines and Diamines

See Also

- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Wax for Volatile Amines and Diamines, Tmax-iso/Tmax-prog 220/220 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.32	25	1.20	CP7422
0.53	25	2.00	CP7424

CP-Wax 51 for Amines: For the Analysis of C4-C10 Amines, Diamines and Aromatic Amines and Conforms to EPA 607

See Also

- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Wax 51 for Amines, Tmax-iso/Tmax-prog 260/275 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	25	0.2	CP7409

CP-Wax 57 CB for Glycols and Alcohols: Optimized for Glycols, Diols and Alcohols

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

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

See Also

- CP-WAX 57 CB, for alcohols in wines and spirits, page 135
- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Wax 57 CB for Glycols and Alcohols, Tmax-iso/Tmax-prog 225/250 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	25	0.2	CP7615
0.53	25	0.5	CP7617

CP-Sil PONA CB

Guaranteed PONA Analysis

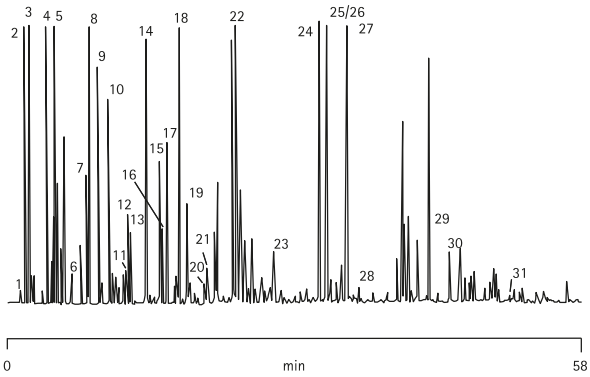
- **Guaranteed hydrocarbon analysis for ultimate reliability**
- **Inert to polar compounds for highly accurate data**
- **Excellent reproducibility increases productivity**

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

Gasoline unleaded ASTM D 5769

Peak Identification

1. Propane
2. Isobutane
3. Butane
4. 2-Methylbutane
5. Pentane
6. 2,2-Dimethylbutnae
7. 2,3-Dimethylbutane
8. 2-Methylpantane
9. 3-Methylpentane
10. Hexane
11. 2,2-Dimethylpentane
12. Methylcyclopentane
13. 2,4-Dimethylpentane
14. Benzene
15. 2-Methylhexane
16. 2,3-Dimethylpentane
17. 3-Methylhexane
18. Tert. amyl methyl ether (TAME)
19. Unknown
20. 2,2-Dimethylhexane
21. Methylcyclohexane
22. Toluene
23. Octane
24. Ethylbenzane
25. p-Xylene
26. m-Xylene
27. o-Xylene
28. Nonane
29. Decane
30. 1,2,3-Trimethylbenzene
31. Undecane



Column: CP-Sil PONA CB Fused Silica WCOT 100 m x 0.25 mm, df = 0.5 µm
Sample Size: 0.1 µL
Carrier Gas: Helium, 240 pKa (2.4 bar, 34 psi)
Temp: 35 °C (7 min) → 250 °C, 3 °C/min
Injector: Split 80 mL/min
Detector: FID

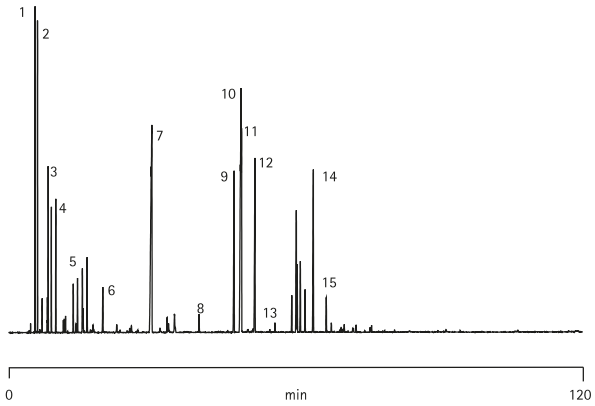
CP-Sil PONA for ASTM D 5134

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

Detailed hydrocarbon analysis of petroleum naphthas through n-nonane using ASTM D 5134

Peak Identification

1. i-Pentane
2. Pentane
3. Cyclopentane
4. Hexane
5. Benzene
6. Heptane
7. Toluene
8. Octane
9. Ethylbenzene
10. p-Xylene
11. m-Xylene
12. o-Xylene
13. Nonane
14. t-Butylbenzene
15. 1,2,3 Trimethylbenzene



Column: CP-Sil PONA CB, 50 m x 0.21 mm, df = 0.5
Sample Size: 0.2 µL
Carrier Gas: Helium
Oven: 35 °C (30 min) @ 2 °C/min to 200 °C (10 min)
Injector: Split/splitless 1177, full EFC control, 250 °C, split 200 mL/min
Detector: FID, 250 °C

GC

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Sil PONA CB, Tmax-iso/Tmax-prog 250/275 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.21	50	0.5	CP7531
0.25	100	0.5	CP7530

See Also

- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Sil PONA for ASTM D 5134-90, Tmax-iso/Tmax-prog 250/275 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.21	50	0.5	CP7531

Optimized GC Columns for Hydrocarbons

CP-TCEP for Alcohols in Gasoline

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

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

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-TCEP for Alcohols in Gasoline, Tmax-iso/Tmax-prog 135/140 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	50	0.4	CP7525

CP-Select CB for MTBE: Analysis of Reformulated Gasolines

- **Guaranteed analysis of MTBE in reformulated gasolines for reproducible results**
- **Unique selectivity for ease-of-use with MTBE**
- **Broad dynamic range for quantification of MTBE for the highest productivity**

See Also

- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Select CB for MTBE, Tmax-iso/Tmax-prog 200/200 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	50	0.25	CP7615

CP-Sil 5 CB for Sulfur: Optimized for Volatile Sulfur Compounds

- **Trace analysis of volatile sulfur compounds to C7 mercaptan for higher productivity**
- **Non-polar phase providing accurate results based on volatility**
- **High inertness, elutes SO_2 for high quality data and low detection limits**

See Also

- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Sil 5 CB for Sulfur, Tmax-iso/Tmax-prog 300/325 °C, Tmin -60 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.32	30	0.4	CP7529

Select FAME: Optimized Selectivity for FAME

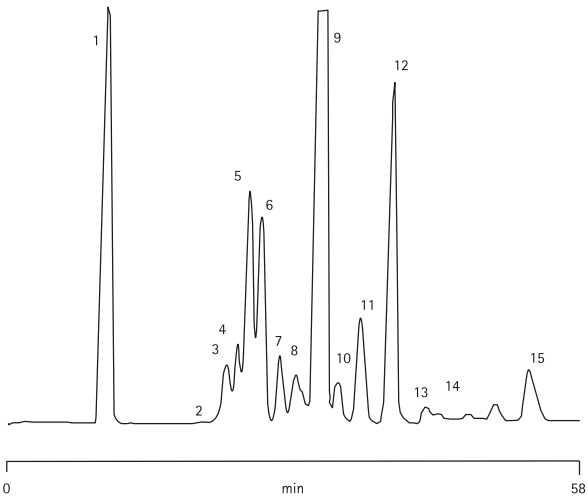
- **Long life time due to high polarity 100% bonded phase**
- **Low bleed provides more sensitivity for better detection limits**
- **Better separation due to high efficiency and loadability for more accurate results**

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

Separation of cis/trans FAME isomers

Peak Identification

1. C18:0
2. C18:1 7 trans
3. C18:1 8 trans
4. C18:1 9 trans
5. C18:1 10 trans
6. C18:1 11 trans
7. C18:1 12 trans
8. C18:1 13 trans + ?
9. C18:1 9 cis
10. C18:1 10 cis
11. C18:1 11 cis
12. C18:1 12 cis
13. C18:1 13 cis
14. C18:1 14 cis
15. C18:1 15 cis



Column: CP-Select CB for FAME, Fused Silica, 200 m x 0.25 mm (film thickness: optimized)
Sample Size: 0.5 µL
Sample Conc: Ca. 5 g per component on the column
Carrier Gas: Helium, 520 kPa
Temp: 185 °C
Injector: Split, 1:20
Detector: FID

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

Select FAME, Tmax-iso/Tmax-prog 275/290 °C

ID (mm)	Length (m)	Part No.
0.25	50	CP7419
0.25	100	CP7420
0.25	200	CP7421

CP-Sil 88 for FAME

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

See Also

- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

CP-Sil 88 for FAME, Tmax-iso/Tmax-prog 225/240 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	50	0.2	CP7488
0.25	60	0.2	CP7487
0.25	100	0.2	CP7489

Optimized GC Columns for Food/Beverages

CP-Cyclodextrin-β-2,3,6-M-19: Separates Optical Isomers of Different Functionality

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

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

CP-Cyclodextrin-β-2,3,6-M-19 has a very high inertness, enabling separation of underivatized polar compounds.

See Also

- CP-Chirasil Val, page 175
- CP-Chirasil-DEX CB, page 175
- Gas Clean™ Filters, page 172

Ordering Information

CP-Cyclodextrin-β-2,3,6-M-19, Tmax-iso/Tmax-prog 225/250 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	25	0.25	CP7500
0.32	50	0.25	CP7501

CP-Carbowax 400 For Volatiles in Alcohol

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

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

See Also

- CP-WAX 57 CB, page 135
- VF-WAXms, page 116
- Gas Clean™ Filters, page 172

Ordering Information

CP-Carbowax 400 for Volatiles in Alcohol, Tmax-iso/Tmax-prog 60/80 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.32	50	0.2	CP7527

CP-TAP CB: Optimized for Detailed Analysis of Triglycerides

- **Guaranteed detailed analysis of triglycerides for complete confidence**
- **Complete triglyceride pattern in about 15 min improves productivity**
- **Stabilized phase and special Fused Silica for enhanced longevity at higher temperature**

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

See Also

- Varian Select Biodiesel for Glycerides, page 149

Ordering Information

CP-TAP CB, Tmax-iso/Tmax-prog 355/360 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	25	0.1	CP7483
0.25	25	0.1	CP7463*

* UltiMetal, Tmax-iso/Tmax-prog 355/370 °C

CP-FFAP: Guaranteed Analysis of Free Fatty Acids in Dairy Products

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

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

See Also

- CP-Sil 88 for FAME, page 163
- Gas Clean Filters, page 172

Ordering Information

CP-FFAP CB, Tmax-iso/Tmax-prog 250/275 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.15	25	0.25	CP7686
0.32	25	0.30	CP7485
0.53	25	1.00	CP7486

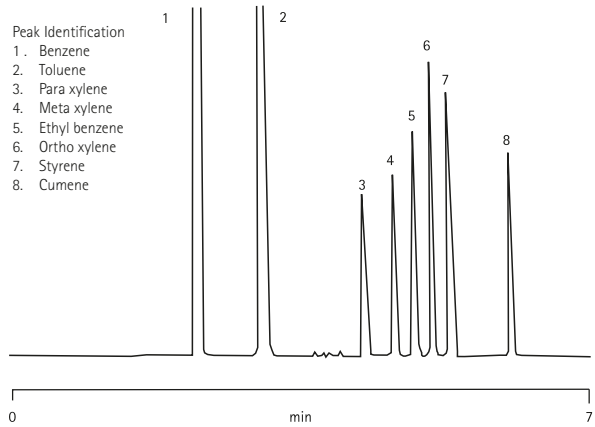
CP-Chirasil

CP-Chirasil-DEX CB: Very High Resolution of Optical Isomers

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

The CP-Chirasil-Dex CB phase consists of cyclodextrin directly bonded to dimethylpolysiloxane. This bond prevents the cyclodextrin from migrating to different locations in the surface film, delivering homogeneous enantioselectivity throughout the phase. This provides the highest resolution factor between isomers. It also guarantees stability of enantioselectivity. As a result, the lifetime of β-cyclodextrin capillary columns is significantly improved. CP-Chirasil-Dex CB permits low elution temperatures of polar compounds and is suitable for all injection techniques.

High resolution separation of xylene isomers



Column: CP-Chirasil-DEX CB Fused Silica 25 m x 0.25 mm, df = 0.25 µm
Sample Size: 0.5 µL
Sample Conc: 10-20%
Carrier Gas: Helium, 40 kPA, 6 psi
Temp: 80 °C, (6 min) → 130 °C, 25 °C/min
Injector: Split, T = 210 °C, 1:20
Detector: FID, T=230 °C

See Also

- CP-Cyclodextrin-β-2,3,6-M-19 Chirasil Val, page 174
- Gas Clean™ Filters, page 172

Ordering Information

CP-Chirasil-Dex CB, Tmax-iso/Tmax-prog 200/200 °C

ID (mm)	Length (m)	df (µm)	Part No.
0.25	25	0.25	CP7502
0.32	25	0.25	CP7503

CP-Chirasil Val

CP-Chirasil Val: For Amino Acid Enantiomers

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

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

See Also

- CP-Cyclodextrin-β-2, 3, 6-M19, page 174
- CP-Chirasil-DEX CB, page 175
- Gas Clean Filters, page 172

Ordering Information

CP-Chirasil Val, Tmax-iso/Tmax-prog 200/200 °C

Antipode	ID (mm)	Length (m)	df (µm)	Part No.
D	0.25	25	0.08	CP7494
L	0.25	25	0.12	CP7495

Varian Packed GC Columns

Stationary Phases are Available for the Production of Packed Columns and Coated Packings

A
Antarox CO 630
Antarox CO 880
Antarox CO 990
Apiezon H
Apiezon J
Apiezon K
Apiezon L
Apiezon M
Apiezon N
Armeen SD

B
Bentone 34
Benzylcyanide-silver nitrate
Bis(2-butoxyetylphthalate)
Benzylpyridine
Bis(2-ethoxyethyladipate)
Bis(2-cyanoethyl)formamide N,N-
Bis(2-ethoxyethylsebacate)
Bis(2-methoxyethyl)adipate
Butanediol succinate
Bis(p-butoxybenziline)-α,α-bi-p-toluidine N,N-
Bis(p-methoxybenzilidine)-α,α-bi-p-toluidine N,N-

C
Carbowax 1000
Carbowax 10000
Carbowax 1500
Carbowax 1540
Carbowax 200
Carbowax 20M
Carbowax 20M TPA
Carbowax 300
Carbowax 400
Carbowax 4000
Carbowax 4000 TPA
Carbowax 550
Carbowax 600
Carbowax 6000
Carbowax 750
Castorwax
Celanese ester

C
CP-Sil 34
CP-Sil 5
CP-Sil 58
CP-Sil 76
CP-Sil 8
CP-Sil 84
CP-Sil 88
CP-Wax 4000 M
CP-Wax 600 M
Cyano B
Cyanoethyl sucrose
Cyanoethyl sucrose, CES
Cyclo N
Cyclohexane dimethanol succinate, CDS

D
Decaglycerol
Decane n-
Dexsil 300 GC polymethylcarborane
Dexsil 400 GC polymethylcarborane
Dexsil 410 GC polymethylcarborane
Di isodecyl-phthalate, DIDP
Di isooctyl-adipate
Di isooctyl-phthalate
Di isooctyl-sebacate, DEHS
Di-n-decyl phthalate, DDP
Di-n-octyl adipate
Di-n-propyl phthalate
Di-n-propyl tetrachlorophthalate
Dioctoil
Dioctyl phthalate
Dioctyl sebacate (Octoil s)
Dibenzyl ether
Dibutyl maleate
Dibutyl phthalate, DBP
Dibutyl tetrachlorophthalate, DBTP
Diethylene glycol
Diethylene glycol adipate, DEGA, cross linked
Diethylene glycol adipate, DEGA
Diethylene glycol sebacate, DEGSe
Diethylene glycol succinate, DEGS

Varian Packed GC Columns

Stationary Phases are Available for the Production of Packed Columns and Coated Packings Continued

D
Diglycerol
Dimer acid
Dimethylformamide, DMF
Dimethyl sulfolane, DMS 2,4-
Dimethanol cyclohexane succinate, CDS
Dimethyl sulfoxide, DMSO
Dinonyl phthalate
Dinonyl sebacate
DOW corning 705
Dow fax 9 N 40
Dowfax 9N9

E
EGSS-X
Emulphor ON-870
Epon 1001, epoxy resin
Ethofat 60/25
Ethylbenzene
Ethylene glycol adipate, EGA
Ethylene glycol isophthalate
Ethylene glycol isophthalate EGIP
Ethylene glycol phthalate
Ethylene glycol sebacate
Ethylene glycol succinate,
Ethylene glycol tetrachlorophthalate

F
FFAP
Fluorad FC 431
Fluorene
Fluorolube GR-362
Fyrquel 220

G
Glycerol

H
H_3PO_4 (Phosphoric acid)
Hallcomid M-18, dimethylstearamide
Hallcomid M-18-OL, dimethyloleamide
Halocarbon K-352

H
Halocarbon oil 10.25
Halocarbon wax
Hexadecane
Hexadecene
Hexadecanol
Hexakis(2-cyanoethoxy)cyclohexane 1,2,3,4,5,6-
Hexamethyl phosphoramide, HMPA
HI-EFF 1 AP
HI-EFF 1 BP
HI-EFF 3 AP
HI-EFF 3 B
HI-EFF 8 BP
Hyprose SP-80, (octakis-(2-hydroxypropyl)sucrose)

I
Isoquinoline

K
Kel F grease
Kel F oil no. 10
Kel F oil no. 3
Kel F wax
KOH (potassium hydroxide)

L
LAC 1 R 296
LAC 10 R 744
LAC 12 R 796
LAC 17-R-770
LAC 22 R 863
Lexan (polycarbonate resin)

M
Mannitol
Montan wax

N
Neopentyl glycol adipate
Neopentyl glycol sebacate
Neopentyl glycol succinate
Nitrobenzene
Nujol (paraffin oil)

Varian Packed GC Columns

Stationary Phases are Available for the Production of Packed Columns and Coated Packings

O
Octadecane n-
Octadecene n-
Octoil
Olive oil
Oronite NIW
Oronite polybutene 128
Oronite polybutene 32
OS-124 (PMPE 5 ring)
OS-138 (PMPE 6 ring)

P
Palladium
Paraffin oil
Paraffin wax
Pentanediolsuccinate; 1,5-
Phenyl diethanolamine
Phenyl diethanolamine succinate
Pluronic P84
Poly-A 101A (polyamide)
Poly-A 103 (polyamide)
Poly-A 135 (polyamide)
Poly-L 110 (polyamide)
Poly-m-phenyl ether 5 ring
Poly-m-phenoxylene, PPE-21
Poly-m-phenyl ether 6 ring
Poly-S 179
Polyethylene glycol 2000
Polyethylene glycol 600, Jefferson
Polyethylene imine
Polypropylene glycol 2000
Polypropylene glycol 3500
Polypropylene glycol 4000
Polypropylene imine
Polyvinylpyrrolidone

R
Reoplex 4000

Q
Quadrol

S
Sebaconitrile
Silar 10 C
Silar 5 CP highly polar
Silar 7 C
Silar 9 C
Silicone AN-600 (50% cyanoethyl)
Silicone DC 111 grease
Silicone DC 200
Silicone DC 410
Silicone DC 550
Silicone DC 560
Silicone DC 702
Silicone DC-704
Silicone DC 710
Silicone fluid MS 550
Silicone OV-1
Silicone OV-101
Silicone OV-105
Silicone OV-11
Silicone OV-17
Silicone OV-1701
Silicone OV-202
Silicone OV-210
Silicone OV-215
Silicone OV-22
Silicone OV-225
Silicone OV-25
Silicone OV-275
Silicone OV-3
Silicone OV-330
Silicone OV-351
Silicone OV-61
Silicone OV-7
Silicone OV-73
Silicone QF-1
Silicone SE-30
Silicone SE-30 GC Grade
Silicone SE-52
Silicone SE-54
Silicone SF-96
Silicone UC W-98

Varian Packed GC Columns

Stationary Phases are Available for the Production of Packed Columns and Coated Packings Continued

S
Silicone UC W-982
Silver nitrate
Sorbitol
SP-1000
SP-1200
SP-2100
SP-2250
SP-2300
SP-2310
SP-2330
SP-2340
SP-2401
SP-300
Span-80
Squalane
Squalene
Sucrose acetate isobutyrate
Sucrose-octa acetate
Supelco SP-216 PS
Surfonic N-300

T
Terephthalic acid
Tergitol NP-35
Tergitol NPX
Tetra ethylene glycol
Tetracyanoethyl pentaerythritol
Tetraethylene glycol dimethyl ether
Tetraethylene pentamine
Tetrahydroxyethylenediamine
Thiodipropionitrile β,β-
Tri(tetra hydrofuryl)phosphate
Triacetin
Tributylphosphate
Triethanolamine
Trimer acid
Trimethylol pelargonate
Triton X-100
Tris(2-cyanoethoxy)propane 1,2,3-
Tritolyl phosphate
Triton X-305
TWEEN-80

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

V
Versamid 900 (polyamide resin)

For a custom GC single piece packed column quotation form, please visit www.varianinc.com/gccolumn_quote.html

Varian Packed GC Columns

Supports are Available for the Production of Packed Columns and Coated Packings

Description	Mesh Size
Activated charcoal	40-60
Activated charcoal	60-80
Activated charcoal	80-100
Alumina GC	40-60
Alumina GC	60-80
Alumina GC	80-100
Carbopack B	60-80
Carbopack B	80-100
Carbopack C	60-80
Carbopack C	80-100
Carbosieve G	60-80
Carbosieve G	80-100
Carbosieve S II	60-80
Carbosieve S II	80-100
Carbosieve S III	60-80
Carbosieve S III	80-100
Carbosphere	60-80
Carbosphere	80-100
Chromosorb 101	60-80
Chromosorb 101	80-100
Chromosorb 101	100-120
Chromosorb 102	20-40
Chromosorb 102	60-80
Chromosorb 102	80-100
Chromosorb 102	100-120
Chromosorb 103	80-100
Chromosorb 103	100-120
Chromosorb 105	80-100
Chromosorb 105	100-120
Chromosorb 106	60-80
Chromosorb 106	80-100
Chromosorb 106	100-120
Chromosorb 107	80-100
Chromosorb 107	100-120
Chromosorb 108	80-100
Chromosorb 108	100-120
Chromosorb 750	80-100
Chromosorb G AW	60-80
Chromosorb G AW	80-100
Chromosorb G AW	100-120
Chromosorb G AW DMCS	60-80
Chromosorb G AW DMCS	80-100

Description	Mesh Size
Chromosorb G AW DMCS	100-120
Chromosorb G HP	45-60
Chromosorb G HP	60-80
Chromosorb G HP	80-100
Chromosorb G HP	100-120
Chromosorb G NAW	45-60
Chromosorb G NAW	60-80
Chromosorb G NAW	80-100
Chromosorb G NAW	100-120
Chromosorb P	20-40
Chromosorb P	40-60
Chromosorb P	60-80
Chromosorb P	80-100
Chromosorb P	100-120
Chromosorb P AW	45-60
Chromosorb P AW	60-80
Chromosorb P AW	80-100
Chromosorb P AW	100-120
Chromosorb P AW DMCS	45-60
Chromosorb P AW DMCS	60-80
Chromosorb P AW DMCS	80-100
Chromosorb P AW DMCS	100-120
Chromosorb P NAW	45-60
Chromosorb P NAW	60-80
Chromosorb P NAW	80-100
Chromosorb P NAW	100-120
Chromosorb T	30-60
Chromosorb T	40-60
Chromosorb W AW	40-60
Chromosorb W AW	60-80
Chromosorb W AW	80-100
Chromosorb W AW	100-120
Chromosorb W AW DMCS	45-60
Chromosorb W AW DMCS	60-80
Chromosorb W AW DMCS	80-100
Chromosorb W AW DMCS	100-120
Chromosorb W HMDS	45-60
Chromosorb W HMDS	60-80
Chromosorb W HMDS	80-100
Chromosorb W HMDS	100-120
Chromosorb W HP	60-80
Chromosorb W HP	80-100

For more information, please visit www.varianinc.com/packed.html or visit www.varianinc.com/products.html to place an order.

Varian Packed GC Columns

Supports are Available for the Production of Packed Columns and Coated Packings Continued

Description	Mesh Size
Chromosorb W HP	100-120
Chromosorb W NAW	60-80
Chromosorb W NAW	80-100
Chromosorb W NAW	100-120
Glass beads regular	45-60
Glass beads regular	60-80
Glass beads regular	100-100
Glass beads regular	100-120
Hayesep A	60-80
Hayesep A	80-100
Hayesep A	100-120
Hayesep B	60-80
Hayesep B	80-100
Hayesep B	100-120
Hayesep C	60-80
Hayesep C	80-100
Hayesep C	100-120
Hayesep N	60-80
Hayesep N	80-100
Hayesep N	100-120
Hayesep P	60-80
Hayesep P	80-100
Hayesep P	100-120
Hayesep Q	60-80
Hayesep Q	80-100
Hayesep Q	100-120
Hayesep R	60-80
Hayesep R	80-100
Hayesep R	100-120
Hayesep S	60-80
Hayesep S	80-100
Hayesep S	100-120
Hayesep T	50-80
Hayesep T	80-100
Hayesep T	100-120
Molecular sieve 5Å	45-60
Molecular sieve 5Å	60-80
Molecular sieve 5Å	80-100
Molecular sieve 5Å	100-120
Molecular sieve 13X	60-80
Molecular sieve 13X	80-100
Molecular sieve 13X	100-120
Porapak N	50-80

Description	Mesh Size
Porapak N	80-100
Porapak N	100-120
Porapak P	50-80
Porapak P	80-100
Porapak P	100-120
Porapak PS	50-80
Porapak PS	80-100
Porapak Q	50-80
Porapak Q	80-100
Porapak Q	100-120
Porapak QS	50-80
Porapak QS	80-100
Porapak QS	100-120
Porapak R	50-80
Porapak R	80-100
Porapak R	100-120
Porapak S	50-80
Porapak S	80-100
Porapak S	100-120
Porapak T	80-100
Porapak T	100-120
Porapak T	50-80
Porasil B	80-100
Porasil C	80-100
Silica gel GC grade	30-40
Silica gel GC grade	60-80
Silica gel GC grade	45-60
Silocel	45-60
Silocel	60-80
Silocel	80-100
Silocel	100-120
Spherosil XOB 75	100-120
Tenax GR	35-60
Tenax GR	60-80
Tenax GR	80-100
Tenax TA	20-35
Tenax TA	35-60
Tenax TA	60-80
Tenax TA	80-100
W KOH washed	45-60
W KOH washed	60-80
W KOH washed	80-100
W KOH washed	100-120

Gas Clean™ Filters

Ensuring Clean Gas Delivery for Accurate Analyses

- **Fast, leak-free filter replacement reduces downtime**
- **Economical, with immediate payback**
- **Highly sensitive filter indicators provide maximum instrument protection**

Our Gas Clean Filter System provides enhanced gas quality for maximum productivity. Clean gases reduce the risk of column damage, sensitivity loss and instrument downtime; contaminants in gases can significantly affect your analysis. Oxygen, hydrocarbons and moisture can cause loss of sensitivity and accuracy of the GC, and damage your column. Impurities activate glass wool in liners and accelerate septa degradation, causing high background signals and ghost peaks, leading to time-consuming troubleshooting. Oxygen in the supply gas for ICP-OES or ICP-MS can cause plasma shutdown and loss of sensitivity. Carbon dioxide in supply gas for TOC analyzers causes elevated baselines and loss of sensitivity and accuracy.

Supply gases can pick up contaminants from every part of the gas line. You therefore need a Varian Gas Clean Filter System even if your supply gas is of the highest quality - it is uneconomic to buy expensive, high purity gases if their quality is downgraded by impurities in the gas line.

Inserting a Varian Gas Clean Filter System in the gas line immediately before the instrument inlet greatly reduces the level of impurities, thus improving trace analysis. Contaminants entering your GC column will also be reduced, which is critical for high temperature analysis and essential for longer column lifetime.

Technical Specifications

Description	Oxygen Filter	Moisture Filter/ Process Moisture Filter	Charcoal Filter	GC/MS Filter	CO_2 Filter
Function	Removes oxygen as well as traces of sulfur and chlorine compounds from carrier gas	Removes water, oil and other foreign material from the carrier gas	Removes organic compounds from gas streams	Single combination filter, removes water, oxygen and organic compounds	Removes CO_2 from the gas stream; use with moisture filter
Indicator color change	From green to gray	From green to pale brown	No indicator	Oxygen, from green to gray; moisture, from green to pale brown	From white to violet
Capacity	150 mL oxygen	7.2 g water	Approximately 7 g, depending on impurities	100 mL oxygen, 1 g water, organics depending on impurities.	9 g CO_2
Outlet concentration at operating flow of 1-10 L/min.	<50 ppb	<0.1 ppm	<0.1 ppm	Oxygen <50 ppb Moisture <0.1 ppm Organics <0.1 ppm	<1 ppm

For more information, please visit www.varianinc.com/gasclean.html or visit www.varianinc.com/products.html to place an order.

Gas Clean™ Filters

Choose from Varian's Extensive Range of Gas Clean Filters

Technique	Filters	Benefit
GC/MS	GC/MS Filter	Higher data accuracy and less maintenance
GC column	Moisture Filter and Oxygen Filter	Longer lifetime
ECD detector (GC)	Moisture Filter and Oxygen Filter	Greater sensitivity
TCD detector (GC)	Moisture Filter and Oxygen Filter	Greater sensitivity and less maintenance
Process GC	Process Moisture Filter	Long term stability
FID detector (GC)	Two Charcoal Filters (for air and hydrogen)	Greater sensitivity
PID detector (GC)	Oxygen Filter and Charcoal Filter	Greater sensitivity
PFPD or FDP detector (GC)	Charcoal Filter, CO_2 Filter and Moisture Filter	Greater sensitivity
TSD or NPD detector (GC)	Charcoal Filter, CO_2 Filter and Moisture Filter	Greater sensitivity
Total Organic Carbon	CO_2 Filter and Moisture Filter	Greater sensitivity
Zero-air Generator	CO_2 Filter and Moisture Filter	Cleaner gas
ICP-OES, ICP-MS	High Flow Connection Unit with two Oxygen Filters	Greater sensitivity

Contact your local Varian representative for the filter sets applicable to your GC configuration.

Ordering Information

Description	Part No.
Varian Gas Clean CO_2 Filter	CP17969
Varian Gas Clean Oxygen Filter	CP17970
Varian Gas Clean Moisture Filter	CP17971
Varian Gas Clean Process Moisture Filter	CP17971P
Varian Gas Clean Charcoal Filter	CP17972
Varian Gas Clean GC/MS Filter	CP17973
1 Filter (1/4 in. tube)	CP7980
1 Filter (1/8 in. tube)	CP7988
2 Filters (1/4 in. tube)	CP738406
2 Filters (1/8 in. tube)	CP738407
4 Filters (1/4 in. tube)	CP7989
4 Filters (1/8 in. tube)	CP736520

Ordering Information

Varian Gas Clean Process Moisture Filter

Description	Part No.
1 Filter (SS, 1/4 in. tube)	CP7980P4
1 Filter (SS, 1/8 in. tube)	CP7988P8
1 Filter (SS, 3 mm tube)	CP7988P3
1 Filter (SS, 6 mm tube)	CP7980P6
High Flow Connecting Unit 1/4 in.	CP17984
High Flow Connecting Unit 1/8 in.	CP17985
Wall mounting bracket for connecting unit (for CP7980 and CP7988)	CP7981
Varian CO_2 Kit, 1/4 in., including 2-pos. conn. unit, CO_2 and Moisture Filters	CP17982
Varian CO_2 Kit, 1/8 in., including 2-pos. conn. unit, CO_2 and Moisture Filters	CP17983
Varian Gas Clean Filter kit (connecting unit for four filters, incl. four filters (1/4 in. tube*) Oxygen, Moisture and 2x Charcoal)	CP7995
Varian Gas Clean Filter kit (connecting unit for four filters, incl. four filters (1/8 in. tube) Oxygen, Moisture and 2x Charcoal)	CP736530
Varian Gas Clean GC/MS Filter kit (incl. one connecting unit 1/8 in. and two GC/MS filters)	CP17976
Varian Gas Clean GC/MS Filter kit (incl. one connecting unit 1/4 in. and two GC/MS filters)	CP17977
Varian Gas Clean GC/MS Filter installation kit (incl. CP17976 1 m copper tubing, two nuts and two ferrules 1/8 in.)	CP17978
TCD Filter kit (with oxygen and moisture filter)	CP738408
Upper part filter connecting unit	CP7978
Flush head for connecting unit	CP7987
Male connector 1/4 in. with dust filter	CP7986
Male connector 1/8 in. with dust filter	CP82117

Male connector for Varian Gas Clean Process Moisture Filter

Description	Part No.
Male connector SS 1/4 in. with dust filter	CP7986SS
Male connector SS 1/8 in. with dust filter	CP82117SS
Male connector SS 3 mm with dust filter	CP82117SS3
Male connector SS 6 mm with dust filter	CP7986SS6
Viton® O-rings (two sets)	CP7983

* For 1/8 in. tube use Reducer 1/8 in. x 1/4 in., Part. No. CP4392

Pressure Regulators

Two Stage Tank Pressure Regulators: For High Purity Gases

These high quality pressure regulators offer constant pressure control and delivery using a stainless steel diaphragm. The output pressure range is 5-125 psi (35-860 kPa) and maximum inlet pressure is 4000 psi. The male pipe thread outlet ports are 1/4 in.

See Also

- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

Description	Part No.
Air, GCA 590	AL8104
H_2, Ar/Methane, CGA 350	AL8109
He, N_2, Ar, Ne, CGA 580	AL8111

Single Stage Pressure Regulators: Economical for General Use

Also fitted with stainless steel diaphragms, this regulator has a maximum inlet pressure of 3000 psi, with a chrome plated brass body and 1/4 in. male pipe thread outlet ports.

See Also

- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

Description	Part No.
0-120 psig delivery pressure, 0-825 kPa	AL81891

Gas Leak Detector

For Gases With High Thermal Conductivity

- **Compact, lightweight and portable for ease-of-use**
- **High sensitivity safeguards the working environment**
- **Long life rechargeable battery saves replacement costs**

The Varian Gas Leak Detector is designed for helium and other gases that have a high thermal conductivity relative to air. It detects gas leaks in GC, GC/MS and Purge and Trap instruments. The Detector is powered by a built-in NiCad battery with a maximum continuous operating time of 9 h (recharging time is 4 h).

Technical Specifications

Gas	Sensitivity (mL/min)
Helium	0.01
Hydrogen	>0.02
Freons	~ 0.2
SF_6, CO_2	~ 0.08
Natural Gas	>50% levels
Neon	0.15
Xenon, Krypton	0.15 (-polarity)

See Also

- Gas Clean Filters, for ultimate column performance and longevity, page 172

Ordering Information

Voltage	Part No.
110 VAC	CP87610
220 VAC	CP80610
240 VAC	CP83610

Ferrules

Vespel® Ferrules: One Piece Design Needs no Back Ferrule

- **Upper temperature limit of 350 °C**
- **Precision drilled so no mold imperfections**
- **One-piece design requires back ferrules to reduce costs**

Our Vespel ferrules are made from 100% DuPont polyimide. Vespel ferrules are fairly hard and can seal permanently to the column. 1/16 in. ferrules are used by most GCs. Please note that 0.425 mm ID ferrules fit 0.25 mm ID capillary columns, 0.5 mm ID ferrules fit 0.32 mm ID capillary columns, and 0.8 mm ID ferrules fit 0.53 mm ID capillary columns.

Ordering Information

Vespel ferrules (10/pk)

Description	Part No.
1/16 in. to 0.3 mm	CR212103
1/16 in. to 0.425 mm, for 0.25 mm ID columns	CR212104
1/16 in. to 0.5 mm, for 0.32 mm ID columns	CR212105
1/16 in. to 0.8 mm, for 0.53 mm ID columns	CR212108

40% Graphite/60% Vespel Ferrules: For GC/MS Applications

- **One-piece design requires no back ferrule**
- **Reusable to reduce running costs**
- **Upper temperature limit of 400 °C for robust performance**

These Vespel/Graphite ferrules are made from 40% graphite and 60% high temperature DuPont polyimide. They can be reused because they do not seize onto the column, and are also recommended for GC/MS interface applications. Size guidelines are: 0.3 mm ID ferrules fit 0.18 mm ID and narrower capillary columns, 0.425 mm ID ferrules fit 0.25 mm ID capillary columns, 0.5 mm ID ferrules fit 0.32 mm ID capillary columns, and 0.8 mm ID ferrules fit 0.53 mm ID capillary columns. "Straight" ferrules are used for the same dimension tubing.

Ordering Information

40% Graphite/60% Vespel Ferrules (10/pk)

Description	Part No.
1/16 in. to 0.3 mm, for 0.18 mm and smaller ID columns	CR213103
1/16 in. to 0.425 mm, for 0.25 mm ID columns	CR213104
1/16 in. to 0.5 mm, for 0.32 mm ID columns	CR213105
1/16 in. to 0.8 mm, for 0.53 mm ID columns	CR213108
1/16 in., 2-hole, 0.425 mm, for 0.25 mm ID columns	CR213124
1/16 in., 2-hole, 0.5 mm, for 0.32 mm ID columns	CR213125
1/16 in. to 0.425 mm. Short, for 0.25 mm ID columns	CR213164
1/16 in. to 0.5 mm. Short, for 0.32 mm ID columns	CR213165
1/16 in. to 0.8 mm. Short, for 0.53 mm ID columns	CR213168

Straight ferrules, for tubing OD as listed (10/pk)

Description	Part No.
1/8 in.	CR213200
1/4 in.	CR213400

Reducing ferrules (10/pk)

Description	Part No.
1/8 in. to 0.425 mm, for 0.25 mm ID columns	CR213204
1/8 in. to 0.5 mm, for 0.32 mm ID columns	CR213205
1/8 in. to 0.8 mm, for 0.53 mm ID columns	CR213208
1/4 in. to 0.5 mm, for 0.32 mm ID columns	CR213405

Blank ferrules, no holes (10/pk)

Description	Part No.
1/16 in.	CR2131XX

Ferrules

Graphite Ferrules: High Temperature, for Capillary GC

- **Precision formed so no mold imperfections**
- **High temperature capability for demanding applications**
- **Reusable to reduce costs**

Graphite ferrules are made from 100% high purity graphite with an upper temperature limit of 450 °C. Ferrules are precision formed with a flash-free ID and may be reused if not over tightened. Our one-piece design does not require a back ferrule. Graphite is ideal for glass-to-metal connections because it does not stick to glass. They are not recommended for GC/MS applications - use Vespel®, Vespel/graphite or SilTite ferrules instead. Size guideline: 0.3 mm ID ferrules fit 0.18 mm ID and narrower capillary columns, 0.425 mm ID ferrules fit 0.25 mm ID capillary columns, 0.5 mm ID ferrules fit 0.32 mm ID capillary columns, and 0.8 mm ID ferrules fit 0.53 mm ID capillary columns. "Straight" ferrules are used for the same dimension tubing.

Ordering Information

Graphite ferrules (10/pk)

Description	Part No.
1/16 in. to 0.425 mm, for 0.25 mm ID Columns	CR211104
1/16 in. to 0.5 mm, for 0.32 mm ID Columns	CR211105
1/16 in. to 0.8 mm, for 0.53 mm ID Columns	CR211108
1/16 in., 2-hole, 0.5 mm, for 0.32 mm, ID Columns	CR211125
1/16 in. to 0.5 mm-HP for 0.25-0.32 mm, ID Columns	CR211165
1/16 in. to 0.8 mm-HP for 0.53 mm, ID Columns	CR211168

Straight ferrules, for tubing OD as listed (10/pk)

Description	Part No.
1/8 in.	CR211200
1/4 in.	CR211400

Reducing ferrules (10/pk)

Description	Part No.
1/8 in. to 0.5 mm, for 0.32 mm, ID Columns	CR211205
1/8 in. to 0.8 mm, for 0.53 mm, ID Columns	CR211208

Blank ferrules, no holes (10/pk)

Description	Part No.
1/16 in.	CR2111XX

SilTite Ferrules: Metal Ferrules for Fused Silica GC

- **Reduce GC and MS down time**
- **Eliminate contamination for greater accuracy**
- **Eliminate retightening for improved productivity**

These ferrules are ideal for GC/MS and eliminate contamination from Vespel or graphite. They also eliminate annoying leaks and reduce air background. Using SilTite ferrules removes the need for retightening after temperature cycling.

Ordering Information

SilTite ferrules (10 ferrules, 2 nuts)

Description	Part No.
SilTite Ferrules Kit for Agilent MSD, 0.10 to 0.25 mm, ID Columns	SG073200
SilTite Ferrules Kit for Varian, 0.10 to 0.25 mm ID Columns	SG073300
SilTite Ferrules Kit for Varian, 0.32 mm ID Columns	SG073301
SilTite Ferrules Kit for Varian, 0.45 to 0.53 mm ID Columns	SG073302

Teflon® Ferrules: For Complete Inertness

- **Upper temperature limit of 250 °C**
- **100% Teflon and completely inert**
- **One-piece design requires no back ferrule**

Ordering Information

Straight ferrules, for tubing OD as listed (10/pk)

Description	Part No.
1/4 in.	CR214400

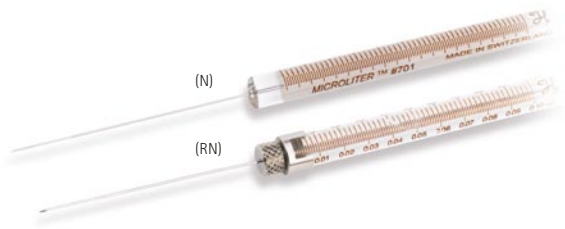
Reducing ferrules (10/pk)

Description	Part No.
1/8 in. to 1/16 in., for 1/16 in. OD Tubing	CR214210

Syringes

Hamilton 700 Series MICROLITER: Economical for Everyday Use

Bevel non-coring needle for GC use, with dispensing volume from 5 to 500 µL. The 700 series accepts fixed and removable needles.



Hamilton 800 Series MICROLITER: Reinforced Plungers for Long Life

Bevel non-coring needles for GC use, dispensing from 5 to 250 µL. Needle length is 2 in. With economical replaceable barrel/plunger assemblies and plunger stop that prevents plunger blowout.

GC

Ordering Information

Hamilton 700 Series MICROLITER fixed needle syringes (N).
Bevel non-coring point

Description	Part No.
5 µL 75N: Point Style 2, Gauge 26s	HM87900
10 µL syringe, 701N, 26s/2 (6/pk)	HM80366
25 µL 702: Point Style 2, Gauge 22s	HM80400
50 µL 705: Point Style 2, Gauge 22s	HM80500
100 µL 710: Point Style 2, Gauge 22s	HM80600
250 µL 725: Point Style 2, Gauge 22s	HM80700
500 µL 750: Point Style 2, Gauge 22	HM80800

Hamilton 700 Series MICROLITER removable needle syringes (RN).
Bevel non-coring point

Description	Part No.
5 µL 75: Point Style 2, Gauge 26s	HM87930
10 µL 701 RN: Point Style 2, Gauge 26s (6/pk)	HM80336
10 µL 701: Point Style 2, Gauge 26s	HM80330
25 µL 702: Point Style 2, Gauge 22s	HM80430
100 µL 710: Point Style 2, Gauge 22s	HM80630
250 µL 725: Point Style 2, Gauge 22s	HM80730
500 µL 750: Point Style 2, Gauge 22	HM80830

Hamilton 700 Series MICROLITER replacement needles.
Bevel non-coring point

Description	Part No.
For 2.5 to 100 µL Syringes, Gauge 26s, (6/pk)	HM775802

Ordering Information

Hamilton 800 Series MICROLITER fixed needle syringes (N)

Description	Part No.
5 µL 85: Point Style 2, Gauge 26s	HM84850
10 µL 801: Point Style 2, Gauge 26s	HM84852

Hamilton 800 Series MICROLITER removable needle syringes (RN)

Description	Part No.
5 µL 85: Point Style 2, Gauge 26s	HM84851
10 µL 801: Point Style 2, Gauge 26s	HM84853
100 µL 810: Point Style 2, Gauge 22s	HM84859
250 µL 825: Point Style 2, Gauge 22s	HM84861

Syringes

Hamilton 1000 Series GASTIGHT: 1 to 50 mL Volumes

With Teflon® Luer lock connectors and chemically resistant, Teflon-tipped, replaceable plungers. Needles should be ordered separately.

Hamilton 1700 Series GASTIGHT: Non-coring Needles for GC Use

These syringes use 2 in. bevel needles and dispense 10 to 500 µL, with cemented and replaceable needles with replaceable Teflon-tipped plungers.

Ordering Information

Hamilton 1000 Series GASTIGHT syringes

Description	Part No.
1 mL, 1001 TTL	HM81320
2.5 mL, 1002TLL	HM81420
5 mL, 1005TLL	HM81520
10 mL, 1010TLL	HM81620
50 mL, 1050TLL	HM85020

Hamilton 1000 Series GASTIGHT replacement Kel-F hub needles (6/pk)

Description	Part No.
Bevel Non-coring Tip, 2 in. Long, Gauge 22, Kel-F Hub	HM90122
Blunt Tip, 2 in. Long, Gauge 22, Kel-F Hub	HM90134

Hamilton 1000 Series GASTIGHT replacement plungers

Description	Part No.
1 mL Plunger Assembly	HM135901

Ordering Information

Hamilton 1700 Series GASTIGHT fixed needle syringes (N)

Description	Part No.
10 µL 1701: Point Style 2, Gauge 26s	HM80000
25 µL 1702: Point Style 2, Gauge 22s	HM80200
50 µL 1705: Point Style 2, Gauge 22s	HM80900
100 µL 1710: Point Style 2, Gauge 22s	HM81000
250 µL 1725: Point Style 2, Gauge 22s	HM81100

Hamilton 1700 Series GASTIGHT removable needle syringes (RN)

Description	Part No.
10 µL 1701: Point Style 2, Gauge 26s	HM80030
100 µL 1710: Point Style 2, Gauge 22s	HM81030
250 µL 1725: Point Style 2, Gauge 22s	HM81130
500 µL 1750: Point Style 2, Gauge 22	HM81230

Hamilton 1700 Series GASTIGHT replacement needles (2 in., 6/pk)

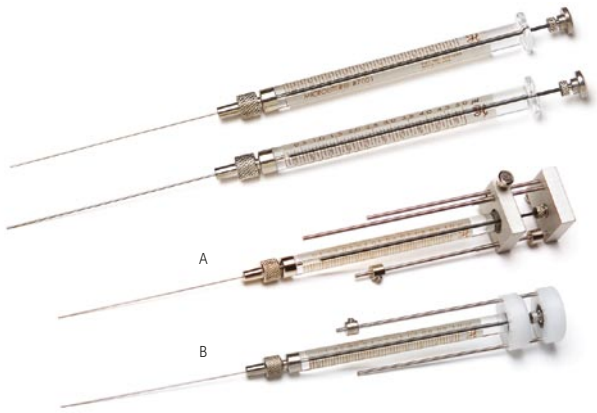
Description	Part No.
For 2.5 to 100 µL Syringes, 26s, bevel	HM775802

For more information, please visit www.varianinc.com/gccol_ac.html or visit www.varianinc.com/products.html to place an order.

Syringes

Hamilton 7000 Series MODIFIED MICROLITER: Positive Displacement

With the 7000 series the sample is contained in the needle, with no dead volume. Removable needles (KH) for cleaning.



Ordering Information

Hamilton 7000 Series MODIFIED MICROLITER 2.75 in. needle

Volume (µL)	Needle Guage	Part No.
0.5	25	HM86259
1.0	25s	HM80135
2.0	25	HM88411

Hamilton guides and Chaney adapters

Description	Part No.
(A): Guide for 701	HM14806
(A): Guide for 702-750	HM14906
(B): Chaney Adapter for 701, 75	HM14700

SGE SuperfleX Syringes: Flexible Plungers That Don't go out of Shape

With flexible plungers that return to their original shape, plunger protection guide, and button reinforcement for long life.

Ordering Information

SGE SuperfleX syringes - fixed needle (5 cm in length), bevel tip

Description	Part No.
5 µL: Point Style 2, Gauge 26	SG001100
10 µL: Point Style 2, Gauge 26	SG002100

SGE Standard Syringes: No More Bent Plungers

A special feature of this syringe is the plunger protection on the 5 µL and 10 µL versions that stops plunger bending. Syringe volume accuracy is ±1%, and the syringes are supplied with a certificate of conformation for NIST traceability.

Ordering Information

SGE standard syringes - fixed needle (5 cm in length)

Description	Quantity	Part No.
5 µL: Gauge 26	1	SG001000
10 µL: Gauge 26	1	SG002000
10 µL: Gauge 26	6/pk	SG002030
10 µL: Gauge 26	10/pk	SG002033
100 µL: Gauge 25	1	SG005000
250 µL: Gauge 25	1	SG006000

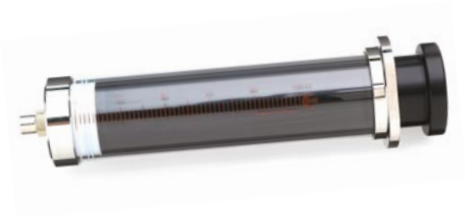
SGE standard syringes - removable needle

Description	Part No.
10 µL: Gauge 26, 6/pk	SG002080
50 µL: Gauge 25	SG004050

Syringes

SGE Gas Tight Syringes: For Gases and Liquids

Completely inert and all plungers are replaceable.



Ordering Information

SGE Gas Tight syringes - fixed needle (bevel needle point, 5 cm in length)

Description	Part No.
10 µL: Point Style 2, Gauge 26	SG002200
100 µL: Point Style 2, Gauge 25	SG005200
250 µL: Point Style 2, Gauge 25	SG006200
500 µL: Point Style 2, Gauge 25	SG007200

SGE Gas Tight syringes - removable needle (bevel needle point, 5 cm in length)

Description	Part No.
50 µL: Point Style 2, Gauge 25	SG004250
100 µL: Point Style 2, Gauge 25	SG005250
500 µL: Point Style 2, Gauge 25	SG007250
1 mL: Point Style 2, Gauge 23	SG008100
2.5 mL: Point Style 2, Gauge 23	SG008500
5 mL: Point Style 2, Gauge 23	SG008700
10 mL: Point Style 2, Gauge 23	SG008900

Septa

Varian BTO Septa: Optimized GC and GC/MS Performance

- **Molded for precise size control**
- **Glass jar packaging eliminates contamination**
- **CenterGuide™ for easy penetration and less tearing reduces costs**

Varian qualified septa optimize GC and GC/MS performance. The BTO septa are ideal for use with all low bleed mass spec capillary columns, and have a maximum set point temperature of 400 °C, or 300 °C for the 17 mm size. Many sizes offer CenterGuide to guide the needle for easy penetration and reduced tearing.

The Varian 1177 injector uses 9 mm septa, the 1040/41/60/61 injectors use 9.5 mm or 10 mm septa, and the 1075/77/78/79 and 1093/94 SPI injectors use 11.5 mm septa.

Ordering Information

Varian BTO septa (50/pk)

Diameter (mm)	Feature	Part No.
9.0	CenterGuide	CR298713
9.5		CR298705
10.0		CR298745
11.0	CenterGuide	CR298717
11.5	CenterGuide	CR298777
17.0	CenterGuide	CR298815

Septa

Varian Marathon Septa: Premium Septa for Autosamplers

- **Outstanding lifetime, ideal for overnight runs to increase productivity**
- **Up to 400 injections per septum reduce costs**
- **Soft 45 durometer material, easy on autosampler needles**

Varian offers an advanced GC septum for autosampler use, with significantly longer life. The Varian Marathon septum typically achieves 400 injections without failure, when used with a rounded tip needle and autosampler, or manual injections using a needle guide. Now you can make extended autosampler runs without fear of sample loss caused by blow back of leaking carrier gas. The Marathon septum is also ideal for standard manual injection GC and GC/MS. Along with superior injection life, the septum provides good physical properties such as low bleed and low injection port sticking. The maximum set point is 400 °C, or 280 °C for the 17 mm size. Many sizes offer CenterGuide™ to guide the needle for easy penetration and reduced tearing.

Varian Advanced Green 3 Septa: True Long Life and High Temperature

- **More injections per septum improve economy**
- **Reduced injection port sticking**
- **CenterGuide™ for easy penetration and less tearing reduces costs**

The Varian Advanced Green 3 Septum was specifically created to combine significantly longer injection life and low bleed. They are supplied in glass jars to eliminate organic contamination. This advanced formula green septum far exceeds the previous benchmark in performance. Maximum set point is 400 °C, or 280 °C for the 17 mm size. Several sizes offer CenterGuide to guide the needle for easy penetration and reduced tearing.

GC

Ordering Information

Varian Marathon Septa (25/pk)

Diameter (mm)	Feature	Part No.
5.0	CenterGuide	CR239587
6.0		CR239488
9.0	CenterGuide	CR239778
9.5		CR239188
11.0	CenterGuide	CR239287
11.5	CenterGuide	CR239787
12.7		CR239388
17.0		CR239688

Ordering Information

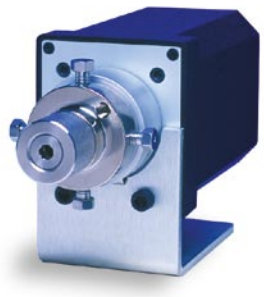
Varian Advanced Green 3 Septa (50/pk)

Diameter (mm)	Feature	Part No.
9.0	CenterGuide	CR246713
9.5		CR246124
11.0	CenterGuide	CR246225
11.5	CenterGuide	CR246725
17.0		CR246624

Valves

Six Port and Ten Port Sampling/Switching Valves: Gas Sampling Injection and Two Column Selection

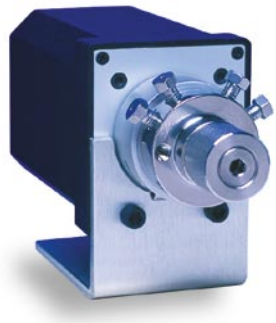
For packed and capillary columns with a 4 in. standoff assembly on air-actuated and manual valves.



Four Port Liquid Sample Injectors Internal Volume

With maximum pressure 1000 psi (6.9 MPa) liquid and maximum temperature 175 °C.

For packed and capillary columns with a 4 in. standoff assembly on air-actuated valves.



Ordering Information

Six Port, Packed 1/4 in. and 1/8 in. OD Maximum temperature 330 °C, maximum pressure 300 psi (20 mpa), Valco E or T rotor

Description	Part No.
Manual Valve w/Standoff, 1/8 in. Fittings	VL46UWE VL46UWT
Manual Valve w/Standoff, 1/16 in. Fittings	VL4C6UWE
Air Actuated Valve w/Standoff, 1/8 in. Fittings	VLA46UWE
Air Actuated Valve w/Standoff, 1/16 in. Fittings	VLA4C6UWE VLA4C6UWT

Capillary 0.53 mm ID

Description	Part No.
Manual Valve w/Standoff, 1/16 in. Fittings	VL4C6WE
Air Actuated Valve w/Standoff, 1/16 in. Fittings	VLA4C6WE VLA4C6WT

Ten Port, Packed 1/4 in. and 1/8 in. OD Maximum temperature 330 °C, maximum pressure 300 psi (20 mpa), Valco E or T rotor

Description	Part No.
Air Actuated Valve w/Standoff, 1/8 in. Fittings	VLA410UWE
Air Actuated Valve w/Standoff, 1/16 in. Fittings	VLA4C10UWE VLA4C10UWT

Capillary 0.53 mm ID

Description	Part No.
Air Actuated Valve w/Standoff, 1/16 in. Fittings	VLA4C10WE VLA4C10WT

Ordering Information

Packed 1/4 in. and 1/8 in. OD

Description	Part No.
Manual w/Standoff Valve, 1/16 in. Fittings, 0.5 µL	VLCI4UWE5

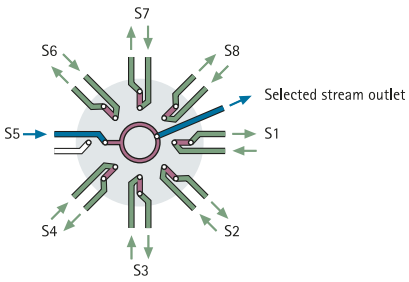
Capillary 0.53 mm ID

Description	Part No.
Manual w/Standoff Valve, 1/16 in. Fittings, 0.5 µL	VLCI4WE5

Valves and Spares

SF Flow-through Flow Path Multi-position Valves

Maximum temperature operation is 200 °C, with maximum pressure 200 psi (1.4 MPa). 1/16 in. fittings, 1 mm bore and stream selection, with a 4 in. standoff assembly.



SF Flow-through Multi-position Valve

Stainless Steel Sample Loop

Ordering Information

SF flow-through flow path multi-position valves

Description	Part No.
6 Position Valve, w/Electrical Actuator, 4 in. Standoff Included	VLE4CSF6MWE

Stainless steel sample loops – two sets of nuts and ferrules included
1/16 in. loops for UW type valves

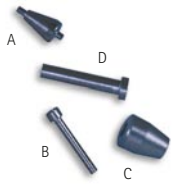
Description	Part No.
100 µL	VLSL100CUW
250 µL	VLSL250CUW
500 µL	VLSL500CUW
1.0 mL	VLSL1KCUW
2.0 mL	VLSL2KCUW
5.0 mL	VLSL5KCUW

1/16 in. loops for W type valves

Description	Part No.
20 µL	VLSL20CW
100 µL	VLSL100CW
250 µL	VLSL250CW
500 µL	VLSL500CW
1.0 mL	VLSL1KCW
2.0 mL	VLSL2KCW

Valco Nuts and Ferrules

These Valco nuts and ferrules are designed to work perfectly with Valco valves.



Ordering Information

Valco nuts (10/pk)

Description	Part No.
SS-Nut: Fitting Size, 1/16 in.	VLZN110
SS-Nut, Long : Fitting Size, 1/16 in.	VLLZN110

Valco ferrules (10/pk)

Description	Part No.
SS-Ferrule: Fitting Size, 1/32 in.	VLZF510
SS-Ferrule: Fitting Size, 1/16 in.	VLZF110

Valco removable fused silica adapters and liners (5/pk)

Description	Part No.
(A): Valcon Removable Fused Silica Adapters: Fitting Size, 1/32 in.	VLFSR45
(B): Valcon Removable Fused Silica Liners: Fitting Size, 1/32 in.	VLFSL45
(C): Valcon Removable Fused Silica Adapters: Fitting Size, 1/16 in.	VLFS1R45
(D): Valcon Removable Fused Silica Liners: Fitting Size, 1/16 in.	VLFS1L45

Retention Gaps

Fused Silica Retention Gaps

- **Easy to install**
- **Three different polarities, plus uncoated, for universal applicability**
- **Complete with universal CP-Quick-Seal connectors that fit all capillary column sizes**

Tip

EZ-Guard™ columns are a superior combination of an analytical column with an integrated guard column (retention gap). These columns are a single continuous length, so no coupling is used, resulting in a 100% leak-free connection.

Retention Gap for Varian Select™ Mineral Oil (TPH) Column

For optimal injection performance of the Varian Select Mineral Oil column, a four meter retention gap is available.

See also

- Select Mineral Oil, optimized for Total Petroleum Hydrocarbon (TPH), page 151
- EZ-Guard, protect your GC column, page 108
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

Retention gaps, Fused Silica

Polarity	Deactivation	ID (mm)	Quantity/pk	Part No. 2.5 (m)	Part No. 4 (m)	Part No. 10 (m)	Quick-Seal Connectors Included (mm)
For Select Mineral Oil	Methyl	0.53	3		CP8015		Order CP4787
Kit: 3 non-polar, 1 medium polarity, 1 polar	Methyl, Cyano-phenyl-methyl, Polyethylene glycol	0.25	5	CP8070			0.32
		0.32	5	CP8080			0.32
		0.53	5	CP8090			0.53
Medium polarity	Cyano-phenyl-methyl	0.25	5	CP8017			0.25
		0.32	5	CP8018			0.32
		0.53	5	CP8019			0.53
Non-polar	Methyl	0.25	5	CP8007			0.25
		0.32	5	CP8008			0.32
		0.53	5	CP8009			0.53
		0.53	6			CP8016	Order CP4787
Polar	Polyethylene glycol	0.25	5	CP8087			0.25
		0.32	5	CP8088			0.32
		0.53	5	CP8089			0.53

UltiMetal™ Retention Gaps

- **Complete with coupled high temperature glass-lined connector for ease-of-use**
- **Pretested to ensure quality**
- **Dimensions equal to 0.53 mm ID Fused Silica provide easy installation**

Ordering Information

Retention gaps, UltiMetal

ID (mm)	Length (cm)	Quantity/pk	Part No.
0.53	25	3	CP8066
	75	3	CP8067
	150	3	CP8068

For more information, please visit www.varianinc.com/gccol_ac.html or visit www.varianinc.com/products.html to place an order.

Connectors and Tools

CP-Quick-Seal Fused Silica Column Connectors

- **Universal so you can always make a connection**
- **Connects tubing from 0.15 – 0.53 mm ID for many applications**
- **Deactivated for maximum inertness providing good data reliability**

Ordering Information

Quick-seal fused silica connectors

ID (mm)	Quantity/ pk	Part No.		
		0.25 (mm)	0.32 (mm)	0.53 (mm)
0.15	10		CP4779	CP4778
0.25	10		CP4774	CP4776
	25	99766805	99766808	99766809
0.32	10		CP4775	CP4777
	25		99766802	99766803
0.53	10			CP4787
	25			99766804

Optimum column connections are made when the Quick-Seal connector is sized for both tubing IDs. However, Quick-Seal connectors may be used with columns that have internal diameters up to the specified value, e.g. CP4779 can be used with column IDs up to 0.32 mm. CP4787 may be used with all column IDs up to 0.53 mm and is therefore a universal connector.

Single Ferrule Connectors (In-Line)

These reusable single-ferrule connectors attach capillary and Fused Silica columns with very low dead volume. Please order the connector and ferrules separately.

Ordering Information

Single ferrule connectors

Description	Part No.
Single Ferrule Column Connector	CP4780
Vespel® Ferrule 0.32 - 0.32 mm ID	CP4781
Vespel Ferrule 0.32 - 0.25 mm ID	CP4782
Vespel Ferrule 0.25 - 0.25 mm ID	CP4783
Vespel Ferrule 0.53 - 0.53 mm ID	CP4784
Vespel Ferrule 0.53 - 0.32 mm ID	CP4785
Vespel Ferrule 0.53 - 0.25 mm ID	CP4786

CP-Quick-Seal Fused Silica Y-Splitter

Universal CP-Quick-Seal Y-splitter that connects tubing from 0.15 to 0.53 mm ID.

Ordering Information

Quantity/pk	Part No.
1	CP4797
5	CP4798

Fused Silica Cutting Tools

The high-quality, long-life tungsten carbide glass knife produces perfect cuts, and is especially suitable for use with CP-Quick-Seal connectors.

Ordering Information

Description	Part No.
Tungsten Carbide Glass Knife	CP22674
Tungsten Carbide Replacement Blade	CP22675

Polyimide Glue

For easy connection of silica and glass tubing.

Ordering Information

Description	Part No.
Polyimide Glue, 5 g	CP8471A

Imp Tubing Cutter: Ideal for Tight Spaces

This cutter slices through stainless steel, copper, nickel and aluminum tubing and requires only 1-3/4 in. swing radius so it is ideal where access is restricted.

Ordering Information

Description	Part No.
Imp Tubing Cutter	AL3208
Replacement Cutting Wheels (3/pk)	AL3202

Ceramic Scoring Wafer: Cheap and Accurate

Ordering Information

Description	Part No.
Ceramic Scoring Wafer	190015800

GC Tubing

Fused Silica Tubing for GC Columns

- **Suitable for guard columns, retention gaps and transfer lines for wide versatility**
- **Non-polar, medium polarity, and polar, plus non-deactivated for many applications**
- **Available in lengths up to 100 m for greater economy**

Varian supplies a complete range of Fused Silica tubing for use in gas chromatography. Several tubing deactivations and inside diameters are available for nearly every application.

Ordering Information

Fused Silica tubing

ID (mm)	Configuration No.			
	Uncoated	Methyl Deactivated (non-polar)	Cyano-phenyl-methyl Deactivated (medium polarity)	Polyethylene Glycol Deactivated (high polarity)
0.025	4090			
0.050	4091			
0.075	4092			
0.100	4093	4073		
0.150	4094	4069		
0.250	4070	4074	4078	4082
0.320	4071	4075	4079	4083
0.530	4072	4076	4080	4084

When ordering Fused Silica tubing, please specify Part No. CP99933, the configuration number from the table above and the length in meters, 100 m maximum.

Copper Tubing: Economical and Pre-cleaned Specifically for GC Use

Ordering Information

Copper tubing

OD (in.)	Part No.
1/8 (25 ft)	391832600
1/4 (50 ft)	3700014600

Standard Stainless Steel Tubing: Supplied in Economical 50 ft Coils

This 316 stainless steel tubing is ideal for GC applications and corrosion resistant for HPLC applications. Its maximum operating temperature is 500 °C and maximum pressure is 10,000 psi.

Ordering Information

Stainless steel tubing (50 ft)

OD (in.)	ID (in.)	Part No.
1/32	0.007	AL81951
1/16	0.010	AL3005
	0.020	AL3002
	0.030	AL3000
	0.040	AL3003
	0.050	AL3004

Untreated 316 stainless steel tubing

OD (in.)	ID (mm)	Length (m)	Part No.
1/16	0.15	1	CP4014
	0.15	10	CP4065
	0.25	10	CP4044
	0.50	1	CP4005
	0.50	5	CP4049
	0.50	10	CP4050
	0.75	1	CP4007
	0.75	10	CP4056
	1.0	1	CP4009
	1.0	5	CP4061
	1.0	10	CP4062
	1.0	25	CP4063
1/4	4.3	1	CP4013
	4.3	10	CP4025
	4.3	25	CP4026
1/8	2.1	5	CP4024

Pretreated 316 stainless steel tubing

OD (in.)	ID (in.)	Part No.
1/16	0.25	CP4010
	0.50	CP4006
	0.75	CP4004

GC Tubing

UltiMetal™ Tubing for GC Columns

- **Inert glass-lined metal tubing – methyl deactivated for accurate data**
- **Suitable for transfer lines and retention gaps providing a wide application range**
- **Virtually unbreakable for longest lifetime and lowest costs of operation**

Ordering Information

UltiMetal tubing

OD (in.)	ID (mm)	Length (m)	Part No.
1/32	0.53	2	CP6530
1/16	0.25	10	CP6540
1/16	0.76	10	CP6545

UltiMetal: Glass Lined Column Connector

Maximum temperature is 450 °C when used with graphite ferrules.

Ordering Information

Description	Part No.
Connector for 0.25 mm ID UltiMetal Columns (Includes 5 ferrules)	CP4795
Replacement Graphite Ferrules for 0.25 mm ID Columns, 10/pk	CP4733
Replacement Graphite Ferrules for 0.53 mm ID Columns, 10/pk	CP4734

UltiMetal Column Cutter

The cutter makes clean cuts on UltiMetal columns and tubing and is recommended when on-column injection techniques are used.

See also

- Retention Gaps, protect columns and optimize peaks, page 184
- EZ-Guard™, protect your GC column, page 108
- Gas Clean™ Filters, for ultimate column performance and longevity, page 172

Ordering Information

Description	Part No.
Column Cutter	CP8099
Replacement Blade	CP736832

AT-Fittings

Parker A-Lok™ w/two-piece ferrules. These fittings have the same deactivation process applied so the sample does not come into contact with metal.

Ordering Information

AT fittings

Description	Part No.
1/8 in. to 1/16 in. Reducing Union	AL11080

Activity Tested (AT) Steel Tubing: Where Rugged Steel Construction is Needed

AT tubing combines the strength of stainless steel with the inertness of deactivated Fused Silica lining. Using chemical vapor deposition techniques and silicone chemistries transforms durable stainless steel tubing into a chromatographically inert material suitable for transfer lines. Flexible and strong, this tubing is inertness tested prior to dispatch.

Ordering Information

AT steel tubing

OD (in.)	ID (in.)	Length (ft)	Part No.
1/16	0.020	25	AL11065
	0.030	6	AL11068
	0.030	100	AL11071
1/8	0.085	50	AL11078

Hi-EFF™ Grade Stainless Steel Tubing: With Exact Specification to Fabricate GC Columns

Hi-EFF tubing is acetone washed 304 stainless steel. It is specially tempered for easy bending and is more ductile than 316 stainless steel.

Ordering Information

Hi-EFF grade stainless steel tubing (50 ft)

Description	Part No.
1/8 in. OD x 0.085 in.	AL30106

Perfluoroalkoxy (PFA) Polymeric Tubing: For Maximum Inertness

Ordering Information

(25 ft)

OD (in.)	ID (in.)	Part No.
1/16	0.03	AL45734

GC Injectors

1177 Split/Splitless Capillary Injector: Superior Performance for Better Sensitivity

- **Dual Split design reduces run-to-run carryover and is excellent for thermally labile samples**
- **High pressure operation (450-GC only) for fast analyses using state of the art ultra-narrow bore capillary columns**
- **Digital pneumatic control for unparalleled ease-of-use and outstanding results regardless of operator skill level**

The Varian 1177 capillary injector provides excellent performance in either split or splitless modes. An improved injector body offers the ability to use larger volume inlet liners for today's most challenging analyses. Fully compliant with all commonly used "industry standard" glass inserts and straightforward insert maintenance and replacement make the 1177 the excellent choice for all of your demanding day-to-day capillary analysis needs. The 1177 is available with UltiMetal™ surface deactivation treatment for ultimate inertness for the sample delivering outstanding results, including the analysis of highly reactive or polar analytes.

Technical Specifications

Characteristics	
Maximum installed concurrently operating injectors	3
Pressure range	0-150 psi
Total flow	500 mL/min at 10 psi
Maximum temperature	450 °C
Split range	1-10,000 (column dependent)
Suited for columns	Wide bore (0.53 mm) and narrow bore (0.05 to 0.32 mm)

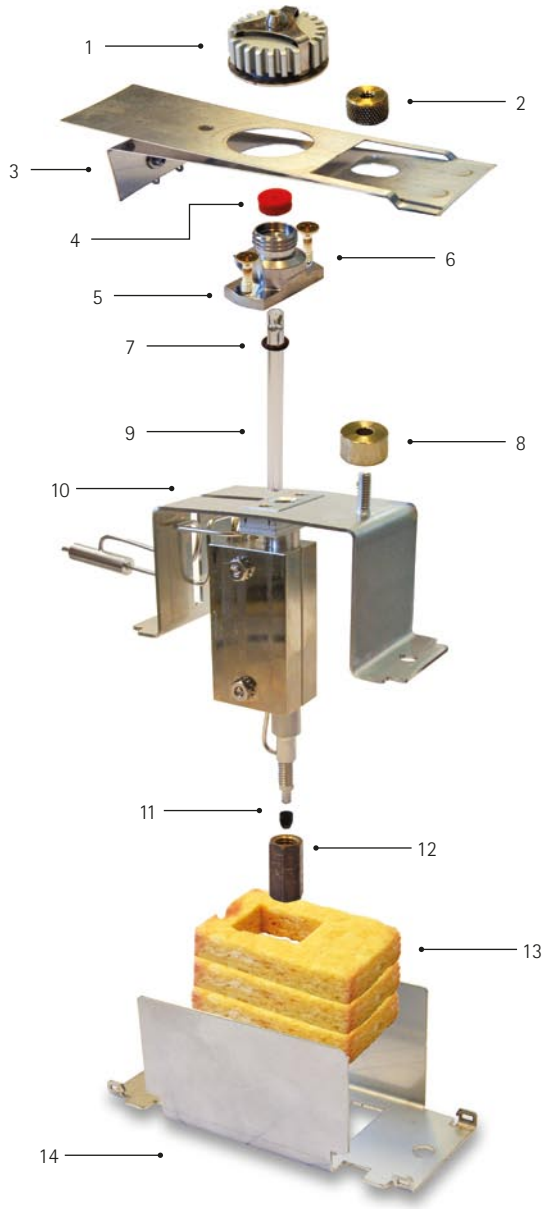
Ordering Information

1177 GC injector, 1/16 in. column ferrules, (10/pk)

Column ID (mm)	Holes	Part No.			
		40% Graphite/60% Vespel®	Graphite	SilTite	Vespel
0.18 and smaller	1	CR213103			CR212103
0.25	1	CR213104	CR211104		CR212104
	2	CR213124	CR211124		
0.25 and smaller	1			SG073300	
0.32	1	CR213105	CR211105	SG073301	CR212105
	2	CR213125	CR211125		CR212125
0.53	1	CR213108	CR211108	SG073302	CR212108

For more information, please visit www.varianinc.com/gccol_ac.html or visit www.varianinc.com/products.html to place an order.

GC Injectors



Ordering Information

1177 GC injector spares

Number	Description	Part No.
1	Injector Nut	392597501
	Injector Nut Wrench	390842300
2	Knob	392597101
3	Inject Switch Assembly	390820601
4	Septum, 9 mm	
	BTO (lowest bleed)	CR298713
	Marathon (autosampler)	CR239778
	Advanced Green 3 (general purpose)	CR246713
	Septum Pick	7200008400
5	Septum Purge Head	
	EFC21 (stainless steel)	392597301
	EFC21 (UltiMetal™)	392597303
	EFC25 or Manual Pneumatics	392597302
6	Purge Head Screw (x2)	391866308
7	O-ring, Liner	
	Graphite, 6.5mm for Splitless	392611930
	Viton®, 6.3mm	8850103100
8	Spacer	39258101
9	Glass Insert (default)	3926119271
10	Injector Body	
	Stainless Steel	392599401
	UltiMetal	392599411
	Manual	392599501
11	Column Ferrule, see table opposite	
12	Capillary Column Nut	394955100
13	Insulation	
14	Cover	

GC Injectors

1079 LVI (Large Volume Injector): For Excellent Chromatographic Flexibility and Performance

- **Highly flexible/multiple operational modes adaptable for a wide analysis range**
- **Broad assortment of inlet liner types easily applied to many applications**
- **Very low detection levels compared to traditional splitless injection methods**

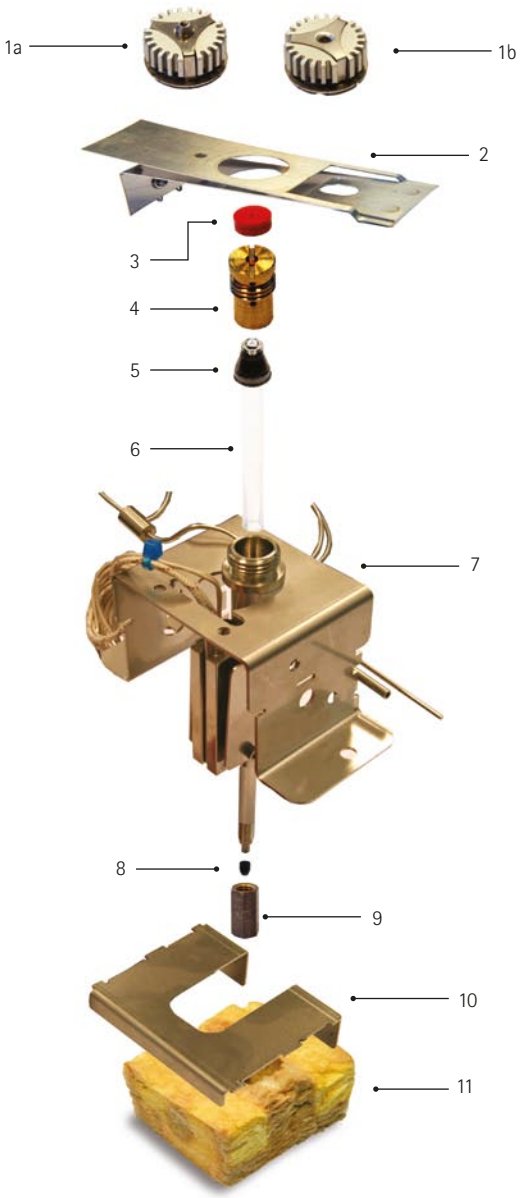
With the 1079 (sometimes referred to as programmable temperature vaporizing (PTV) injector), you can inject up to 250 µL automatically, delivering much more analyte onto the column to achieve very low detection levels compared to traditional splitless injection techniques. The 1079 is compatible with the full range of all WCOT (open tubular) capillary columns and is operated in isothermal or temperature programmed modes. The injection port can be cryogenically cooled via liquid nitrogen or carbon dioxide as well as through the use of forced air. The injector is available with UltiMetal™ surface deactivation treatment for ultimate inertness for the sample delivering outstanding results, including the analysis of highly reactive or polar analytes.

Ordering Information

1079 GC injector, 1/16 in. column ferrules (10/pk)

Column ID (mm)	Holes	Part No.			
		40% Graphite/60% Vespel®	Graphite	SilTite	Vespel
0.18 and smaller	1	CR213103			CR212103
0.25	1	CR213104	CR211104		CR212104
	2	CR213124	CR211124		
0.25 and smaller	1			SG073300	
0.32	1	CR213105	CR211105	SG073301	CR212105
	2	CR213125	CR211125		
0.53	1	CR213108	CR211108	SG073302	CR212108

GC Injectors



Ordering Information

1079 GC injector spares

Number	Description	Part No.
1a	Injector Nut	CP8400/8410 (392595401 default)
1b	Injector Nut	394966601
	Injector Nut Wrench	390842300
2	Automatic Start Switch	390820601
3	Septum, 11.5 mm	
	BTO (lowest bleed)	CR298717
	Marathon (autosampler)	CR239787
	Advanced Green 3 (general purpose)	CR246725
	Septum Pick	7200008400
4	Septum Support	391867600
5	Insert Ferrule	392534201
6	Glass Insert (default)	392611945
7	Injector Body, EFC type	
	Stainless Steel	392544001
	UltiMetal™	392544011
8	Column Ferrule, see table opposite	
9	Bottom Nut	394955100
10	Insulation	
11	Cover	

GC Injectors

1093 Cold On-Column (COC) Injector: For Ultimate Chromatographic Fidelity

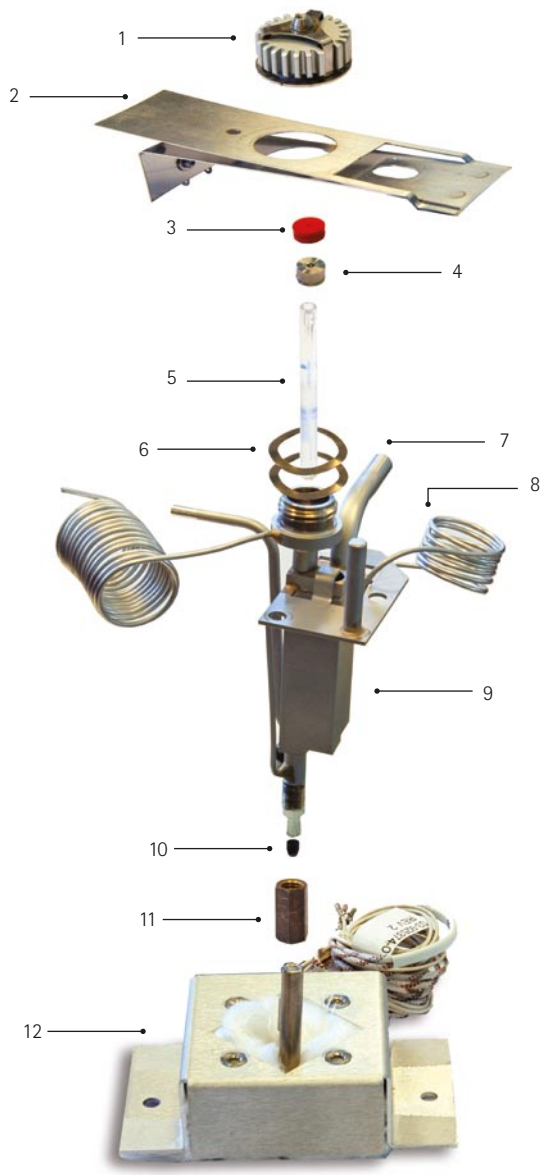
- **Virtually no possibility of discrimination or sample degradation**
- **Fully temperature programmable for the widest range of method/column requirements**
- **Flexible/active cooling reduces run-to-run analysis times**

With the 1093 injector you can deposit the sample onto the analysis column intact with virtually no possibility of discrimination or sample degradation. The injector is fully temperature programmable to meet the widest range of method and column requirements. Flexible/active cryogenic cooling is via liquid nitrogen or carbon dioxide, or economical forced air cooling, to reduce analysis times. The 1093 can be heated to 450 °C for high temperature analysis such as biodiesel glycerides and simulated distillation. This injector is available with UltiMetal™ surface deactivation treatment for ultimate inertness for the sample delivering outstanding results, including the analysis of highly reactive or polar analytes.

Technical Specifications

Characteristics	
Pressure range	0-150 psi
Total flow	50 mL/min (Type 3 EFC), 500 mL/min (Type 4 EFC)
Maximum temperature	450 °C
Maximum temperature ramp rate	200 °C/min
Temperature ramps/holds	24/25
Suited for columns	Wide bore (0.53 mm) and narrow bore (0.32 mm)

GC Injectors



Ordering Information

1093 GC injector spares

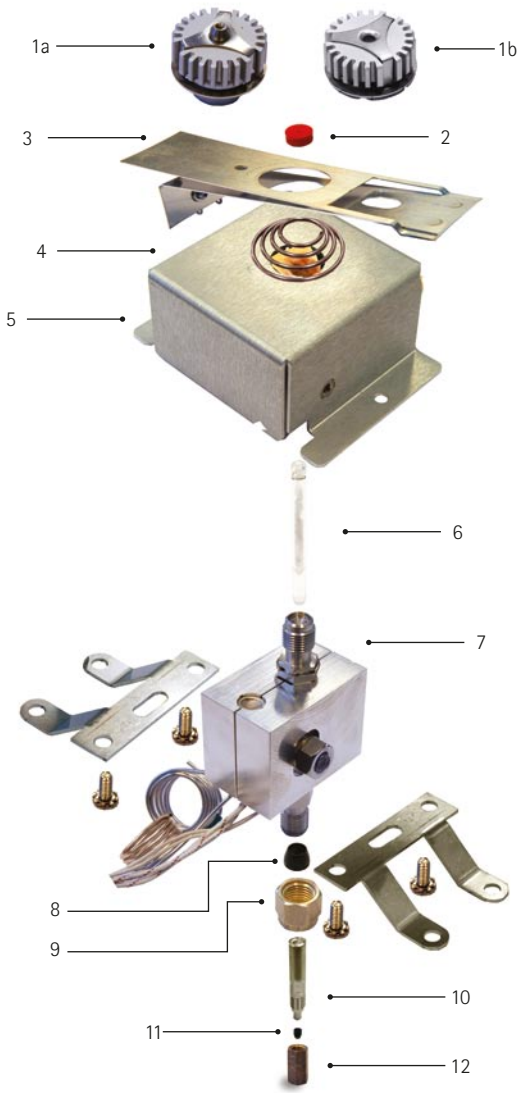
Number	Description	Part No.
1	Injector Nut	3949666601
	Injector Nut Wrench	390842300
2	Automatic Start Switch	390820601
3	Septum, 7/16 in.	
	BTO CenterGuide™	CR298717
	Marathon (autosampler)	CR239287
	Advanced Green 3 CenterGuide	CR246225
	Septum Pick	7200008400
4	Septum Support	391821100
5	Glass Insert (default)	SG092034
	High performance	190010906
	On-column	190010907
	Packed	392611950
6	Wave Spring Washer (x2)	1492000501
7	Coolant Exit	
	Frit Restrictor	3600004601
	Plug, 1/8 in. tube	2824707101
8	Screw (x3)	391866306
9	Injector Body	
10	Ferrule	
	40% Graphite/60% Vespel® (up to 400 °C)	CR213400
	Graphite (up to 450 °C)	CR211400
11	Bottom Nut	
	Brass	394955100
	Stainless Steel	CP743117
12	Heater/Probe	
	120 Vac	391833400
	230 Vac	391833401

GC Injectors

1061 Packed/530 µm Capillary Column Injector: Flash Vaporization

- **Top loading liners are quick to maintain and replace, saving time**
- **Simple column switch over facilitates ease-of-use**
- **No need to disconnect the column, improving productivity**

The 1061 is designed for sample injection onto 530 µm Fused Silica columns or 1/8 in. to 1/4 in. OD packed columns (glass or metal). It is used with packed glass liners to facilitate the analysis of "dirty" samples. Switch over from packed column to 530 µm column operation is accomplished by a simple change of column adapter. Electronic flow control is available for either constant flow or constant pressure mode depending on the analysis requirements.



Ordering Information

1061 GC injector spares

Number	Description	Part No.
1a	Injector Nut	390812700
1b	Injector Nut	392595501
	Injector Nut Wrench	390842300
2	Septum, 9.5 mm	
	BTO (lowest bleed)	CR298705
	Marathon (autosampler)	CR239188
	Advanced Green 3 (general purpose)	CR246124
	Septum Pick	7200008400
3	Automatic Start Switch	390820601
4	Spring	
5	Cover and Insulation	
6	Glass Insert (default)	392611943
7	Injector Body, EFC23	392548301
8	Ferrule	
	40% Graphite/60% Vespel® (up to 400 °C)	CR213400
	Graphite (up to 450 °C)	CR211400
9	Injector Body Nut (stainless steel)	SWSS4021
10	Column Guide	392558301
11	Column Ferrule, see table below	
12	Bottom Nut	394955100

Ordering Information

1061 GC injector, 1/16 in. x 0.8 mm ID column ferrules (10/pk)

Column	Part No.			
	40% Graphite/60% Vespel	Graphite	SilTite	Vespel
0.53 mm ID	CR213108	CR211108	SG073302	CR212108

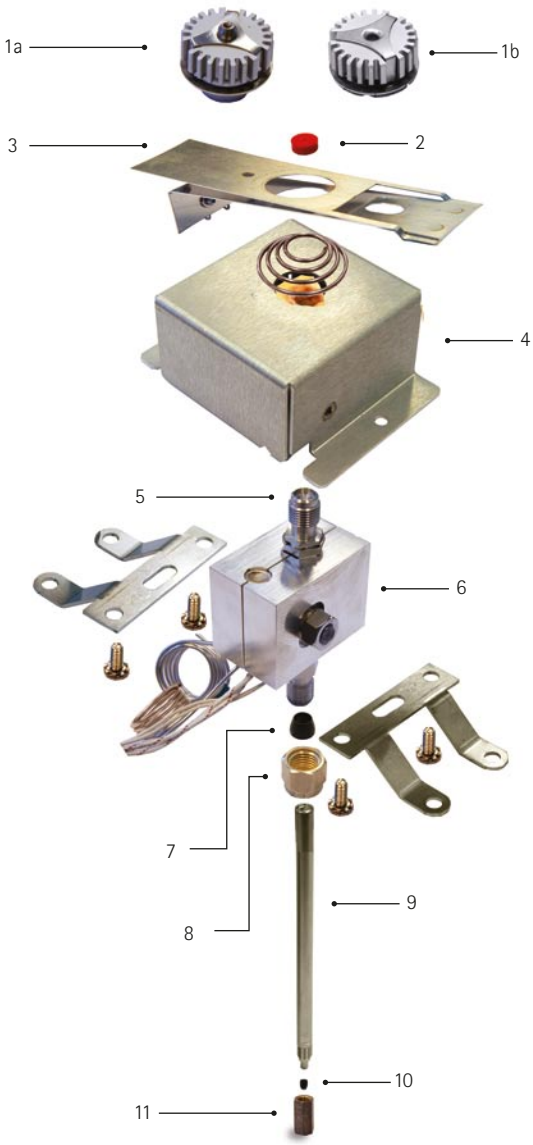
For more information, please visit www.varianinc.com/gccol_ac.html or visit www.varianinc.com/products.html to place an order.

GC Injectors

1041 Packed/Wide Bore On-Column (PWOC) Injector: Maintain Sample Integrity

- **On-column injection maintains sample integrity**
- **Inert analysis pathway minimizes sample degradation**
- **Simple column switch over facilitates ease-of-use**

On-column injection with the 1041 injector ensures sample integrity for thermally labile materials, with virtually no discrimination for samples across a very wide range of analyte boiling points. The Fused Silica or glass column extends all the way from the injector septum to the detector, providing a clean, inert analysis pathway to minimize or eliminate sample degradation. A simple change of column adapter makes switching between 530 µm capillary columns and packed columns fast and simple. The 1041 is designed for on-column sample injection onto 530 µm Fused Silica columns or 1/4 in. and 1/8 in. OD packed columns. Electronic flow control is available for constant flow or constant pressure mode.



Ordering Information

1041 GC injector spares

Number	Description	Part No.
1a	Injector Nut	390812700
1b	Injector Nut	392595501
	Injector Nut Wrench	390842300
2	Septum, 9.5 mm	
	BTO (lowest bleed)	CR298705
	Marathon (autosampler)	CR239188
	Advanced Green 3 (general purpose)	CR246124
	Septum Pick	7200008400
3	Automatic Start Switch	390820601
4	Spring	
5	Cover and Insulation	
6	Injector Body, EFC type	392548201
7	Ferrule	
	40% Graphite/60% Vespel® (up to 400 °C)	CR213400
	Graphite (up to 450 °C)	CR211400

Ordering Information

1041 GC injector spares continued

Number	Description	Part No.
8	Injector Body Nut (stainless steel)	SWSS4021
9	Injector Insert (stainless steel)	392543101
10	Column Ferrule, see table below	
11	Capillary Nut	394955100
	Liner for 0.53 mm columns	391720300

Ordering Information

1041 GC injector, 1/16 in. x 0.8 mm ID column ferrules (10/pk)

Column	Part No.			
	40% Graphite/60% Vespel	Graphite	SilTite	Vespel
0.53 mm ID	CR213108	CR211108	SG073302	CR212108

GC Injector liners

CP-1177 Deactivated Injector Liners: Deactivated to Preserve Sample Integrity

- **Deactivation reduces loss of sample**
- **Deactivation reduces peak tailing**
- **Deactivation reduces loss of sensitivity**

Varian injection liners are deactivated using gas phase silanization to limit sample degradation.

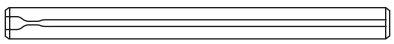
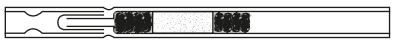
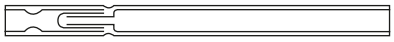
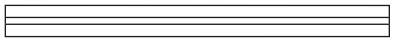
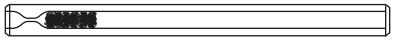
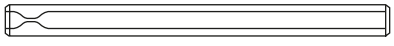
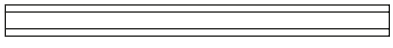
Ordering Information

O-Rings for all 6.3 and 6.5 mm OD liners

Material	T Max (°C)	Part No.		
		6.3 and 6.5 (mm) (25/pk)	6.3 (mm) (10/pk)	6.5 (mm) (10/pk)
Graphite	400		392611935	392611940
Viton®	250	8850103100		

Ordering Information

(5/pk)

Top	Injection Mode	ID (mm)	OD (mm)	Type	Packing	Part No.
	SPME	0.75	6.3	Gooseneck	Open	392611998
	Split	1.00	6.3	Straight Through	Open	392611999
	Split	4.00	6.3	Cup Splitter	10% OV-1 On Chromosorb-W HP	392611933
	Split	4.00	6.3	Cup Splitter	Fused Silica Wool	392611932
	Split	4.00	6.3	Cup Splitter	Open	392611931
	Split	4.00	6.3	Straight Through	Fused Silica Wool	392611934
	Split/ splitless	2.00	6.5	Gooseneck	Open	392611926
	Splitless	2.00	6.5	Straight Through	Glass Wool	392599903
	Splitless	2.00	6.5	Straight Through	Open	392611924
	Splitless	4.00	6.5	Double Gooseneck	Open	392611929
	Splitless	4.00	6.5	Gooseneck	Fused Silica Wool	392611928
	Splitless	4.00	6.5	Gooseneck	Glass Wool	392611936
	Splitless	4.00	6.5	Gooseneck	Open	392611927
	Splitless	4.00	6.5	Straight Through	Glass Wool	392611937
	Splitless	4.00	6.5	Straight Through	Open	392611925

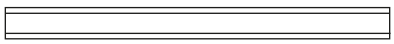
GC Injector liners

CP-1177 Siltek Deactivated Injector Liners: Maximize Inertness of Sample Path

- Minimize sample breakdown to preserve trace components
- Low bleed improves signal to noise ratio for trace analysis
- Thermally stable to resist breakage and reduce costs

Ordering Information

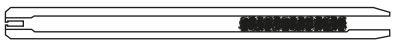
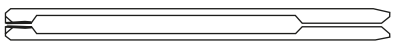
(5/pk)

Top	Injection Mode	ID (mm)	OD (mm)	Type	Packing	Part No.
	Split	4	6.3	Gooseneck	Glass Frit	RT210462145
	Split	4	6.3	Straight	Siltek-deactivated Fused Silica Wool	RT210792135
	Splitless	2	6.3	Straight	Open	RT207132145
	Splitless	4	6.3	Gooseneck	Open	RT207992145
	Splitless	4	6.3	Straight	Open	RT207732145

1060/1061 Varian Injector Liners

Ordering Information

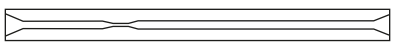
(5/pk)

Top	Injector	Injection Mode	Type	Packing	Part No.
	1060	Flash Vaporization, Packed	Gooseneck	Glass Wool	392611944
	1060	Flash Vaporization, Packed	Gooseneck	Glass Wool	3700081301 (10/pk)
	1061	Flash Vaporization, 0.53 mm ID Capillary	Double Gooseneck	Open	392611943

1093/1094 SPI SGE Deactivated Injector Liners: Tapered for Narrow or Wide Bore Capillary Columns

Ordering Information

(5/pk), liners are 4.6 mm OD x 54 mm in length

Top	Injection Mode	ID (mm)	Type	Packing	Part No.
	On Column	0.8	Taper, 0.25 mm Restriction	Open	SG092030
	On Column	0.8	Taper, 0.5 mm Restriction	Open	SG092034

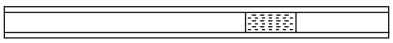
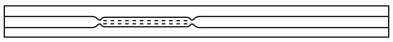
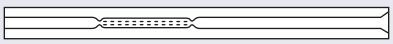
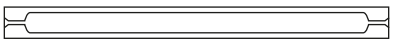
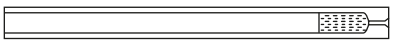
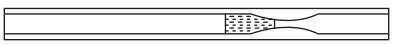
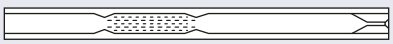
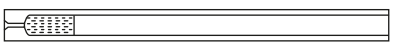
GC Injector liners

CP-1177 SGE Deactivated Injector Liners: For Less Peak Tailing

- **Reduced sample loss improves quantitation**
- **Improved peak shape for better chromatography**
- **Direct, split and splitless injection modes cover most applications**

Ordering Information

(5/pk)

Top	Injection Mode	ID (mm)	Type	Packing	Part No.
	Split	4.0	Straight Through	Fused Silica Wool	SG092001
	Split	4.0	Straight Through	Open	SG092007
	Split/splitless	2.3	FAST FocusLiner	Fused Silica Wool	SG092005
	Split/splitless	2.3	Tapered Fast FocusLiner	Fused Silica Wool	SG092111 (25/pk SG092115)
	Split/splitless	4.0	Double Gooseneck	Open	SG092018
	Split/splitless	4.0	FocusLiner	Fused Silica Wool	SG092002 (25/pk SG092219)
	Split/splitless	4.0	Gooseneck	Quartz Wool	SG092019
	Split/splitless	4.0	Gooseneck	Open	SG092017
	Split/splitless	4.0	Recessed Gooseneck	Quartz Wool	SG092010
	Split/splitless	4.0	Tapered Fast FocusLiner	Fused Silica Wool	SG092003 (25/pk SG092011)
	Split/splitless	4.0	Single Taper	Quartz Wool	SG092218

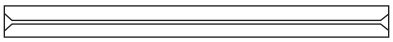
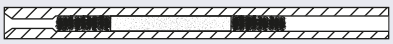
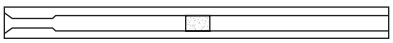
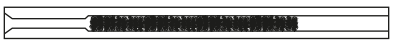
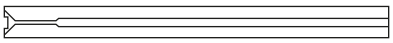
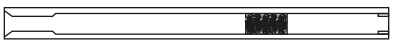
GC Injector liners

Varian Deactivated Injector Liners: Optimized for Sensitive and Reproducible Analysis

- **Sold in packages of five, easy-opening storage trays**
- **All liners deactivated to meet our high performance standards**
- **Silanization activation prevents sample degradation**

Ordering Information

(5/pk), liners are 5 mm OD x 54 mm in length

Top	Injection Mode	ID (mm)	Type	Packing	Part No.
	Direct, for 0.25 and 0.32 mm ID Columns	0.5	Taper	Open	190010906
	On Column, for 0.53 mm ID Columns	0.8	Taper	Open	190010907
	SPME	0.8	Straight Through	Open	392611948
	Split	3.4	Gooseneck	10% OV-101 on Chromosorb W-HP 80/100	392611954
	Split	3.4	Gooseneck	Glass Frit	392611946
	Split	3.4	Gooseneck	Open	392611945
	Split/splitless	2.0	Gooseneck	Glass Wool	392611953
	Splitless	0.5	Straight Through	Open	392611949
	Splitless	2.0	Gooseneck	Open	392611947
	Large Volume Injection	3.4	Mineral Oil Analysis	Application specific	CP14988
	Large Volume Injection	3.4	Pesticide Analysis	Frit	CP8020

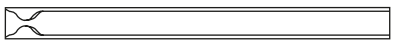
GC Injector Liners

1078/1079 Siltek Deactivated Injector Liners: Maximizes Sample Path Inertness

- Minimize sample breakdown to avoid misleading results
- Low bleed improves signal to noise ratio for trace analysis
- High thermal stability resists breakage and reduces costs

Ordering Information

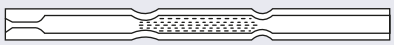
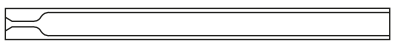
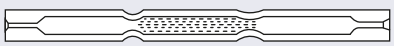
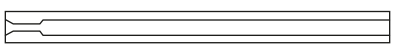
(5/pk), liners are 5 mm OD x 54 mm in length

Top	Injection Mode	ID (mm)	Type	Packing	Part No.
	Split	2.0	Gooseneck	Open	RT217122145
	Split	3.4	Gooseneck	Glass Frit	RT217092145
	Split	3.4	Gooseneck	Open	RT209012145

1078/1079 SGE Deactivated Injector Liners: FocusLiner for Improved Accuracy and Precision

Ordering Information

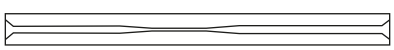
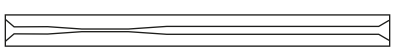
(5/pk), liners are 5 mm OD x 54 mm in length

Top	Injection Mode	ID (mm)	Type	Packing	Part No.
	Large Volume Injection	1.0	Gooseneck	Scintered Tube	SG092245
	Split/splitless	3.4	FocusLiner	Fused Silica Wool	SG092037
	Split/splitless	3.4	Gooseneck	Open	SG092038
	Split/splitless	3.4	Tapered FocusLiner	Fused Silica Wool	SG092036
	Splitless	2.0	Gooseneck	Open	SG092039

1093/1094 SPI Varian Deactivated Injector Liners

Ordering Information

(5/pk), liners are 4.6 mm OD x 54 mm in length

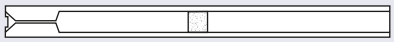
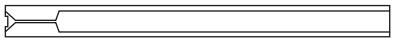
Top	Injection Mode	ID (mm)	Type	Packing	Part No.
	Direct	0.8	Taper	Glass Wool	392611950
	Direct, for 0.25 and 0.32 mm ID Columns	0.5	Taper	Open	190010906
	On Column, for 0.53 mm ID Columns	0.8	Taper	Open	190010907

GC Injector Liners

1075/1077 Varian Deactivated Injector Liners: Deactivated, Split and Splitless

Ordering Information

(5/pk), liners are 6.3 mm OD

	Injection Mode	ID (mm)	Type	Packing	Length (mm)	Part No.
	Split	4.0	Gooseneck	Baffle	72	190010904
	Split	4.0	Gooseneck	Glass Frit	72	190010903
	Split	4.0	Gooseneck	Open	72	392611942
	Splitless	2.0	Taper	Open	75	190010905

Ordering Information

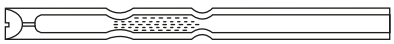
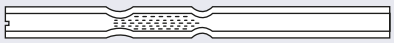
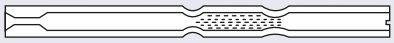
Liner Accessories

Description	Part No.
1/4 in. Graphite Ferrule	CR211400 (10/pk)
Spring for use with Split Liners	394978600 (1 each)

1075/1077 SGE Deactivated Injector Liners: FocusLiners for Improved Accuracy and Precision

Ordering Information

(5/pk), liners are 6 mm OD

	Injection Mode	ID (mm)	Type	Packing	Length (mm)	Part No.
	Split	4.0	FocusLiner	Fused Silica Wool	72	SG092028
	Split	4.0	FocusLiner	Fused Silica Wool	72	SG092022
	Split	4.0	Gooseneck	Fused Silica Wool	72	SG092021
	Split	4.0	Tapered FocusLiner	Fused Silica Wool	72	SG092025

Ordering Information

Liner accessories

Description	Part No.
1/4 in. Graphite Ferrule	CR211400 (10/pk)
Spring for use with Split Liners	394978600 (1 each)

Vials

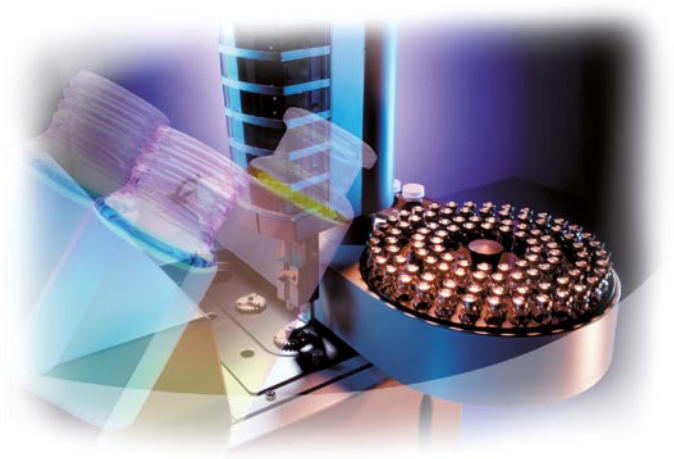
Vial Septa: Specially Formulated to Minimize Contamination

Vial septa (also called cap liners) are selected according to the type of sample being analyzed. All vial septa contain small quantities of organic materials that might be detectable with the analytical instrumentation you are using. For most GC/MS and other high sensitivity detectors, we recommend the Ultra GC/MS septum. It has very low levels of contaminants to minimize interference with the analysis, and has been qualified by Varian, Inc. using GC/MS technology.

Chemical compatibility information is of a general nature, often measured by the degree of swelling and other effects the chemical has on the material, and should be used only as a guide. Compatibility within a chemical class can vary according to the molecular weight of the solvent, and other factors. We recommend that you try different vial septa materials to determine the best one for your combination of sample type and analytical conditions.

- Silicone is the most widely used material for vial septa. Our Ultra GC/MS septa are specially prepared from silicone and PTFE materials to provide minimal septa contamination of the sample.
- Butyl rubber/PTFE septa are used with ketones and acids, and where silicone septa do not perform well.

Our silicone and butyl rubber septa, including Ultra GC/MS septa, have a PTFE barrier layer to reduce the contact between the sample and septum materials. Before the PTFE layer is punctured, the chemical compatibility properties of PTFE will determine the solvent compatibility. After puncture, the septa material will determine the compatibility.



Septa Compatibility

Chemical	PTFE	Silicone	Butyl Rubber
Acids, concentrated	Excellent	Poor	Good
Acids, dilute	Excellent	Good	Excellent
Air and gas permeability	High	Moderate	Low
Alcohols	Excellent	Excellent	Good to excellent
Aliphatic hydrocarbons	Excellent	Poor	Poor
Alkalis	Excellent	Good to excellent	Good to excellent
Aromatic hydrocarbons	Excellent	Poor	Poor
Halogenated solvents	Excellent	Poor	Poor
Ketones	Excellent	Poor to good	Good to excellent
Water	Excellent	Excellent	Excellent

Once a vial septum has been penetrated by a needle, contamination on subsequent analyses can increase if sample components are able to extract chemicals from the septa. If contamination is apparent on the 2nd or later analyses from a vial, but is not apparent on the 1st analysis, you should use each vial for only one analysis.

Sample storage time and temperature before the analysis influence the extent to which septa materials might be transferred into the sample. Good practice suggests shorter storage times and avoiding elevated storage temperatures. Also, volatile components can be lost with long storage times, even with the best vial septa.

Vials

2 mL Screw Top 9 mm Wide Opening Vials: Compatible With Virtually all Robotic Autosamplers

- **Wide vial opening reduces syringe needle damage and saves downtime**
- **Available in large, economical pack sizes**
- **Universal 12 x 32 mm size**

We recommend our Ultra GC/MS vial kits and vial septa for all GC/MS and high sensitivity detector applications. These vials are 12 x 32 mm.

Ordering Information

2 mL screw top 9 mm wide-opening vial kits

Material	Septa	Part No.	
		(100/Pk)	(1000/Case)
Clear Glass	Ultra GC/MS/ PTFE	392611979	392620530
	Silicone/PTFE	392611549	392620532
	Butyl/PTFE	392611633	392620534
Amber Glass	Ultra GC/MS/ PTFE	392612016	392620531
	Silicone/PTFE	392611550	392620533
	Butyl/PTFE	392611834	392620535

100 vials and caps with pre-inserted septa per kit. 10 kits per case. Select kits according to the vial glass and septa materials needed.

2 mL screw top 9 mm wide-opening vials

Material	Deactivation	Part No.	
		(100/Pk)	(1000/Case)
Clear Glass	Not Deactivated	392611653	392620500
	Silanized	392611655	392620501
Amber Glass	Silanized	392611879	392620503

Order caps and septa separately to meet your needs.

9 mm red polypropylene caps with septa inserted

Septa	Part No.	
	(100/Pk)	(1000/Case)
Ultra GC/MS/PTFE	392620504	392620505
Silicone/PTFE	392611659	392620506
Butyl/PTFE	392611661	392620507

Pre-inserted septa save time and reduce contamination

Ordering Information

9 mm septa

Septa	Part No.	
	(100/Pk)	(1000/Case)
Ultra GC/MS/PTFE	392620508	392620509
Silicone/PTFE	392620510	392620511

For use in 9 mm screw caps.

Low volume inserts for 9 mm wide-opening vials

Volume (µL)	Deactivation	Type	Part No.	
			(100/Pk)	(1000/Case)
200	Not Deactivated	Conical, no spring	392611596	392620536
	Not Deactivated	Conical, polymer spring	392611594	392620538
	Silanized	Conical, no spring	392611855	392620537
	Silanized	Conical, polymer spring	392611595	392620539

Inserts without springs are taller so they form a tight seal with the septa. Inserts with springs self-center in the vial, and the spring pressure creates the seal between the insert and the septa. For volatile samples, we recommend inserts without springs, or the fused insert below. Use with amber vials for light-sensitive samples. Order vials, and caps with septa separately.

300 µL fused insert 9 mm vials

Volume (µL)	Material	Deactivation	Part No.
300	Clear Glass	Not deactivated	392620514

These vials have a glass low-volume insert that is fused to the vial opening, preventing volatile sample components from leaking into the space between the vial and the insert. Order caps and septa separately. 100/pk

Vials

2 mL Crimp Top Wide Opening Vials: Crimp Top Vials Fit Many Autosamplers

- **Wide vial opening reduces syringe needle damage and reduces costs**
- **Economical, large pack sizes**
- **Universal 12 x 32 mm size**

We recommend our Ultra GC/MS vial kits and vial septa for all GC/MS and high sensitivity detector applications.

Ordering Information

2 mL crimp top wide-opening vial kits

Material	Septa	Part No.	
		(100/Pk)	(1000/Case)
Clear Glass	Ultra GC/MS/ PTFE	392620515	392620540
	Silicone/PTFE	392611525	392620542
Amber Glass	Ultra GC/MS/ PTFE	392620516	392620541
	Silicone/PTFE	392611526	392620543

100 vials and caps with pre-inserted septa per kit. 10 kits per case. Select kits according to the vial glass and septa materials needed. Vials are not silanized.

2 mL crimp top wide-opening vials

Material	Deactivation	Part No.	
		(100/Pk)	(1000/Case)
Clear Glass	Not Deactivated	392611634	392620517
	Silanized	392611637	392620518
Amber Glass	Not Deactivated	392611635	392620519
	Silanized	392611638	392620520

Order caps and septa separately to meet your needs.

11 mm crimp caps with septa inserted

Septa	Part No.	
	(100/Pk)	(1000/Case)
Ultra GC/MS/PTFE	392620521	392620522
Silicone/PTFE	392611631	392620523
Butyl/PTFE	392611632	392620524

Pre-inserted septa save time and reduce contamination.

Ordering Information

Low volume inserts for wide-opening crimp top vials

Volume (µL)	Deactivation	Type	Part No.	
			(100/Pk)	(1000/Case)
200	Not Deactivated	Conical, no spring	392611596	392620536
	Not Deactivated	Conical, polymer spring	392611594	392620538
	Silanized	Conical, no spring	392611855	392620537
	Silanized	Conical, polymer spring	392611595	392620539

Inserts without springs are taller so they form a tight seal with the septa. Inserts with springs self-center in the vial, and the spring pressure creates the seal between the insert and the septa. For volatile samples, we recommend inserts without springs, or the fused insert below. Order vials, and caps with septa separately.

2 mL Screw Top Standard Opening Vials: Classic Vials Compatible With Some Autosamplers

Ordering Information

Clear glass 2 mL screw top standard opening vial kits

Deactivation	Quantity	Part No.		
		Ultra GC/ MS/PTFE	Silicone/ PTFE	Butyl/PTFE
Not Deactivated	100/pk	392612022	392611530	392611826
Not Deactivated	144/pk		394983500	
Not Deactivated	1440/ case		392611987	
Not Deactivated	1728/ case		394983501	
Silanized	100/pk		392611535	

Vials and caps with pre-inserted septa. Select kits according to the vial glass, deactivation, and septa materials needed.

Amber glass 2 mL screw top standard opening vial kits

Deactivation	Quantity	Part No.		
		Ultra GC/ MS/PTFE	Silicone/ PTFE	Butyl/PTFE
Not Deactivated	100/pk		392611531	392611827
Silanized	100/pk		392611833	

Vials and caps with pre-inserted septa. Select kits according to the vial glass, deactivation, and septa materials needed.

2 mL screw top standard opening vials

Material	Deactivation	Part No.	
		(100/Pk)	(1000/Case)
Clear Glass	Not Deactivated	392611639	392620550
	Silanized	392611642	392620551
Amber Glass	Not Deactivated	392611640	392620552

Order caps and septa separately to meet your needs.

8/425 screw caps with septa

Septa	Part No.	
	(100/Pk)	(1000/Case)
Ultra GC/MS/PTFE	392612023	392620557
Silicone/PTFE	392611641	392620558
Butyl/PTFE	392611645	392620559

Pre-inserted septa save time and reduce contamination.

Ordering Information

8 mm septa

Septa	Part No.		
	(100/Pk)	(144/Pk)	(1728/Case)
Ultra GC/MS/ PTFE	392612024		
Silicone/Red PTFE		6900016900	
Silicone/Blue PTFE		390614901	390614902

For use in 8 mm screw caps.

Low volume inserts for standard opening 2 mL vials

Volume (µL)	Deactivation	Type	Part No.	
			(100/Pk)	(1000/Case)
100	Not Deactivated	Conical, no spring	392611593	392620546
	Not Deactivated	Conical, polymer spring	392611591	392620548
	Silanized	Conical, no spring	392611856	392620547
	Silanized	Conical, polymer spring	392611592	392620549

Inserts without springs are taller so they form a tight seal with the septa. Inserts with springs self-center in the vial, and the spring pressure creates the seal between the insert and the septa. For volatile samples, we recommend inserts without springs. Order vials, and caps with septa separately.

Vials

Polypropylene Vials: For Samples That are Not Compatible With Glass

- **Smaller volume requires less sample and reduces solvent costs**
- **Crimp and screw cap types for wide applicability**
- **Universal 12 x 32 mm dimensions fit all autosamplers**

Use Ultra GC/MS septa for all GC/MS and high sensitivity detectors.

Vial Storage Racks: Safely Hold Vials While Loading Samples

- **Help organize vials and samples to ensure correct identification**
- **Prevent top-heavy vials from falling over and avoid loss of valuable product**
- **Available for all popular vial sizes to ensure maximum applicability**

Ordering Information

12 x 32 mm polypropylene vials

Volume (µL)	Type	Part No.
750	Crimp Top 11 mm	392611667

Order the caps with septa for your application separately. 100/pk

11 mm aluminum crimp caps with septa

Septa	Part No.	
	(100/Pk)	(1000/Case)
Ultra GC/MS/PTFE	392620521	392620522
Silicone/PTFE	392611631	392620523
Butyl/PTFE	392611632	392620524

8 mm screw caps with septa

Septa	Part No.	
	(100/Pk)	(1000/Case)
Ultra GC/MS/PTFE	392612023	392620557
Silicone/PTFE	392611641	392620558
Butyl/PTFE	392611645	392620559

Ordering Information

Vial storage racks

Description	Size (mm)	Part No.
Plastic Vial Rack for 2 mL, 12 x 32 mm, Vials, Holds 50 Vials	12	392611517
Solid Plexiglass Vial Rack for 2 mL, 12 x 32 mm, Vials, Holds 50 Vials		392611516
Vial Storage Rack for 15 mm, Vials, Holds 48 Each	15	AL94878
Vial Storage Rack for 28 mm, Vials, Holds 50 Each	28	AL94882

Vials

Screw Top Headspace Vials: Easier to Seal

- **Good and bad seals can be felt by hand, and corrected before analysis**
- **No crimper to adjust**
- **Compatible with CTC autoamplers**

The 1.3 mm Silicone/PTFE septa are recommended for SPME applications.

Ordering Information

Screw top headspace kits, 100/pk

Volume (mL)	Septa	Thickness (mm)	Septa Color	Part No. Clear Glass
20	Silicone/PTFE	1.3	White/Light Blue PTFE	392620401
	Silicone/PTFE	1.5	White/Dark Blue PTFE	392620403
	Butyl/PTFE	1.6	Black/Red PTFE	392620405

Screw top headspace vials, 100/pk

Volume (mL)	Part No.	
	Amber Glass	Clear Glass
10	392620104	392620102
20	392620204	392620202

Screw caps with septa, 100/pk

Septa	Thickness (mm)	Septa Color	Part No.
Silicone/PTFE	1.3	White/Light Blue PTFE	392620302
	1.5	White/Dark Blue PTFE	392620304
Butyl/PTFE	1.6	Black/Red PTFE	392620306

Electronic Vial Crimpers: Reduce Hand and Wrist Strain

- **Electronic crimpers produce reliable crimp seals**
- **Electronic vial decappers quickly remove cap and septa**
- **Use with aluminum and bimetal crimp caps for wide applicability**

These hand-held rechargeable electronic crimpers and decappers will quickly and conveniently process hundreds of vials on one battery charge. With the crimper, you electronically set the precise crimp level required to create the proper cap seal. The crimper then repeats the same crimp operation time-after-time. The electronic decappers quickly and easily remove crimp caps and septa to speed up used vial processing. Each crimper and decapper comes with a battery and a separate battery charger. We recommend ordering a spare battery so your crimper will always be ready for use. These units are ergonomically designed to fit comfortably in the user's hand. Power is supplied by battery that uses environmentally-friendly nickel-metal hydride (NiMH) technology. The battery is rated for 200-300 charging cycles, and will crimp or decap several hundred vials per charge, depending on battery age and your crimp settings.

These units are designed for use with aluminum and bimetal crimp caps, but are not compatible with pharmaceutical flip off/tear off caps, or steel caps.

Ordering Information

Electronic vial crimpers

Region	Voltage	Part No.	
		(11 mm)	(20 mm)
Europe	240 VAC	CR311900QW	CR320900QW

Vials

Manual Vial Crimpers and Decappers: Fast and Economical

- **Crimpers are adjustable so crimp caps seal correctly to prevent leakage**
- **Adjusts for septa thickness and vial top dimensions for wide applicability**
- **Decappers easily remove the crimped cap from the vial, saving time**

Crimp Top Headspace Vials: Headspace Vials for all Autosamplers

- **Sizes from 6 to 20 mL for wide applicability**
- **Clear and amber glass vials for all sample types**
- **20 mm caps and septa**

Headspace autosamplers each have their own vial and cap configuration requirements. For example, CTC samplers require round-bottom vials, and several headspace autosamplers require magnetic caps. Our ordering information shows each vial's configuration, so check your autosampler's requirements so you can order compatible items. For magnetic caps, we recommend the bimetal magnetic crimp caps since they generally provide better seals, are easier to crimp and decap using hand tools, and are compatible with electronic rechargeable vial crimpers and decappers. All crimpers must be adjusted for the vial and cap/septa combination you are using. The crimp height needed to form a proper seal varies with flat- and bevel-top vials, the vial lip thickness, the septum thickness, and the crimp cap material. You should check the crimper adjustment with any change in the vial, septa, or cap. Only use crimpers that have a crimp depth adjustment. All crimpers Varian, Inc. sells are adjustable.

Tip
SPME headspace applications may require softer or thinner septa to avoid fiber damage.

Ordering Information

Manual vial crimpers and decappers

Diameter (mm)	Part No.	
	Hand Crimper	Hand Decapper
8	AL666008	AL98709
11	AL666011	AL98711
20	392612019	AL98719

For more information, please visit www.varianinc.com/gccol_ac.html or visit www.varianinc.com/products.html to place an order.

Ordering Information

Clear glass/magnetic steel crimp top headspace kits, 100/pk

Volume (mL)	Top	Bottom	Septa	OD x Height (mm)	Part No.
10	Bevel	Flat	Silicone/PTFE	23 x 46	392611615
	Bevel	Flat	Butyl/PTFE	23 x 46	392611616
20	Bevel	Flat	Silicone/PTFE	23 x 75	392611609
	Bevel	Flat	Butyl/PTFE	23 x 75	392611610

Clear glass/aluminium crimp top headspace kits, 100/pk

Volume (mL)	Top	Bottom	Septa	OD x Height (mm)	Part No.
10	Bevel	Flat	Silicone/PTFE	23 x 46	392611613
	Bevel	Flat	Butyl/PTFE	23 x 46	392611614
12	Flat	Flat	Silicone/PTFE	18 x 65	392611611
20	Bevel	Flat	Silicone/PTFE	23 x 75	392611607
	Bevel	Flat	Butyl/PTFE	23 x 75	392611608

Kits include vials and caps with septa inserted. The caps have 5 mm openings. Flat bottom vials are not compatible with CTC headspace autosamplers. Use our round bottom crimp top or new screw top vials and order the caps you need separately.

Crimp top headspace vials, 100/pk

Volume (mL)	Top	Bottom	Part No.	
			Amber Glass	Clear Glass
6	Bevel	Flat		392611857
10	Bevel	Flat		392611677
	Bevel	Round	392620526	
	Flat	Round		392612020
20	Bevel	Flat		392611675
	Bevel	Round	392620528	

Order caps with septa separately. Round-bottom vials are compatible with CTC headspace autosamplers.

Ordering Information

20 mm crimp caps with septa for headspace vials, 100/pk

Cap Material	Opening (mm)	Part No.	
		Butyl/PTFE	Silicone/PTFE
Aluminium	9.5	392611859	392611858
Bimetal Magnetic	8.0		392612017
Steel Magnetic	5.0		MLA200051M
	8.0		MLA200051ML

Order vials separately. With SPME applications, the septa in these caps are about 1/8 in. thick. SPME fibers might be damaged if the fiber is inserted too quickly, or the crimp cap is applied too tightly such that the septa material is tightly compressed. Crimp caps with 8 mm and larger openings are preferred for SPME applications. However, we recommend the screw cap headspace vials for SPME applications as the septa are thinner.

20 mm autosampler vials - for large samples or solvents

Item Name	Quantity (/Pk)	OD (mm)	Length (mm)	Part No.
5 mL Solvent Vials & CP-8410 Sample Vials w/20 mm Snap Caps & Septa	50	20	38	392611975
	100	20	38	392611974
10 mL CP-8410 Sample Vials w/20 mm Snap Caps & Septa	50	23	46	392611973

20 mm snap caps and septa, 50/pk

Description	Part No.
20 mm Snap Caps, 6 mm Hole, Ultra GC/MS Liners 50	392611984
Ultra GC/MS Septa for 20 mm Snap Caps	392611986