

Gas Chromatography Capillary Columns

InertCap™



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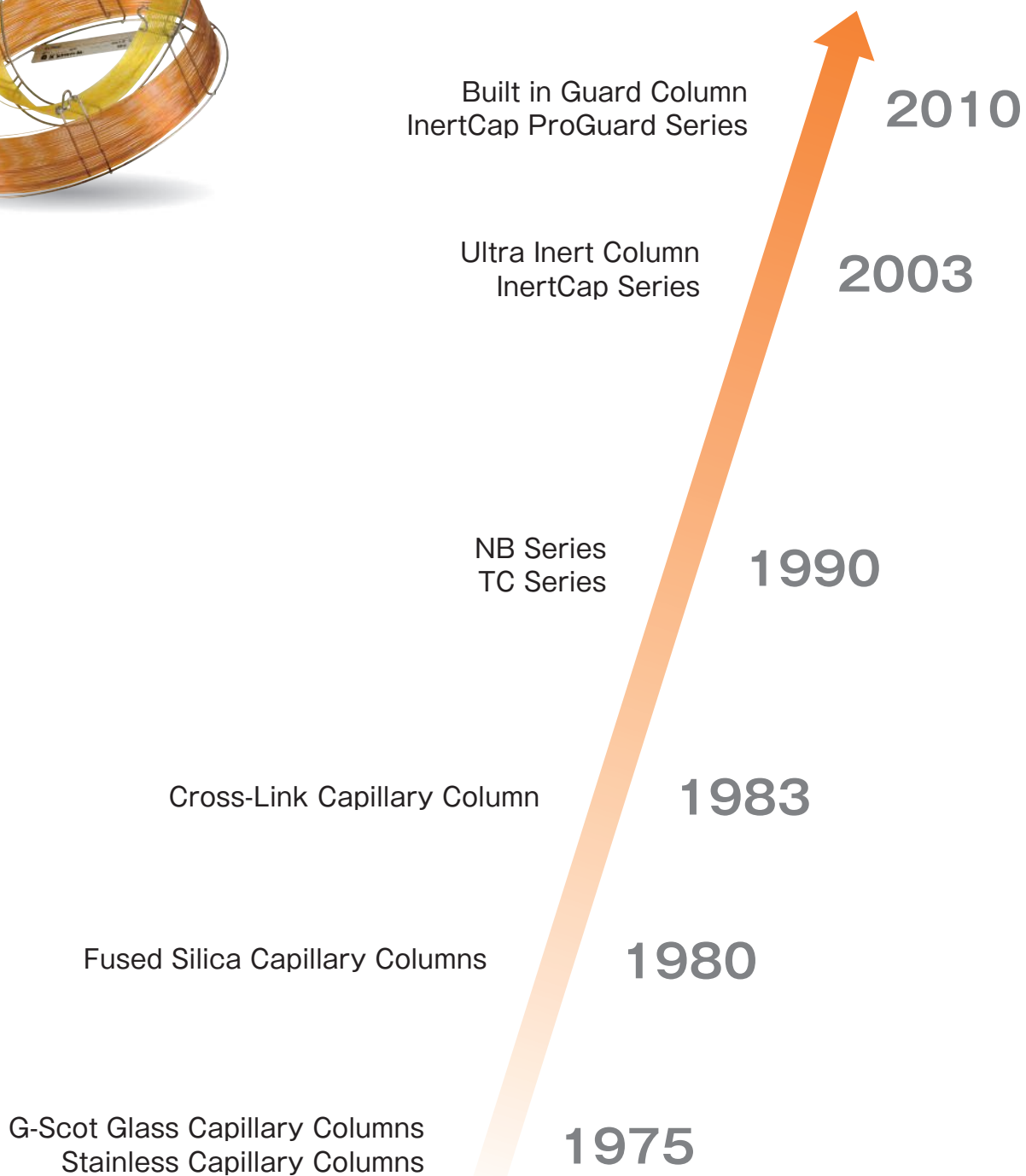
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Overview



ISO Certificate



GL Sciences Inc. is certified for ISO 14001.

GL Sciences Inc. recognizes that the global environmental protection is one of the most important issues to all humankind and that it is essential for companies to try to reduce the environmental burden in order to continue and grow. We contribute to realize a better society through the global environmental protection conscious cooperate activities.



The Fukushima factory is certified for ISO 9001.

GL Sciences Inc. Fukushima factory obtained an International Organization for Standardization ISO 9001: 2008 for quality management system to design, produce and supply instruments, parts, peripheral devices, columns, bulk materials, reagents and spectroscopic cells for gas chromatography and liquid chromatography.



■ General Technical Center



■ Fukushima Factory

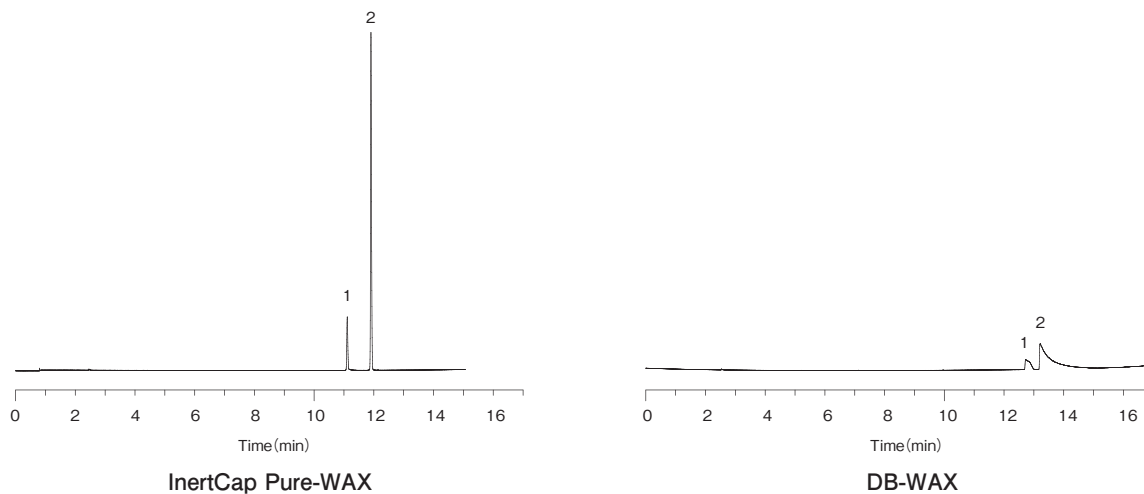


Features of InertCap

High inertness

Our unique inner surface deactivation technology radically removes halogenated compounds, silanol groups, and the residual metals on the inner surface. It gives an excellent peak symmetry to highly adsorptive polar, acidic, basic, and metal coordination compounds.

Highly adsorptive samples



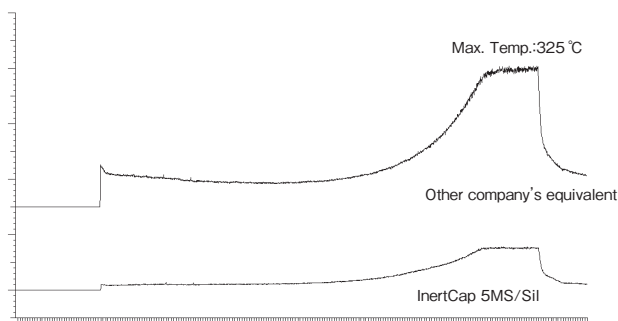
System : GC/FID
 Column : 0.25 mm I.D. × 30 m df = 0.25 μm
 Col.Temp. : 90 °C(5 min hold) -10 °C/min-240 °C
 Carrier Gas : He 100 kPa
 Injection : Split Flow 100 mL/min 240 °C
 Detection : FID Range10¹⁰ 240 °C
 Sample Size : 0.4 μL 5 mg/mL

1. Acrylic acid
 2. Methacrylic acid

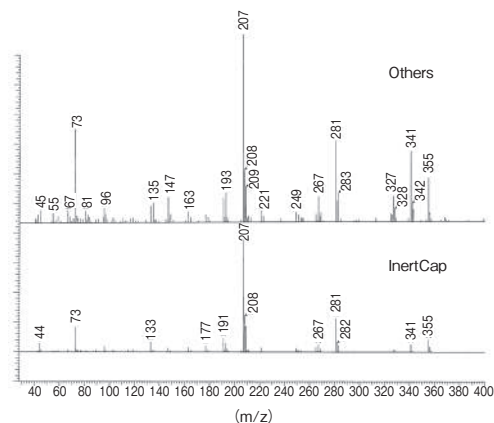
Low bleed

It is important to select a column with low bleed for GC/MS analyses in order to improve the S/N ratio and detection limit, and avoid the contamination of the MS parts. The level of the column bleed will affect the sensitivity of any MS. As the level of the column bleed increases, the signal and the sensitivity surely degrade. The cause of bleed is the elution of cyclo-siloxanes, m/z 207 for example from the phase. InertCap for GC/MS columns realize an extreme low bleed due to our superior polymerization technology.

Bleeding comparison



Spectral intensity



Quality Assurance

InertCap columns are rigorously tested. We use a variety of easily-absorbed samples, such as alcohols, diols, phenols, and primary amines at an ISO 9001 certified factory in Japan.

Inspection samples and articles

(Ex: InertCap 1MS)

- ① Retention factor (k)
- ② Theoretical plate number (N)
- ③ *n*-Decylamine (basic compounds adsorption)
- ④ 2,4,5-Trichlorophenol (acidic compounds adsorption)
- ⑤ Naphthalene (metal coordination adsorption)
- ⑥ *n*-Nonanol (residual silanol)
- ⑦ Baseline by temperature increase (bleed value)

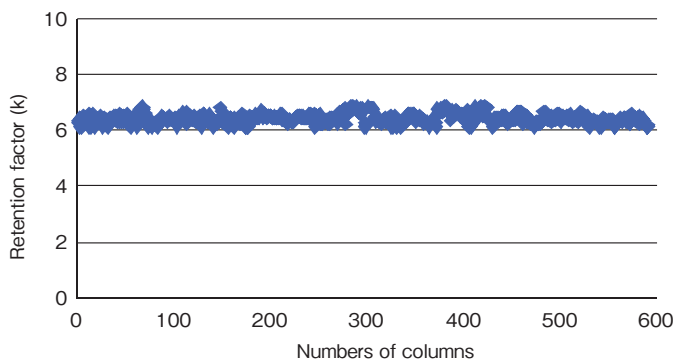
Product stability

Retention factor (k) is one of the crucial factors to inspect the batch-to-batch stability of columns. The retention factor of InertCap has been always >2.0 % on the CV value since its release and offering the stable columns for the customers.

$$k = (t_1 - t_0) / t_0$$

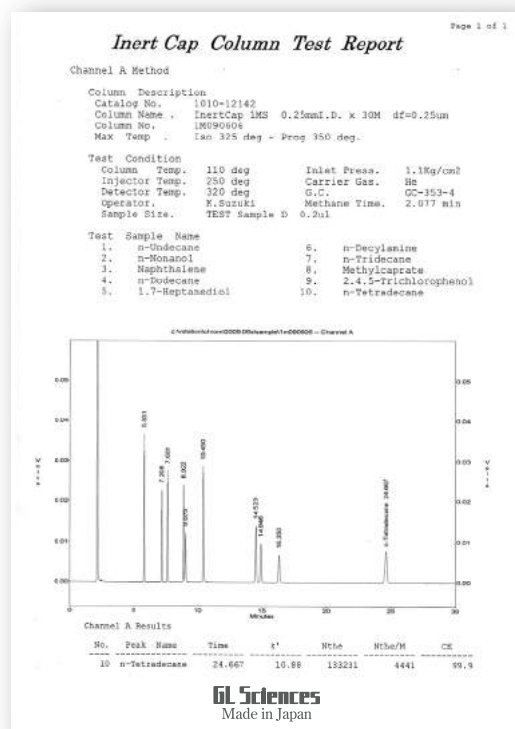
t_1 : Retention time of targeted compounds

t_0 : Gases that are not retained



Inspection report

Every InertCap column will be shipped with an individual inspection report.



InertCap Product Line

Phase	Phase Composition	USP Code	Polarity	Application
InertCap 1MS	100 % Methylpolysiloxane	G2	Non	General purpose, Hydrocarbons, PCBs, High Volatile solvents, Phenols
InertCap 1	100 % Methylpolysiloxane	G2	Non	General purpose, Hydrocarbons, PCBs, High Volatile solvents, Phenols
InertCap 5MS/Sil	Phenyl Arylene polymer equivalent to a 5 % Phenyl - 95 % Methylpolysiloxane	G27	Slightly Polar	General purpose, Halogenated compounds, Phenols, Pesticides, FAME
InertCap 5MS/NP	5 % Phenyl 95 % Methylpolysiloxane	G27	Slightly Polar	General purpose, Halogenated compounds, Phenols, Pesticides, FAME
InertCap 5	5 % Phenyl 95 % Methylpolysiloxane	G27	Slightly Polar	General purpose, Halogenated compounds, Phenols, Pesticides, FAME
InertCap Pesticides	Phenyl Arylene polymer equivalent to a 5 % Phenyl - 95 % Methylpolysiloxane	G27	Slightly Polar	Pesticides screening
InertCap 624	6 % Cyanopropylphenyl 94 % Methylpolysiloxane	G43	Medium Polar	VOCs, Alcohols
InertCap 1301	6 % Cyanopropylphenyl 94 % Methylpolysiloxane	G43	Medium Polar	Pesticides, PCBs, Alcohols, VOCs
InertCap 25	25 % Phenyl 75 % Methylpolysiloxane	G28	Medium Polar	Pesticides, PCBs, Alcohols, VOCs
InertCap 35	35 % Phenyl 65 % Methylpolysiloxane	G42	Medium Polar	Pesticides, Amines, Drugs, PCBs
InertCap 1701	14 % Cyanopropylphenyl 86 % Methylpolysiloxane	G46	Medium Polar	Sugars, TMS derivatives, Drugs, Alcohol, Steroids
InertCap 17MS	50 % Phenyl 50 % Methylpolysiloxane	G3	Medium Polar	Steroids, Drugs, Pesticides
InertCap 17	50 % Phenyl 50 % Methylpolysiloxane	G3	Medium Polar	Steroids, Drugs, Pesticides
InertCap 210	50 % Trifluoropropyl 50 % Methylpolysiloxane	G6	Medium Polar	Organophosphorus acids
InertCap 225	50 % Cyanopropylmethyl 50 % Phenylmethylpolysiloxane	G19	Medium Polar	FAME
InertCap Pure-WAX	Polyethylene Glycol	G16	Polar	General purpose, Esters, Perfumes, Alcohols, Aromatic hydrocarbons, FAME
InertCap WAX	Polyethylene Glycol	G16	Polar	General purpose, Esters, Perfumes, Alcohols, Aromatic hydrocarbons, FAME
InertCap WAX-HT	Polyethylene Glycol	G16	Polar	General purpose, Esters, Perfumes, Alcohols, Aromatic hydrocarbons, FAME
InertCap FFAP	Nitroterephthalic acid modified Polyethylene Glycol	G35	Polar	FAME, Free fatty acids, Organic acids, Alcohols, Aldehydes

Special columns

Phase	Phase Composition	USP Code	Polarity	Application
InertCap for Amines	GL Sciences original	—	—	Amines, Alcohols
InertCap CHIRAMIX	GL Sciences original	—	—	Optical isomers
AQUATIC	25 % Phenyl 75 % Methylpolysiloxane	G28	Medium Polar	VOCs, Organic solvents
AQUATIC-2	25 % Phenyl 75 % Methylpolysiloxane	G28	Medium Polar	VOCs, Organic solvents

Capillary Column Phase Cross References

GL Sciences	Phase Composition	Similar Phases
InertCap 1MS	100 % Methylpolysiloxane	DB-1ms, HP-1ms, Rxi-1ms, VF-1ms, CP-Sil 5 CB Low Bleed/MS, ZB-1ms, TR-1MS, BPX1, Equity-1, 007-1
InertCap 1	100 % Methylpolysiloxane	DB-1, HP-1, ULTRA-1, Rtx-1, CP-Sil 5 CB, ZB-1, TR-1, BP1
InertCap 5MS/Sil	Phenyl Arylene polymer equivalent to a 5 % Phenyl - 95 % Methylpolysiloxane	DB-5ms, Rxi-5Sil MS, Rtx-5Sil MS, VF-5ms, ZB-5ms, TR-5MS, BPX5, SLB-5, 007-5MS, Optima-5ms, AT-5ms
InertCap 5MS/NP	5 % Phenyl 95 % Methylpolysiloxane	HP-5ms, Rxi-5ms, CP-Sil 8 CB Low Bleed/MS, ZB-5MSi, TR-5, BPX5, Equity-5, 007-5, AT-5ms
InertCap 5	5 % Phenyl 95 % Methylpolysiloxane	DB-5, HP-5, ULTRA-2, Rtx-5, CP-Sil 8 CB, ZB-5, TR-5, BP5, SPB-5, 007-5, Optima-5, AT-5
InertCap Pesticides	Phenyl Arylene polymer equivalent to a 5 % Phenyl - 95 % Methylpolysiloxane	—
InertCap 624	6 % Cyanopropylphenyl 94 % Methylpolysiloxane	DB-624, Rtx-624, VF-624ms, CP-Select 624 CB, ZB-624, BP624, 007-624, Optima-624, AT-624
InertCap 1301	6 % Cyanopropylphenyl 94 % Methylpolysiloxane	HP-1301, Rtx-1301, VF-1301ms, CP-1301, SPB-1301, 007-1301, Optima-1301, AT-1301
InertCap 25	25 % Phenyl 75 % Methylpolysiloxane	—
InertCap 35	35 % Phenyl 65 % Methylpolysiloxane	HP-35, DB-35, Rtx-35, VF-35ms, ZB-35, TR-35MS, BPX35, SPB-35, 007-11, AT-35
InertCap 1701	14 % Cyanopropylphenyl 86 % Methylpolysiloxane	DB-1701, Rtx-1701, VF-1701ms, CP-Sil 19 CB, ZB-1701, TR-1701, BP10 (1701), SPB-1701, 007-1701, Optima-1701, AT-1701
InertCap 17MS	50 % Phenyl 50 % Methylpolysiloxane	HP-17, DB-17ms, Rxi-17, VF-17ms, CP-Sil 24 CB Low Bleed/MS, ZB-50, TR-50MS, BPX50 . AT-50
InertCap 17	50 % Phenyl 50 % Methylpolysiloxane	DB-17, HP-50, Rtx-50, CP-Sil 24 CB, ZB-50, SPB-50, 007-17, Optima-17, AT-50ms
InertCap 210	50 % Trifluoropropyl 50 % Methylpolysiloxane	DB-210, DB-200, Rtx-200, VF-200ms, 007-210, Optima-210, AT-210
InertCap 225	50 % Cyanopropylmethyl 50 % Phenylmethylpolysiloxane	DB-225, Rtx-225, CP-Sil 43 CB, BP225, 007-225, Optima-225, AT-225
InertCap Pure-WAX	Polyethylene Glycol (PEG)	DB-WAX, HP-INNOWAX, Rtx-Wax, Stabilwax, CP-Wax 52 CB, ZB-Wax, TR-WAX, BP20 (WAX), Supelcowax-10, 007-CW, Optima Wax, AT-Wax
InertCap WAX	Polyethylene Glycol (PEG)	DB-WAX, HP-INNOWAX, Rtx-Wax, Stabilwax, CP-Wax 52 CB, ZB-Wax, TR-WAX, BP20 (WAX), Supelcowax-10, 007-CW, Optima Wax, AT-Wax
InertCap WAX-HT	Polyethylene Glycol (PEG)	DB-WAX, HP-INNOWAX, Rtx-Wax, Stabilwax, CP-Wax 52 CB, ZB-Wax, TR-WAX, Solgel WAX, Supelcowax-10, 007-CW, Optima Wax, AT-Wax
InertCap FFAP	Nitroterephthalic acid modified Polyethylene Glycol	DB-FFAP, HP-FFAP, Stabilwax-DA, CP-WAX 58 CB, ZB-FFAP, BP21 (FFAP), 007-FFAP, Optima FFAP, PermaBond FFAP, AT-AQUAWAX-DA, AT-1000, EC-1000
InertCap for Amines	GL Sciences original	CP-Volamine
InertCap CHIRAMIX	GL Sciences original	—
AQUATIC	25 % Phenyl 75 % Methylpolysiloxane	—
AQUATIC-2	25 % Phenyl 75 % Methylpolysiloxane	—

JIS Codes

Code	Description	Phase	Column Size	Cat.No.
K 0088	Methods for determination of benzene in flue gas	InertCap 1 InertCap 5	0.25 mm I.D. × 60 m df = 0.40 μm 0.25 mm I.D. × 60 m df = 0.40 μm	1010-11163 1010-18163
K 0089	Methods for determination of acrolein in flue gas	InertCap Pure-WAX InertCap WAX	0.32 mm I.D. × 60 m df = 0.50 μm	1010-68264 1010-67264
K 0093	Methods for determination of polychlorinated biphenyl in industrial waste water	InertCap 1 InertCap 5	0.25 mm I.D. × 60 m df = 0.25 μm 0.25 mm I.D. × 60 m df = 0.25 μm	1010-11162 1010-18162
K 0125	Testing methods for volatile organic compounds in industrial water and waste water	AQUATIC	0.25 mm I.D. × 60 m df = 1.00 μm	1010-29165
K 0128	Testing methods for pesticides of industrial water and waste water	InertCap 1 InertCap 5	0.25 mm I.D. × 60 m df = 0.25 μm 0.25 mm I.D. × 60 m df = 0.25 μm	1010-11162 1010-18162
K 0303	Methods for determination of formaldehyde in flue gas	InertCap 1701	0.25 mm I.D. × 30 m df = 0.25 μm	1010-61142
K 0305	Methods for determination of trichloroethylene and tetrachloroethylene in flue gas	AQUATIC	0.25 mm I.D. × 60 m df = 1.00 μm	1010-29165
K 0450-10-10	Testing methods for bisphenol A in industrial water and waste water	InertCap 1	0.25 mm I.D. × 60 m df = 0.25 μm	1010-11162
K 0450-20-10	Testing methods for alkyl phenol in industrial water and waste water	InertCap 1	0.25 mm I.D. × 60 m df = 0.25 μm	1010-11162
K 0450-30-10	Testing methods for phthalic acid esters in industrial water and waste water	InertCap 1	0.25 mm I.D. × 60 m df = 0.25 μm	1010-11162
K 1570	Test methods for determining the effectiveness of wood preservatives and their performance requirements	InertCap 5	0.32 mm I.D. × 30 m df = 0.25 μm	1010-18242
K 2435	Benzene Toluene Xylene	InertCap Pure-WAX InertCap WAX	0.25 mm I.D. × 60 m df = 0.25 μm	1010-68162 1010-67162
K 2536-3	Liquid petroleum products - Testing method for components	InertCap Pure-WAX InertCap WAX	0.25 mm I.D. × 30 m df = 0.25 μm	1010-68142 1010-67142
K 6231	Rubber – Identification of polymers (single polymers and blends) – Pyrolytic gas chromatographic method	InertCap 5MS/Sil	0.25 mm I.D. × 30 m df = 1.00 μm 0.25 mm I.D. × 30 m df = 0.25 μm	1010-15145 1010-15142
K 8034	Acetone	InertCap 1	0.53 mm I.D. × 30 m df = 5.00 μm	1010-11449
K 8040	Acetone for pesticide residue and polychlorinated biphenyl analysis	InertCap Pure-WAX InertCap WAX	0.25 mm I.D. × 30 m df = 0.25 μm	1010-68142 1010-67142
K 8093	Ethanol for pesticide residue and polychlorinated biphenyl analysis	InertCap Pure-WAX InertCap WAX	0.25 mm I.D. × 30 m df = 0.25 μm	1010-68142 1010-67142
K 8361	Ethyl acetate (Reagent)	InertCap 1	0.53 mm I.D. × 30 m df = 5.00 μm	1010-11449
K 8461	1,4-Dioxane (Reagent)	InertCap 1	0.53 mm I.D. × 30 m df = 5.00 μm	1010-11449
K 8500	N,N-Dimethylformamide (Reagent)	InertCap 1	0.53 mm I.D. × 30 m df = 5.00 μm	1010-11449
K 8680	Toluene	InertCap 1	0.53 mm I.D. × 30 m df = 5.00 μm	1010-11449
K 8698	1-Naphthol (Reagent)	InertCap 1	0.25 mm I.D. × 30 m df = 0.25 μm	1010-11142
K 8699	2-Naphthol (Reagent)	InertCap 1	0.25 mm I.D. × 30 m df = 0.25 μm	1010-11142
K 8810	1-Butanol (Reagent)	InertCap 1	0.53 mm I.D. × 30 m df = 5.00 μm	1010-11449
K 8858	Benzene (Reagent)	InertCap 1	0.53 mm I.D. × 30 m df = 5.00 μm	1010-11449
K 9032	Resorcinol (Reagent)	InertCap 1	0.25 mm I.D. × 30 m df = 0.25 μm	1010-11142
A 1904	SVOC	InertCap 1MS InertCap 5MS/Sil	0.25 mm I.D. × 60 m df = 0.25 μm 0.25 mm I.D. × 60 m df = 0.25 μm	1010-12162 1010-15162
A 1965	VOC	InertCap 1	0.25 mm I.D. × 60 m df = 0.25 μm	1010-11162

GL Sciences' Recommendations

Code	Target Compounds	Phase	Column Size	Cat.No.
Water Quality	VOC	AQUATIC	0.25 mm I.D. × 60 m df = 1.00 µm	1010-29165
	Fust	InertCap 1	0.25 mm I.D. × 30 m df = 0.40 µm	1010-11143
		InertCap 5	0.25 mm I.D. × 30 m df = 0.40 µm	1010-18143
	1,4-dioxane	AQUATIC	0.25 mm I.D. × 60 m df = 1.00 µm	1010-29165
	Haloacetic acid	InertCap 1MS	0.25 mm I.D. × 30 m df = 1.00 µm	1010-12145
		InertCap 1	0.25 mm I.D. × 30 m df = 0.25 µm	1010-11142
		InertCap 5MS/Sil	0.25 mm I.D. × 30 m df = 0.25 µm	1010-15142
		InertCap 5MS/NP	0.25 mm I.D. × 30 m df = 0.25 µm	1010-18642
	Formaldehyde	InertCap 1MS	0.25 mm I.D. × 30 m df = 0.25 µm	1010-12142
		InertCap 5MS/Sil	0.25 mm I.D. × 30 m df = 0.25 µm	1010-15142
InertCap 5MS/NP		0.25 mm I.D. × 30 m df = 0.25 µm	1010-18642	
Phenols	InertCap 1MS	0.25 mm I.D. × 30 m df = 0.25 µm	1010-12142	
Di-2-ethylhexyl phthalate				
MTBE				
Pesticides	InertCap 1MS	0.25 mm I.D. × 30 m df = 0.25 µm	1010-12142	
	InertCap 5MS/Sil	0.25 mm I.D. × 30 m df = 0.25 µm	1010-15142	
	InertCap 5MS/NP	0.25 mm I.D. × 30 m df = 0.25 µm	1010-18642	
	InertCap Pesticides	0.25 mm I.D. × 30 m	1010-15141	
Environmental Water	VOC	AQUATIC	0.25 mm I.D. × 60 m df = 1.00 µm	1010-29165
	1,4-dioxane	InertCap Pure-WAX	0.25 mm I.D. × 30 m df = 0.50 µm	1010-68144
		InertCap WAX	0.25 mm I.D. × 30 m df = 0.50 µm	1010-67144
	Pesticides	InertCap 1MS	0.25 mm I.D. × 30 m df = 0.25 µm	1010-12142
InertCap 5MS/Sil		0.25 mm I.D. × 30 m df = 0.25 µm	1010-15142	
Air	VOC	AQUATIC	0.25 mm I.D. × 60 m df = 1.00 µm	1010-29165
	Oxidized ethylene	InertCap Pure-WAX InertCap WAX	0.25 mm I.D. × 30 m df = 0.25 µm	1010-68142 1010-67142
	Indoor Air	VOC (Toluene, <i>o</i> -, <i>m</i> -, <i>p</i> -xylene, styrene, ethylbenzene, <i>p</i> -dichlorobenzene, tertadecane, nonanal)	InertCap 1 InertCap 5	0.25 mm I.D. × 60 m df = 1.50 µm 0.25 mm I.D. × 60 m df = 1.50 µm
Phthalic acid ester (Dibutyl phthalate, Diethylhexyl phthalate)				
		Organic phosphoric compounds (Chlorpyrifos, diazinon)	InertCap 5	0.25 mm I.D. × 30 m df = 0.25 µm
Pesticide (Fenobcarb)				

Food (Positive List System)

Target Compounds	Phase		
Simultaneous analyses of pesticides by GC/MS (Agricultural products, live stock)	InertCap 5MS/Sil	InertCap 5MS/NP	InertCap Pesticides
BHC, γ - BHC, DDT, Aldrin, Ethalfuralin, Etridiazole, Quintozene, Chlordane, Dicofof, Dieldrin, Tecnazene, Tetradifon, Tefluthrin, Trifluralin, Halfenprox, Fenprppathrin, Hexachlorobenzene, Heptachlor, Benfluralin, Methoxychlor (Agricultural products)	InertCap 1MS	InertCap 1701	
2,4 - D, 2,4 - DB, Cloprop (Agricultural products)	InertCap 5MS/Sil	InertCap 5MS/NP	
2,2 - DPA (Agricultural products)	InertCap 17MS	InertCap 17	
EPTC	InertCap 5		
MCPA, Dicamba	InertCap 5		
Acetamidrid (Agricultural products)	InertCap 5		
Acephate, Omethoate, Methamidophos (Agricultural products)	InertCap 210		
Anilazine (Agricultural products)	InertCap 5MS/Sil	InertCap 5MS/NP	
Amitraz (Agricultural products)	InertCap 5MS/Sil	InertCap 5MS/NP	InertCap 17
Uniconazole P	InertCap 5MS/Sil	InertCap 5MS/NP	
Esprocarb, Chlorpropham, Thiobencarb, Pyributicarb, Pendimethalin	InertCap 5MS/Sil	InertCap 5MS/NP	
Ethephon (Agricultural products)	InertCap 5MS/Sil	InertCap 5MS/NP	
Cartap, Bensultap, Thiocyclam (Agricultural products)	InertCap 210	InertCap 5MS/Sil	InertCap 5MS/NP
Carbosulfan, Carbofuran, Furathiocarb, Benfuracarb (Agricultural products)	InertCap 210	InertCap 5MS/Sil	InertCap 5MS/NP
Dichlobenil (Agricultural products)	InertCap 17MS	InertCap 17	
Dithiopyr, Thiazopyr (Agricultural products)	InertCap 1MS	InertCap 5MS/Sil	InertCap 5MS/NP
Dazomet, Metam, Methyl isothiocyanate (Agricultural products)	InertCap Pure-WAX	InertCap WAX	InertCap WAX-HT
Thiodicarb, Mesomile (Agricultural products)	InertCap Pure-WAX	InertCap WAX	InertCap WAX-HT
Sodium TCA (Agricultural products)	InertCap 1MS		
Nicotine (Agricultural products)	InertCap 5MS/Sil	InertCap 5MS/NP	
Hymexazol (Agricultural products)	InertCap 5MS/Sil	InertCap 5MS/NP	InertCap FFAP
Pyridalyl (Agricultural products)	InertCap 5MS/Sil	InertCap 5MS/NP	InertCap 1
Fentin (Agricultural products)	InertCap 1MS		
Butyrate	InertCap 210		
Furametpyr	InertCap 1MS		
Fluazinam	InertCap 5MS/Sil	InertCap 5MS/NP	
Fluazifop	InertCap 5MS/Sil	InertCap 5MS/NP	
Fluoroimide	InertCap 17		
Flusilazole	InertCap 1701		
Flusulfamide	InertCap 5		
Flumioxazin	InertCap 5MS/Sil	InertCap 5MS/NP	
Prochloraz	InertCap 1		
Procymidone	InertCap 1MS		
Prohydrojasmon	InertCap 5MS/Sil	InertCap 5MS/NP	
Bentazone	InertCap 1701		
Benfuresate	InertCap 1MS		
Boscalid (Agricultural products)	InertCap 1MS	InertCap 5MS/Sil	InertCap 5MS/NP
Fosetyl	InertCap 225		
Metconazole (Agricultural products)	InertCap 1	InertCap 5MS/Sil	InertCap 5MS/NP
Molinate	InertCap 5		

Food and Additives Standards (Notification by the Health and Welfare Minister in 1959)

Target compounds	Phase		
2,4,5-T	InertCap 5MS/Sil	InertCap 5MS/NP	
Azocyclotin, Cyhexatin	InertCap 5		
Aldrin, Endrin, Dieldrin	InertCap 1MS	InertCap 1701	
Captafol	InertCap 1MS	InertCap 5MS/Sil	InertCap 5MS/NP
Coumaphos	InertCap 1	InertCap 210	
Daminozide	InertCap 5MS/Sil	InertCap 5MS/NP	
Triazophos, Parathion	InertCap 1	InertCap 210	
Ethylene dibromide	InertCap 624		
Propham	InertCap 5MS/Sil	InertCap 5MS/NP	

USP (US Pharmacopeia) /JP (Japanese Pharmacopeia)

USP (US Pharmacopeia)

USP Code	Phase Composition	Phase		
G1	Dimethylpolysiloxane oil	InertCap 1MS	InertCap 1	
G2	Dimethylpolysiloxane gum	InertCap 1MS	InertCap 1	
G3	50% Phenyl - 50% methylpolysiloxane	InertCap 17MS	InertCap 17	
G6	Trifluoropropylmethylpolysiloxane	InertCap 210		
G7	50% 3-Cyanopropyl - 50% phenylmethylsilicone	InertCap 225		
G14	Polyethylene glycol (av. mot. wt. of 950 to 1050)	InertCap Pure-WAX	InertCap WAX	InertCap WAX-HT
G15	Polyethylene glycol (av. mot. wt. of 3000 to 3700)	InertCap Pure-WAX	InertCap WAX	InertCap WAX-HT
G16	Polyethylene glycol compound (av. mot. wt. about 15,000). A high molecular weight compound of polyethylene glycol with a diepoxide linker	InertCap Pure-WAX	InertCap WAX	InertCap WAX-HT
G19	25% Phenyl - 25% cyanopropyl - 50% methylsilicone	InertCap 225		
G20	Polyethylene glycol (av. mot. wt. of 380 to 420)	InertCap Pure-WAX	InertCap WAX	InertCap WAX-HT
G25	Polyethylene glycol compound TPA. A high molecular weight compound of polyethylene glycol and diepoxide that is esterified with terephthalic acid.	InertCap FFAP		
G27	5% Phenyl - 95% methylpolysiloxane	InertCap 5MS/Sil	InertCap 5MS/NP	InertCap 5
G28	25% Phenyl - 75% methylpolysiloxane	InertCap 25	AQUATIC	AQUATIC-2
G35	A high molecular weight compound of a polyethylene glycol and a diepoxide that is esterified with nitroterephthalic acid.	InertCap FFAP		
G36	1% Vinyl - 5% phenylmethylpolysiloxane	InertCap 5MS/Sil	InertCap 5MS/NP	InertCap 5
G38	Phase G1 containing a small percentage of a tailing inhibitor	InertCap 1MS	InertCap 1	
G39	Polyethylene glycol (av. mol. wt. of about 1500)	InertCap Pure-WAX	InertCap WAX	InertCap WAX-HT
G42	35% phenyl-65% dimethylpolysiloxane (percentage refer to molar substitution)	InertCap 35		
G43	6% cyanopropylphenyl-94% dimethylpolysiloxane (percentage refer to molar substitution)	InertCap 624	InertCap 1301	
G46	14% Cyanopropylphenyl - 86% methylpolysiloxane	InertCap 1701		
G47	Polyethylene glycol (av. mol. wt. of about 8000)	InertCap Pure-WAX	InertCap WAX	InertCap WAX-HT

JP (Japanese Pharmacopeia)

Target Compounds	Phase	Column Size	Cat.No.
Magnesium Stearate	InertCap Pure-WAX InertCap WAX InertCap WAX-HT	0.32 mm I.D. × 30 m df = 0.50 μm	1010-68244 1010-67244 1010-68644
Senna Leaf	InertCap 1701	0.32 mm I.D. × 30 m df = 0.25 μm	1010-61242
Powdered Senna Leaf	InertCap 1701	0.32 mm I.D. × 30 m df = 0.25 μm	1010-61242
Red Ginseng	InertCap 1701	0.32 mm I.D. × 30 m df = 0.25 μm	1010-61242
Ginseng	InertCap 1701	0.32 mm I.D. × 30 m df = 0.25 μm	1010-61242
Powdered Ginseng	InertCap 1701	0.32 mm I.D. × 30 m df = 0.25 μm	1010-61242
Ethanol	InertCap 624	0.32 mm I.D. × 30 m df = 1.80 μm	1010-14747
Anhydrous Ethanol	InertCap 624	0.32 mm I.D. × 30 m df = 1.80 μm	1010-14747
Ethanol for Disinfection	InertCap 624	0.32 mm I.D. × 30 m df = 1.80 μm	1010-14747
Epirubicin Hydrochloride	InertCap Pure-WAX InertCap WAX	0.53 mm I.D. × 30 m df = 1.00 μm	1010-68445 1010-67445
Colchicine	InertCap Pure-WAX InertCap WAX	0.53 mm I.D. × 30 m df = 1.00 μm	1010-68445 1010-67445
Benzyl Alcohol	InertCap Pure-WAX InertCap WAX	0.32 mm I.D. × 30 m df = 0.50 μm	1010-68244 1010-67244
Glycerin	InertCap 1701	0.32 mm I.D. × 30 m df = 1.00 μm	1010-61245
Wood Creosote	InertCap 1 InertCap 5MS/Sil InertCap 5MS/NP	0.25 mm I.D. × 60 m df = 0.25 μm 0.25 mm I.D. × 30 m df = 0.25 μm 0.25 mm I.D. × 30 m df = 0.25 μm	1010-11162 1010-15142 1010-18642
Sevoflurane	InertCap 624	0.32 mm I.D. × 30 m df = 1.80 μm	1010-14747
Labetalol Hydrochloride	InertCap 1	0.53 mm I.D. × 25 m df = 5.00 μm	Contact us

EPA Method Code

Method	Application	Phase	Column Size	Cat.No.
501.3	Measurement of trihalomethanes in drinking water	InertCap 624	0.53 mm I.D. × 30 m df = 3.00 µm	1010-14948
504.1	1,2-Dibromoethane (EDB), 1,2-Dibromo-3-chloropropane (DBCP), and 1,2,3-Trichloropropane (123TCP)	InertCap 1	0.32 mm I.D. × 30 m df = 1.00 µm	1010-11245
502.2	Volatile organic compounds (VOC) in water	InertCap 624	0.53 mm I.D. × 30 m df = 3.00 µm	1010-14948
505	Organohalide pesticides	InertCap 5	0.25 mm I.D. × 30 m df = 1.00 µm	1010-18145
506	Determination of phthalate and adipate esters	InertCap 1 InertCap 5	0.32 mm I.D. × 30 m df = 0.25 µm 0.32 mm I.D. × 30 m df = 0.25 µm	1010-11242 1010-18242
507	Determination of nitrogen- and phosphorus-containing pesticides in water	InertCap 5MS/Sil InertCap 1701	0.25 mm I.D. × 30 m df = 0.25 µm 0.53 mm I.D. × 30 m df = 1.00 µm	1010-15142 1010-61445
508.1	Organochlorine pesticides and PCBs	InertCap 5MS/Sil InertCap 5 InertCap 1701	0.25 mm I.D. × 30 m df = 0.25 µm 0.25 mm I.D. × 30 m df = 0.25 µm 0.25 mm I.D. × 30 m df = 0.25 µm	1010-15142 1010-18142 1010-61142
515	Determination of chlorinated acids in water	InertCap 5	0.25 mm I.D. × 30 m df = 0.25 µm	1010-18142
515.2	Determination of chlorinated acids in water	InertCap 1701	0.25 mm I.D. × 30 m df = 0.25 µm	1010-61142
515.3	Determination of chlorinated acids in drinking water by liquid-liquid extraction, derivatization and gas chromatography with electron capture detection	InertCap 1701	0.25 mm I.D. × 30 m df = 0.25 µm	1010-61142
515.4	Determination of chlorinated acids in water by liquid-liquid microextraction, derivatization, and fast gas chromatography with electron capture detection	InertCap 1701	0.32 mm I.D. × 30 m df = 0.25 µm	1010-61242
524.2	Measurement of purgeable organic compounds in water by capillary column gas chromatography/mass spectrometry (GC/MS)	InertCap 624	0.53 mm I.D. × 30 m df = 3.00 µm 0.53 mm I.D. × 75 m df = 3.00 µm	1010-14948 1010-14978
525.2	Determination of organic compounds in drinking water	InertCap 5MS/Sil	0.25 mm I.D. × 30 m df = 0.25 µm	1010-15142
526	Determination of selected semivolatile organic compounds in drinking water by solid phase extraction and capillary column gas chromatography/ mass spectrometry (GC/MS)	InertCap 5MS/Sil	0.25 mm I.D. × 30 m df = 0.25 µm	1010-15142
527	Determination of selected pesticides and flame retardants in drinking water by solid phase extraction and capillary column gas chromatography/ mass spectrometry (GC/MS)	InertCap 5MS/Sil	0.25 mm I.D. × 30 m df = 0.25 µm	1010-15142
528	Determination of phenols in drinking water by solid phase extraction and capillary column gas chromatography/mass spectrometry (GC/MS)	InertCap 5MS/Sil	0.25 mm I.D. × 30 m df = 0.25 µm	1010-15142
529	Determination of explosives and related compounds in drinking water by solid phase extraction and capillary column gas chromatography/mass spectrometry (GC/MS)	InertCap 5MS/Sil	0.25 mm I.D. × 15 m df = 0.25 µm	1010-15122
551	Determination of chlorination disinfection byproducts, chlorinated solvents, and halogenated pesticides, herbicides in drinking water	InertCap 5	0.25 mm I.D. × 30 m df = 1.00 µm	1010-18145
551.1	Chlorinated solvents & disinfection by-products	InertCap 1MS InertCap 1301	0.25 mm I.D. × 30 m df = 1.00 µm 0.25 mm I.D. × 30 m df = 1.00 µm	1010-12145 1010-60145
552	Haloacetic acids	InertCap 5 InertCap 1701	0.25 mm I.D. × 30 m df = 0.25 µm 0.25 mm I.D. × 30 m df = 0.25 µm	1010-18142 1010-61142
556	Determination of carbonyl compounds in drinking water by pentafluorobenzylhydroxylamine derivatization and capillary gas chromatography with electron capture detection	InertCap 1701	0.25 mm I.D. × 30 m df = 0.25 µm	1010-61142
556.1	Determination of carbonyl compounds in drinking water by fast gas chromatography	InertCap 5MS/Sil InertCap 1701	0.1 mm I.D × 10 m df = 0.10 µm 0.1 mm I.D × 10 m df = 0.10 µm	Contact us Contact us
601	Purgeable halocarbons	InertCap 624	0.53 mm I.D. × 30 m df = 1.00 µm 0.53 mm I.D. × 30 m df = 3.00 µm	Contact us 1010-14948
602	Purgeable aromatics	InertCap 624	0.53 mm I.D. × 30 m df = 1.00 µm 0.53 mm I.D. × 30 m df = 3.00 µm	Contact us 1010-14948
603	Acrolein and acrylonitrile	InertCap 624	0.25 mm I.D. × 30 m df = 1.00 µm 0.53 mm I.D. × 30 m df = 3.00 µm	Contact us 1010-14948
604/605	Phenols & benzidines	InertCap 5MS/Sil	0.53 mm I.D. × 30 m df = 1.40 µm 0.25 mm I.D. × 30 m df = 0.25 µm	Contact us 1010-15142
606	Phthalate esters	InertCap 5MS/Sil	0.25 mm I.D. × 30 m df = 0.25 µm 0.53 mm I.D. × 15 m df = 1.50 µm	1010-15142 Contact us
607	Nitrosamines	InertCap 5MS/Sil	0.25 mm I.D. × 30 m df = 0.50 µm 0.53 mm I.D. × 30 m df = 1.50 µm	1010-15144 Contact us

Method	Application	Phase	Column Size	Cat.No.
609	Nitroaromatics and isophorone	InertCap 5MS/Sil	0.25 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 0.50 μm df = 1.50 μm 1010-15144 Contact us
610	Polycyclic aromatic hydrocarbons	InertCap 5MS/Sil	0.32 mm I.D. × 30 m 0.32 mm I.D. × 30 m	df = 0.10 μm df = 0.25 μm 1010-15240 1010-15242
611	Haloethers	InertCap 5MS/Sil	0.25 mm I.D. × 30 m 0.53 mm I.D. × 15 m	df = 0.50 μm df = 1.50 μm 1010-15144 Contact us
612	Chlorinated hydrocarbons	InertCap 5MS/Sil	0.25 mm I.D. × 30 m 0.25 mm I.D. × 60 m 0.32 mm I.D. × 30 m	df = 0.10 μm df = 0.10 μm df = 1.00 μm 1010-15140 1010-15160 Contact us
615	Chlorinated pesticides	InertCap 1701	0.25 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 0.25 μm df = 1.00 μm 1010-61142 1010-61445
619	Triazine herbicides	InertCap 17	0.25 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 0.50 μm df = 1.00 μm Contact us 1010-65445
624	Purgeables	InertCap 624	0.25 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 1.40 μm df = 3.00 μm 1010-14646 1010-14948
625	Semi volatile organic compounds	InertCap 5MS/Sil	0.32 mm I.D. × 30 m	df = 0.25 μm 1010-15242
680	Pesticides and PCBs in water and soil/sediment	InertCap 1MS InertCap 5MS/Sil	0.32 mm I.D. × 30 m 0.32 mm I.D. × 30 m	df = 0.25 μm df = 0.25 μm 1010-12242 1010-15242
1624	Volatile organic compounds by isotope dilution GC/MS	InertCap 624	0.25 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 1.40 μm df = 3.00 μm 1010-14646 1010-14948
1625	Semivolatile organic compounds by isotope dilution	InertCap 5MS/Sil	0.25 mm I.D. × 30 m	df = 0.25 μm 1010-15142
1653	Chlorinated phenols in waste water by in-situ MS acylation and GC low bleed/MS	InertCap 5MS/Sil	0.32 mm I.D. × 30 m 0.25 mm I.D. × 30 m	df = 0.25 μm df = 0.25 μm 1010-15242 1010-15142
8010	Halogenated volatile organics	InertCap 624	0.25 mm I.D. × 30 m	df = 1.40 μm 1010-14646
8011	1, 2-dibromoethane and 1, 2-dibromo-3-chloropropane	InertCap 1	0.32 mm I.D. × 30 m	df = 0.25 μm 1010-11242
8015	Non-halogenated volatile organics	InertCap 624	0.25 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 1.40 μm df = 3.00 μm 1010-14646 1010-14948
8021	Aromatic volatile organics	InertCap 624	0.25 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 1.40 μm df = 3.00 μm 1010-14646 1010-14948
8030/8031	Acrolein, acrylonitrile, acetonitrile	InertCap 624	0.25 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 1.40 μm df = 3.00 μm 1010-14646 1010-14948
8040/8041	Phenols	InertCap 5	0.25 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 0.25 μm df = 1.50 μm 1010-18142 1010-18446
8061	Determination of phthalate and adipate esters	InertCap 5 InertCap 1701	0.53 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 1.50 μm df = 1.00 μm 1010-18446 1010-61445
8080	Organochlorine pesticides and PCBs	InertCap 1 InertCap 5MS/Sil	0.53 mm I.D. × 30 m 0.25 mm I.D. × 30 m	df = 1.50 μm df = 0.50 μm 1010-11446 1010-15144
8081/8082	Organochlorine pesticides and PCBs as Arochlor	InertCap 5 InertCap 1701	0.53 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 1.50 μm df = 1.00 μm 1010-18446 1010-61445
8090/8091	Nitroaromatics and cyclic ketones	InertCap 5MS/Sil InertCap 5	0.25 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 0.50 μm df = 1.50 μm 1010-15144 1010-18446
8100	Polynuclear aromatic hydrocarbons	InertCap 5MS/Sil	0.32 mm I.D. × 30 m	df = 0.25 μm 1010-15242
8120/8121	Chlorinated hydrocarbons	InertCap 1MS	0.32 mm I.D. × 30 m	df = 1.00 μm Contact us
8140	Organophosphorus pesticides	InertCap 1MS InertCap 1 InertCap 1701	0.25 mm I.D. × 30 m 0.53 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 0.25 μm df = 1.50 μm df = 1.00 μm 1010-12142 1010-11446 1010-61445
8141	Organophosphorus compounds	InertCap 5MS/Sil InertCap 5	0.25 mm I.D. × 15 m 0.53 mm I.D. × 15 m	df = 0.25 μm df = 1.50 μm 1010-15122 1010-18426
8150/8151	Chlorinated herbicides	InertCap 5MS/Sil InertCap 1701	0.25 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 0.50 μm df = 1.00 μm 1010-15144 1010-61445
8240	Volatile organic compounds	InertCap 624	0.25 mm I.D. × 30 m 0.53 mm I.D. × 30 m	df = 1.00 μm df = 3.00 μm Contact us 1010-14948
8250	Semi-volatile organic compounds	InertCap 5MS/Sil	0.25 mm I.D. × 30 m	df = 0.50 μm 1010-15144
8260	Volatile organic compounds	InertCap 624	0.32 mm I.D. × 60 m 0.53 mm I.D. × 75 m	df = 1.80 μm df = 3.00 μm 1010-14767 1010-14978
8270	Semi volatile organic compounds(SVOC)	InertCap 5	0.25 mm I.D. × 30 m	df = 1.00 μm 1010-18145
8280	Analysis of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans	InertCap 5MS/Sil	0.25 mm I.D. × 30 m 0.25 mm I.D. × 60 m	df = 0.25 μm df = 0.10 μm 1010-15142 1010-15160

ASTM Method Codes

Method	Application	Phase		Column Size	Cat.No.	
D 1983	Fatty acid	InertCap Pure-WAX	InertCap WAX	0.25 mm I.D. × 30 m df = 0.25 μm	1010-68142	1010-67142
D 2268	Analysis of n-heptane and iso-octane (high purity)	InertCap 1		0.25 mm I.D. × 60 m df = 0.50 μm	Contact us	
D 2306	Xylene isomer	InertCap Pure-WAX	InertCap WAX	0.25 mm I.D. × 60 m df = 0.25 μm	1010-68162	1010-67162
D 2426	Butadiene and styrene in butadiene concentrates	InertCap 1		0.53 mm I.D. × 30 m df = 5.00 μm	1010-11449	
D 2427	C2-C5 hydrocarbons in gasolines	InertCap 1		0.53 mm I.D. × 30 m df = 5.00 μm	1010-11449	
D 2580	Phenols in water	InertCap SMS/Sil		0.32 mm I.D. × 25 m df = 0.40 μm	Contact us	
D 2804	Purity of methyl ethyl ketone	InertCap Pure-WAX	InertCap WAX	0.53 mm I.D. × 30 m df = 1.00 μm	1010-68445	1010-67445
D 2908	Volatile organics compounds (VOC) in water	InertCap 624 InertCap Pure-WAX		0.32 mm I.D. × 30 m df = 1.80 μm 0.32 mm I.D. × 30 m df = 0.50 μm	1010-14747	1010-68244
D 2998	Polyhydric alcohols	InertCap 1		0.32 mm I.D. × 30 m df = 1.00 μm	1010-11245	
D 2999	Monopentaerythritol in commercial pentaerythritol	InertCap 1		0.53 mm I.D. × 30 m df = 1.50 μm	1010-11446	
D 3009	Composition of turpentine	InertCap Pure-WAX	InertCap WAX	0.32 mm I.D. × 30 m df = 0.50 μm	1010-68244	1010-67244
D 3168	Polymers in emulsion paints	InertCap 1		0.32 mm I.D. × 30 m df = 1.00 μm	1010-11245	
D 3257	Aromatics in mineral spirits	InertCap 624		0.53 mm I.D. × 30 m df = 3.00 μm	1010-14948	
D 3329	Purity of methyl isobutyl ketone	InertCap Pure-WAX	InertCap WAX	0.53 mm I.D. × 30 m df = 1.00 μm	1010-68445	1010-67445
D 3432	Toluene diisocyanates in urethane prepolymers	InertCap 1		0.32 mm I.D. × 30 m df = 1.00 μm	1010-11245	
D 3447	Purity of halogenated organic solvents	InertCap 1		0.53 mm I.D. × 60 m df = 5.00 μm	1010-11469	
D 3452	Identification of rubber	InertCap 1		0.53 mm I.D. × 30 m df = 1.50 μm	1010-11446	
D 3606	Benzene and toluene in gasoline	InertCap 1		0.25 mm I.D. × 15 m df = 0.10 μm	Contact us	
D 3687	Volatile organic compounds vapors (VOC)	InertCap Pure-WAX	InertCap WAX	0.32 mm I.D. × 30 m df = 0.50 μm	1010-68244	1010-67244
D 3695	Volatile alcohols in water	InertCap Pure-WAX	InertCap WAX	0.53 mm I.D. × 30 m df = 1.00 μm	1010-68445	1010-67445
D 3725	Fatty acids in drying oils	InertCap FFAP		0.53 mm I.D. × 30 m df = 1.00 μm	1010-28945	
D 3760	Analysis of cumene	InertCap Pure-WAX	InertCap WAX	0.32 mm I.D. × 60 m df = 0.25 μm	1010-68262	1010-67262
D 3797	Analysis of o-xylene	InertCap Pure-WAX	InertCap WAX	0.32 mm I.D. × 60 m df = 0.50 μm	1010-68264	1010-67264
D 3798	Analysis of p-xylene impurities	InertCap Pure-WAX	InertCap WAX	0.32 mm I.D. × 60 m df = 0.50 μm	1010-68264	1010-67264
D 3876	Methoxyl and hydroxypropyl substitution in cellulose ether products	InertCap 1		0.32 mm I.D. × 30 m df = 1.00 μm	1010-11245	
D 3962	Impurities in styrene	InertCap FFAP		0.53 mm I.D. × 30 m df = 1.00 μm	1010-28945	
D 4367	Benzene in hydrocarbon solvent	InertCap 1		0.25 mm I.D. × 15 m df = 0.10 μm	Contact us	
D 4420	Aromatics compounds in gasoline	InertCap 1		0.25 mm I.D. × 15 m df = 0.10 μm	Contact us	
D 4735	Thiophene impurities in benzene	InertCap FFAP		0.53 mm I.D. × 30 m df = 1.00 μm	1010-28945	
D 4768	Phenol and cresol inhibitors in insulating oils	InertCap FFAP		0.53 mm I.D. × 30 m df = 1.00 μm	1010-28945	
D 4864	Methanol in propylene concentrates	InertCap Pure-WAX	InertCap WAX	0.53 mm I.D. × 30 m df = 1.00 μm	1010-68445	1010-67445
D 4947	Chlordane and heptachlor residues in indoor air	InertCap 5		0.53 mm I.D. × 30 m df = 1.50 μm	1010-18446	
D 5060	Impurities in ethylbenzene	InertCap Pure-WAX	InertCap FFAP	0.32 mm I.D. × 60 m df = 0.50 μm	1010-68264	1010-28764
D 5075	Nicotine and 3-ethenylpyridine in indoor air	InertCap 5		0.53 mm I.D. × 30 m df = 1.50 μm	1010-18446	
D 5135-35	Analysis of styrene	InertCap Pure-WAX	InertCap WAX	0.32 mm I.D. × 60 m df = 0.50 μm	1010-68264	1010-67264
D 5310	Tar acid composition	InertCap SMS/Sil		0.25 mm I.D. × 30 m df = 0.25 μm	1010-15142	
D 5320	Determination of 1,1,1-trichloroethane and methylene chloride content in stabilized trichloroethylene and tetrachloroethylene	InertCap 1		0.53 mm I.D. × 30 m df = 3.00 μm	1010-11448	
D 5442	Analysis of petroleum waxes	InertCap 1		0.32 mm I.D. × 30 m df = 0.25 μm	1010-11242	
D 5580	Aromatics in finished gasoline	InertCap 1		0.53 mm I.D. × 30 m df = 5.00 μm	1010-11449	
D 5599	Determination of oxygenates in gasoline	InertCap 1		0.25 mm I.D. × 60 m df = 1.00 μm	1010-11165	
D 5769	Determination of benzene, toluene, and total aromatics in finished gasolines	InertCap 1		0.25 mm I.D. × 60 m df = 1.00 μm	1010-11165	
D 5812	Determination of organochlorine pesticides in water	InertCap SMS/Sil		0.25 mm I.D. × 30 m df = 0.25 μm	1010-15142	
D 6160	Determination of polychlorinated biphenyls (PCBs) in waste materials	InertCap SMS/Sil		0.25 mm I.D. × 30 m df = 0.25 μm	1010-15142	

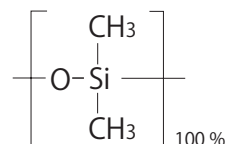
GC Capillary Columns

● InertCap™ 1MS	002	● InertCap™ 1701	013
● InertCap™ 1	003	● InertCap™ 17MS	014
● InertCap™ 5MS/Sil	004	● InertCap™ 17	015
● InertCap™ 5MS/NP	006	● InertCap™ 210	016
● InertCap™ 5	007	● InertCap™ 225	017
● InertCap™ Pesticides	008	● InertCap™ Pure-WAX	018
● InertCap™ 624	009	● InertCap™ WAX	020
● InertCap™ 1301	010	● InertCap™ WAX-HT	021
● InertCap™ 25	011	● InertCap™ FFAP	022
● InertCap™ 35	012	● InertCap™ Fast GC Column	023

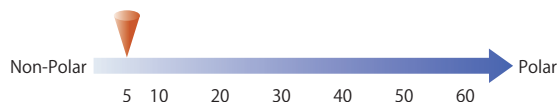
InertCap™ 1MS

- 100 % Methylpolysiloxane
- USP Phase G2
- Non-Polar
- Cross-Linked
- Ultra Low Bleed
- Equivalent : DB-1ms, HP-1ms, Rxi-1ms, VF-1ms, Equity-1

Structure



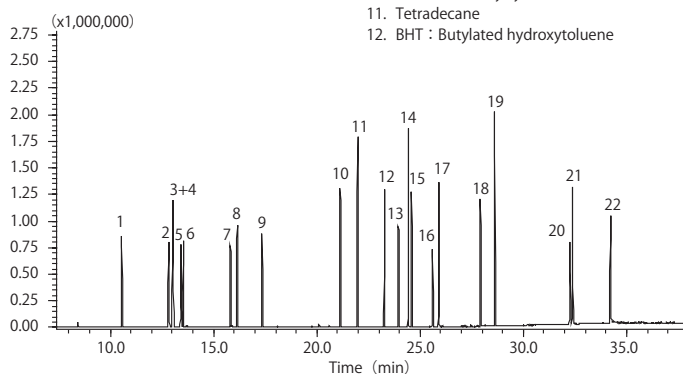
InertCap 1MS is a non-polar column incorporating 100 % methylpolysiloxane. Samples elute in order of low boiling points. Designed for GC/MS, InertCap 1MS realizes the world highest inertness and lowest bleeding.



Automobile Interior Material Analysis

System : GC/MS Thermal Desorption (T-Dex II)
 Column : InertCap 1MS
 0.25 mm I.D. × 60 m df = 0.25 μm
 Col. Temp. : 40 °C (5 min hold) - 10 °C/min - 280 °C (21 min hold)
 Carrier Gas : He 1 mL/min (constant flow)
 Injection : Thermal Desorption 270 °C
 Split 1 : 5
 Detection : MS Scan
 Sample Size : 100 μg/mL in Ethanol
 1 μL

1. Toluene
2. Ethylbenzene
3. *m*-Xylene
4. *p*-Xylene
5. Styrene
6. *o*-Xylene
7. *p*-Dichlorobenzene
8. 2-Ethyl-1-hexanol
9. Nonanal
10. D6 : Hexamethylcyclotrisiloxane
11. Tetradecane
12. BHT : Butylated hydroxytoluene
13. DEP : Diethyl phthalate
14. C16 : *n*-Hexadecane
15. TBP : Tributyl phosphate
16. TCEP : Tris (2-chloroethyl) phosphate
17. DBA : Di-*n*-butyl adipate
18. DBP : Di-*n*-butyl phthalate
19. C20 : *n*-Eicosane
20. TPP : Triphenyl phosphate
21. DOA : Di (2-ethylhexyl) adipate
22. DOP : Di (2-ethylhexyl) phthalate



【 InertCap™ 1MS 】

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.18	20	0.18	iso.325-prog.350	1010-12031	€ 530,-
	15	0.25	iso.325-prog.350	1010-12122	€ 394,-
0.25	30	0.25	iso.325-prog.350	1010-12142	€ 493,-
		1.00	iso.300-prog.320	1010-12145	€ 493,-
	60	0.25	iso.325-prog.350	1010-12162	€ 778,-
		1.00	iso.300-prog.320	1010-12165	€ 778,-
0.32	15	0.25	iso.325-prog.350	1010-12222	€ 433,-
	30	0.25	iso.325-prog.350	1010-12242	€ 532,-
	60	0.25	iso.325-prog.350	1010-12262	€ 849,-

【 InertCap™ 1MS ProGuard (Built-in Guard Column) 】

ID (mm)	Length (m)	Thickness (μm)	Guard Column (m)	Max. Temperature (°C)	Cat.No.	Price
0.25	30	0.25	2	iso.325-prog.350	1010-12172	€ 558,-
			5		1010-12173	€ 598,-
			10		1010-12174	€ 640,-

【 InertCap™ 1MS T.L. (Built-in Transfer Line) 】

ID (mm)	Length (m)	Thickness (μm)	Transferline (m)	Max. Temperature (°C)	Cat.No.	Price
0.25	30	0.25	2	iso.325-prog.350	1010-12192	€ 558,-

※See page 32 for more information about ProGuard and T.L.

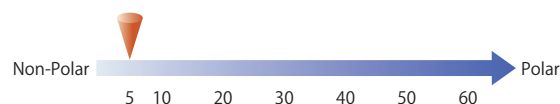
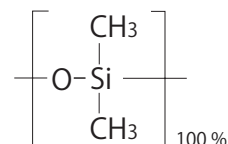
※Contact us for different dimensions.

InertCap™ 1

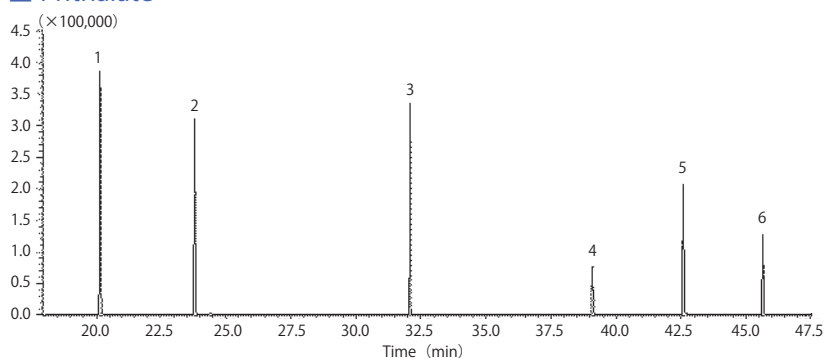
- 100 % Methylpolysiloxane
- USP Phase G2
- Non-Polar
- Cross-Linked
- Equivalent : DB-1, HP-1, Rtx-1, CP-Sil 5CB, SPB-1, BP-1

InertCap 1 is a non-polar column incorporating 100 % methylpolysiloxane. Samples elute in order of low boiling points. InertCap 1 has broad utility and can be used for a variety of general analyses.

Structure



Phthalate



System : GC/MS
 Column : InertCap 1
 0.25 mm I.D. × 30 m df = 0.25 μm
 Col. Temp. : 60 °C (3 min hold) - 5 °C/min - 280 °C (3 min hold)
 Injection : Splitless
 280 °C
 Detection : MS SIM
 Sample Size : 1 μL

1. Dimethylphthalate
2. Diethylphthalate
3. Di-*n*-butylphthalate
4. Butylbenzylphthalate
5. Di (2-ethylhexyl) phthalate
6. Dioctylphthalate

[InertCap™ 1]

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price	
0.18	15	0.18	iso.325-prog.350	1010-11021	€ 512,-	
		0.28		1010-11022	€ 512,-	
	20	0.18	iso.325-prog.350	1010-11031	€ 536,-	
		0.28		1010-11032	€ 536,-	
0.25	15	0.25	iso.325-prog.350	1010-11122	€ 258,-	
		0.40		1010-11123	€ 258,-	
		0.50		1010-11124	€ 258,-	
		5.00		iso.260-prog.300	1010-11129	€ 260,-
	30	0.10	iso.325-prog.350	1010-11140	€ 394,-	
		0.25		1010-11142	€ 394,-	
		0.40		1010-11143	€ 394,-	
		0.50		1010-11144	€ 394,-	
		1.00		1010-11145	€ 394,-	
		1.50		iso.300-prog.320	1010-11146	€ 394,-
		5.00		iso.260-prog.300	1010-11149	€ 410,-
		60		0.25	iso.325-prog.350	1010-11162
0.40	1010-11163		€ 642,-			
0.50	1010-11164		€ 642,-			
1.00	iso.300-prog.320		1010-11165	€ 642,-		
1.50	1010-11166		€ 642,-			
0.32	15	0.25	iso.325-prog.350	1010-11222	€ 382,-	
		0.40		1010-11223	€ 392,-	
		5.00		iso.260-prog.300	1010-11229	€ 404,-

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price		
0.32	30	0.25	iso.325-prog.350	1010-11242	€ 428,-		
		0.40		1010-11243	€ 428,-		
		0.50		1010-11244	€ 428,-		
		1.00		iso.300-prog.320	1010-11245	€ 428,-	
		5.00		iso.260-prog.300	1010-11249	€ 504,-	
	60	0.25	iso.325-prog.350	1010-11262	€ 703,-		
		0.40		1010-11263	€ 703,-		
		0.50		1010-11264	€ 703,-		
		1.00		iso.300-prog.320	1010-11265	€ 703,-	
		5.00		iso.260-prog.300	1010-11269	€ 703,-	
0.53	15	1.00	iso.300-prog.320	1010-11425	€ 307,-		
		1.50		1010-11426	€ 307,-		
		2.00		1010-11427	€ 307,-		
		3.00		1010-11428	€ 307,-		
		5.00		iso.260-prog.280	1010-11429	€ 340,-	
		30		1.00	iso.300-prog.320	1010-11445	€ 512,-
				1.50		1010-11446	€ 512,-
	2.00		1010-11447	€ 512,-			
	3.00		1010-11448	€ 512,-			
	5.00		iso.260-prog.280	1010-11449		€ 512,-	
	60		2.00	iso.300-prog.320		1010-11467	€ 822,-
		5.00	iso.260-prog.280		1010-11469	€ 822,-	

[InertCap™ 1 ProGuard (Built-in Guard Column)]

ID (mm)	Length (m)	Thickness (μm)	Guard Column (m)	Max. Temperature (°C)	Cat.No.	Price
0.25	30	0.25	2	iso.325-prog.350	1010-11172	€ 558,-
			5		1010-11173	€ 598,-
			10		1010-11174	€ 640,-

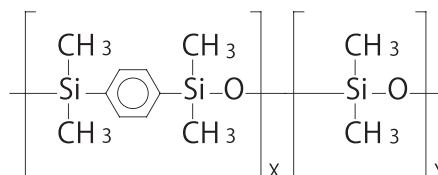
※Contact us for different dimensions.

※See page 32 for more information about ProGuard and T.L.

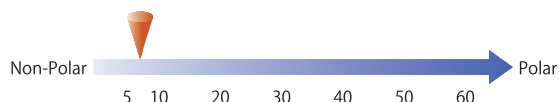
InertCap™ 5MS/Sil

- Phenyl Arylene polymer equivalent to a 5 % Phenyl - 95 % Methylpolysiloxane
- USP Phase G27
- Slightly Polar
- Cross-Linked
- Ultra Low Bleed
- Equivalent : DB-5ms, Rxi-5Sil MS, VF-5ms, SLB-5, BPX-5

Structure

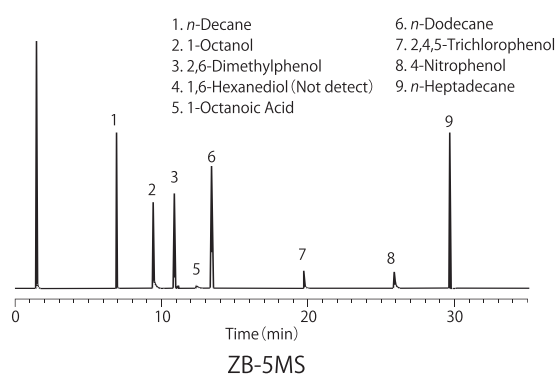
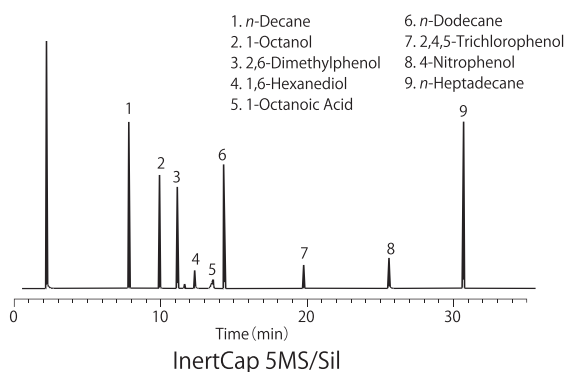


InertCap 5MS/Sil is a low polarity column incorporating 5 % phenyl and 95 % methylpolysilylene. Designed for GC/MS, InertCap 5MS/Sil realized the higher heat resistance and lower bleeding by arylene technology. In addition to our basic performance and quality inspection, pesticide mixture sample is used for the further rigorous inspection for each lot to guarantee the product reliability.

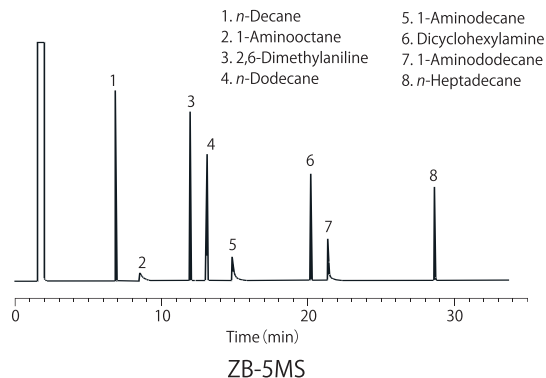
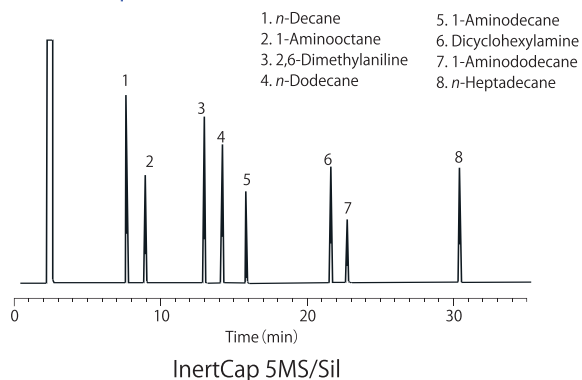


【 Comparison data 】

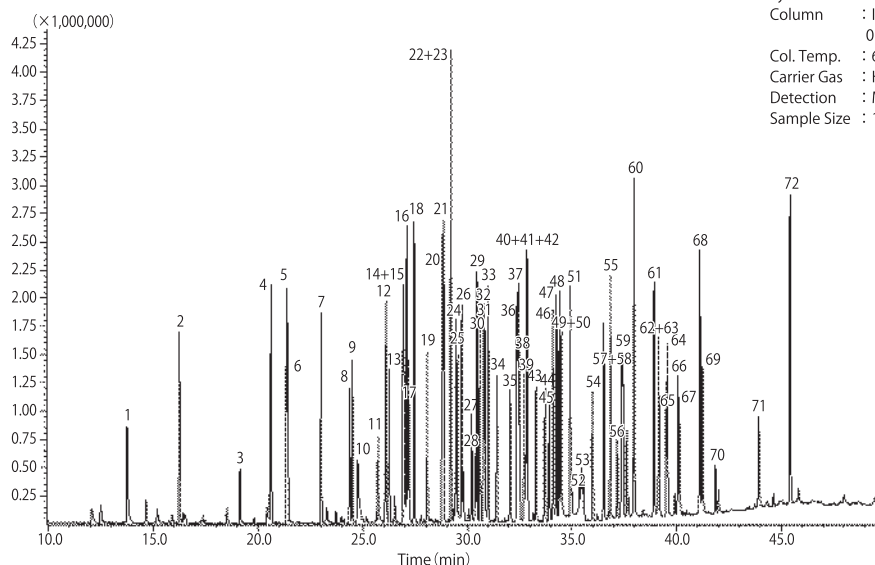
Acidic compounds



Basic compounds



Pesticides



System : GC/MS
 Column : InertCap 5MS/Sil
 0.25 mm I.D. × 30 m df = 0.25 μm
 Col. Temp. : 60 °C (1 min hold) – 5 °C/min – 280 °C
 Carrier Gas : He 35 cm/sec.
 Detection : MS
 Sample Size : 1 μL

1. dichlorvos (DDVP)	12. simazine	23. tolclophosmethyl	34. fthalide	45. butamifos	56. chlornitrofen	67. bifenox
2. dichlobenil	13. atrazine	24. simetryn	35. pendimethalin	46. napropamide	57. propiconazole	68. pyriproxyfen
3. etridiazole	14. propyzamide	25. metalaxyl	36. dimethametryn	47. flutranil	58. edifenphos	69. mefenacet
4. chloroneb	15. pyroquilon	26. dithiopyr	37. isofenphos	48. pretilachlor	59. endosulfan sulfate	70. benfuracarb
5. Isoproc carb	16. diazinon	27. fenitrothion	38. methyl dymron	49. isoprothiolane	60. thenylchlor	71. cafenstrole
6. molinate	17. chlorothalonil	28. probenazole	39. phenothoate	50. tricyclazole	61. pyributicarb	72. ethofenprox
7. fenobucarb	18. disulfoton	29. esprocarb	40. procymidone	51. buprofezin	62. pyridaphenthion	
8. trifluralin	19. iprobenfos	30. malathion	41. captan	52. isoxathion	63. iprodione	
9. benfluralin	20. terbucarb	31. chlorpyrifos	42. dimepiperate	53. carpropamid	64. EPN	
10. pencycuron	21. bromobutide	32. benthio carb	43. methidathion	54. β-Endosulfan	65. piperophos	
11. dimethoate	22. alachlor	33. fenithion	44. α-Endosulfan	55. mepronil	66. anilofos	

【 InertCap™ 5MS/Sil 】

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price		
0.18	20	0.18	iso.325-prog.350	1010-15031	€ 511,-		
		0.10		1010-15120	€ 394,-		
				1010-15122	€ 394,-		
	15	0.25	iso.325-prog.350	1010-15124	€ 394,-		
				1010-15140	€ 493,-		
		0.10		1010-15142	€ 493,-		
	0.25	30	0.25	iso.325-prog.350	1010-15144	€ 493,-	
			0.50		1010-15145	€ 493,-	
			1.00		1010-15145	€ 493,-	
		60	0.10	iso.325-prog.350	1010-15160	€ 778,-	
			0.25		1010-15162	€ 778,-	
			0.50		1010-15220	€ 465,-	
0.32	15	0.10	iso.325-prog.350	1010-15222	€ 465,-		
		0.25		1010-15224	€ 465,-		
		0.50		1010-15240	€ 532,-		
	30	0.10	iso.325-prog.350	1010-15242	€ 532,-		
		0.25		1010-15244	€ 532,-		
		0.50		1010-15245	€ 532,-		
		1.00		1010-15245	€ 532,-		
		60		0.10	iso.325-prog.350	1010-15260	€ 849,-
				0.25		1010-15262	€ 849,-
	0.50		1010-15262	€ 849,-			

【 InertCap™ 5MS/Sil ProGuard (Built-in Guard Column) 】

ID (mm)	Length (m)	Thickness (μm)	Guard Column (m)	Max. Temperature (°C)	Cat.No.	Price
0.25	30	0.25	2	iso.325-prog.350	1010-15172	€ 558,-
			5		1010-15173	€ 598,-
			10		1010-15174	€ 640,-

【 InertCap™ 5MS/Sil T.L. (Built-in Transfer Line) 】

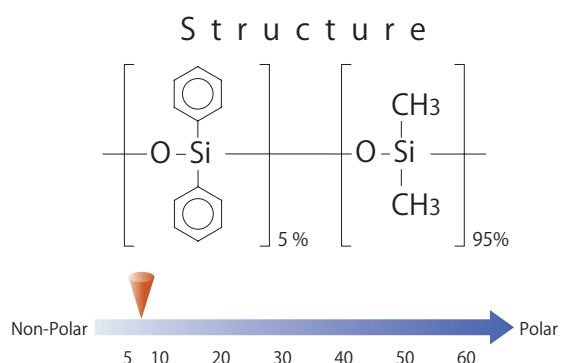
ID (mm)	Length (m)	Thickness (μm)	Transfer Line (m)	Max. Temperature (°C)	Cat.No.	Price
0.25	30	0.25	2	iso.325-prog.350	1010-15192	€ 604,-

※ See page 32 for more information about ProGuard and T.L.

InertCap™ 5MS/NP

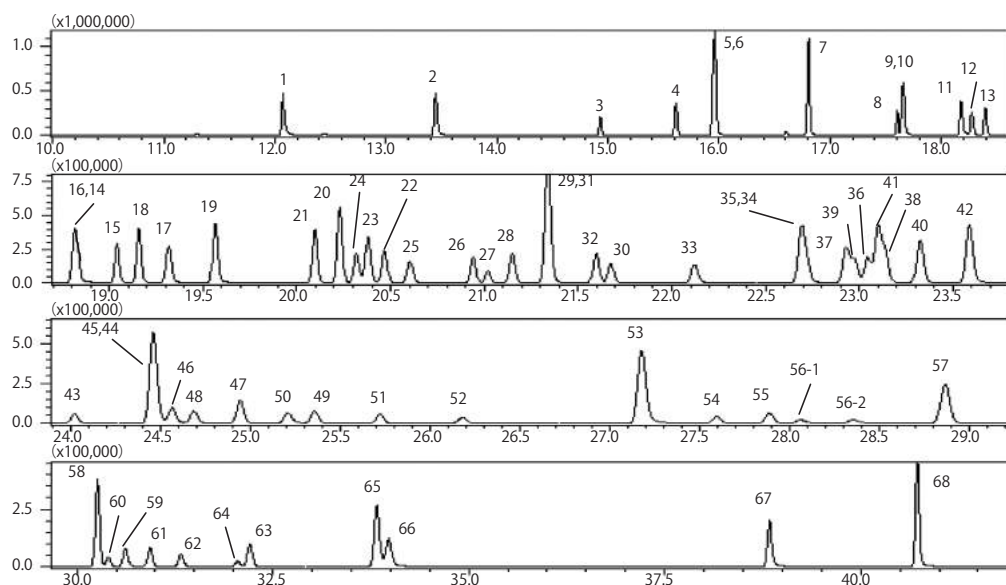
- 5 % Diphenyl - 95 % Dimethylpolysiloxane
- USP Phase G27
- Slightly Polar
- Cross-Linked
- Ultra Low Bleed
- Equivalent : HP-5ms, Rxi-5ms, Equity-5, SPB-5

InertCap 5MS/NP is a low polarity column incorporating 5 % phenyl and 95 % methylpolysiloxane. Designed as a column for GC/MS, InertCap 5MS/NP realizes the world highest inertness and lowest bleeding.



68 Pesticides

System : GC/MS
 Column : InertCap 5MS/NP 0.25 mm I.D. × 30 m df = 0.25 μm
 Col. Temp. : 50 °C (3 min hold) - 10 °C/min - 200 °C - 3 °C/min - 230 °C (5 min hold) - 5 °C/min - 300 °C (8 min hold)
 Injection : Splitless 2 min
 Detection : MS SIM
 Sample Size : 1 μg/mL 1 μL



- | | | | | | | |
|----------------|---------------------|----------------------|-------------------|--------------------|----------------------|---------------------|
| 1. DDVP | 11. Dimethoate | 21. Bromobutide | 31. Benthio carb | 41. Dimepiperate | 51. Isoxathion | 59. Pyridaphenthion |
| 2. Dichlobenil | 12. Simazine | 22. Alachlor | 32. Fenthion | 42. Methidathion | 52. Endosulfan β | 60. Iprodione |
| 3. Etridiazole | 13. Atrazine | 23. Tolclofos-methyl | 33. Fthtalide | 43. Endosulfan α | 53. Mepronil | 61. EPN |
| 4. Chloroneb | 14. Propyzamide | 24. Simetryn | 34. Pendimethalin | 44. Butamifos | 54. CNP | 62. Piperophos |
| 5. Isoprocarb | 15. Diazinon | 25. Metalaxyl | 35. Dimethametryn | 45. Napropamide | 55. Edifenphos | 63. Anilofos |
| 6. Molinate | 16. Pyroquilon | 26. Dithiopyr | 36. Isophenphos | 46. Flutolanil | 56-1. Propiconazole1 | 64. Bifenox |
| 7. Fenobucarb | 17. Chlorothalonil | 27. Fenitrothion | 37. Methyl dymron | 47. Pretiochlor | 56-2. Propiconazole2 | 65. Pyriproxyfen |
| 8. Trifluralin | 18. Ethylthiomethon | 28. Esprocarb | 38. Phenthoate | 48. Isoprothiolane | 57. Thenylchlor | 66. Mefenacet |
| 9. Benfluralin | 19. Iprobenfos | 29. Malathion | 39. Captan | 49. Buprofezin | 58. Pyributicarb | 67. Cafenstrole |
| 10. Pencycuron | 20. Terbutcarb | 30. Chlorpyrifos | 40. Procymidone | 50. CNP-amino | | 68. Ethofenprox |

【 InertCap™ 5MS/NP 】

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.18	20	0.18	iso.325-prog.350	1010-18531	€ 525,-
0.25	30	0.25	iso.325-prog.350	1010-18642	€ 507,-
0.32	30	0.25	iso.325-prog.350	1010-18742	€ 547,-

※ Different dimensions are available on request.

【 InertCap™ 5MS/NP ProGuard (Built-in Guard Column) 】

ID (mm)	Length (m)	Thickness (μm)	Guard Column (m)	Max. Temperature (°C)	Cat.No.	Price
0.25	30	0.25	2	iso.325-prog.350	1010-18941	€ 558,-
			5		1010-18942	€ 598,-
			10		1010-18943	€ 640,-

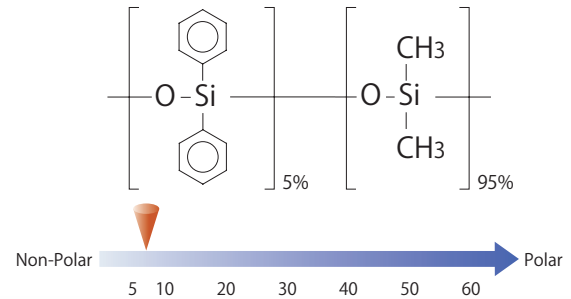
※ See page 32 for more information about ProGuard.
 ※ Different dimensions are available on request.

InertCap™ 5

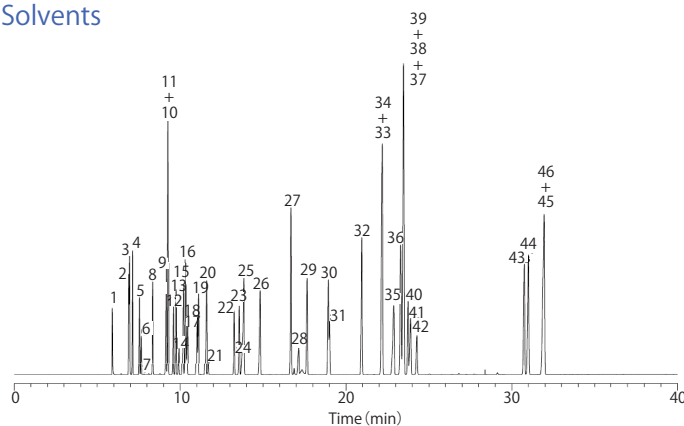
- 5 % Phenyl - 95 % Methylpolysiloxane
- USP Phase G27
- Slightly Polar
- Cross-Linked
- Equivalent : DB-5, HP-5, Rtx-5, CP-Sil 8CB, SPB-5

InertCap 5 is a low polarity column incorporating 5 % phenyl and 95 % methylpolysiloxane. InertCap 5 is an optimal first choice column for a variety of general analyses such as pesticides and volatile compounds etc.

Structure



Solvents



- Methanol
- Acetone
- i-Propanol
- Ethyl ether
- Methyl acetate
- Dichloromethane
- Carbon disulfide
- trans*-1,2-Dichloroethylene
- Methyl ethyl ketone
- 2-Butanol
- n*-Hexane
- cis*-1,2-Dichloroethylene
- Ethyl acetate
- Chloroform
- i*-Butanol
- Tetrahydrofuran
- Methyl cellosolve
- 1,1,1-Trichloroethane
- 1,2-Dichloroethane
- n*-Butanol

- Carbon tetrachloride
- Trichloroethylene
- 1,4-Dioxane
- Ethyl cellosolve
- n*-Propyl acetate
- i*-Amyl alcohol
- Toluene
- N,N*-Dimethyl formamide
- Methyl-*n*-butyl ketone
- n*-Butyl acetate

System : GC/FID
 Column : InertCap 5
 0.25 mm I.D. × 60 m df = 0.40 μm
 Col. Temp. : 40 °C (5 min hold) - 4 °C/min - 230 °C (5 min hold)
 Carrier Gas : He 130 kPa
 Injection : Split flow 100 mL/min
 250 °C
 Detection : FID Range 10¹¹
 250 °C
 Sample Size : Mixed evenly 1 μL

- Tetrachloroethylene
- Chlorobenzene
- m*-Xylene
- p*-Xylene
- Cyclohexanol
- Styrene
- Cyclohexanone
- 1-Methylcyclohexanol
- o*-Xylene
- Cellosolve acetate
- Butyl cellosolve
- 1,1,2,2-Tetrachloroethane
- o*-Dichlorobenzene
- o*-Cresol
- m*-Cresol
- p*-Cresol

【InertCap™ 5】

ID (mm)	Length (m)	Thickness (μm)	Max. Temp. (°C) iso. - prog.	Cat.No.	Price
0.18	15	0.18	325 - 350	1010-18021	€ 414,-
		0.28		1010-18022	€ 414,-
	20	0.18	325 - 350	1010-18031	€ 484,-
		0.28		1010-18032	€ 484,-
0.25	15	0.25	325 - 350	1010-18122	€ 258,-
		0.40		1010-18123	€ 258,-
		0.50		1010-18124	€ 258,-
	30	0.10	325 - 350	1010-18140	€ 394,-
		0.25		1010-18142	€ 394,-
		0.40		1010-18143	€ 394,-
		0.50		1010-18144	€ 402,-
		1.00		1010-18145	€ 394,-
		1.50		1010-18146	€ 394,-
		1.00		1010-18146	€ 394,-
	60	0.25	325 - 350	1010-18162	€ 642,-
		0.40		1010-18163	€ 642,-
		0.50		1010-18164	€ 642,-
		1.00		1010-18165	€ 642,-
1.50		1010-18166		€ 642,-	

【InertCap™ 5 ProGuard (Built-in Guard Column)】

ID (mm)	Length (m)	Thickness (μm)	Guard Column (m)	Max.Temp. (°C) iso. - prog.	Cat.No.	Price
0.25	30	0.25	2	325 - 350	1010-18172	€ 558,-
			5		1010-18173	€ 598,-
			10		1010-18174	€ 640,-

※See page 32 for more information about ProGuard.

ID (mm)	Length (m)	Thickness (μm)	Max. Temp. (°C) iso. - prog.	Cat.No.	Price
0.32	15	0.25	325 - 350	1010-18222	€ 292,-
		0.40		1010-18223	€ 292,-
	30	0.25	325 - 350	1010-18242	€ 498,-
		0.40		1010-18243	€ 498,-
		0.50		1010-18244	€ 498,-
		1.00		1010-18245	€ 498,-
60	0.25	325 - 350	1010-18262	€ 703,-	
	0.40		1010-18263	€ 703,-	
	0.50		1010-18264	€ 703,-	
0.53	15	1.00	300 - 320	1010-18425	€ 340,-
		1.50		1010-18426	€ 340,-
		2.00		1010-18427	€ 340,-
	30	3.00	260 - 280	1010-18428	€ 340,-
		5.00		1010-18429	€ 340,-
		1.00		1010-18445	€ 512,-
		1.50		1010-18446	€ 512,-
		2.00		1010-18447	€ 512,-
		3.00		1010-18448	€ 512,-
		5.00		1010-18449	€ 512,-
60	2.00	300 - 320	1010-18467	€ 843,-	

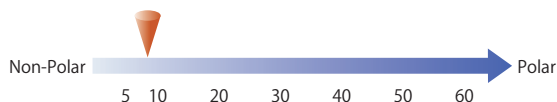
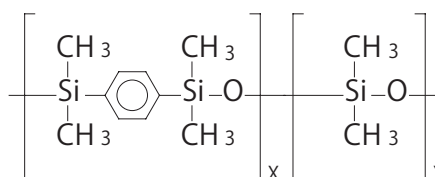
※Different dimensions are available on request.

InertCap™ Pesticides

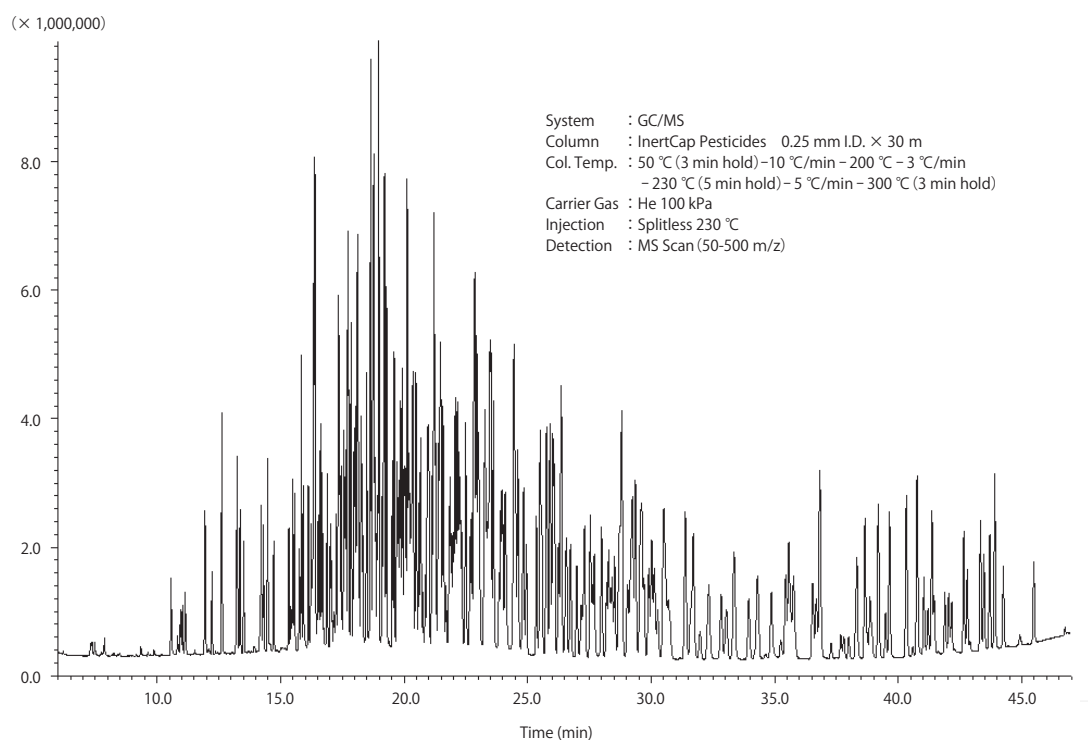
- Phenyl Arylene polymer equivalent to a 5 % Phenyl - 95 % Methylpolysiloxane
- USP Phase G27
- Slightly Polar
- Cross-Linked
- Ultra Low Bleed
- GL Sciences' original, No equivalent

InertCap Pesticides is specially designed for simultaneous analyses of pesticides with GC/MS. Heat decomposition of pesticides in column and influence by matrix can be eliminated.

Structure



324 Pesticides



【 InertCap™ Pesticides 】

ID (mm)	Length (m)	Thickness (μ m)	Max. Temperature (°C)	Cat.No.	Price
0.25	30	0.2	iso.325-prog.350	1010-15141	€ 664,-

【 InertCap™ Pesticides ProGuard (Built-in Guard Column) 】

ID (mm)	Length (m)	Thickness (μ m)	Guard Column (m)	Max. Temp. (°C)	Cat.No.	Price
0.25	30	0.2	2	iso.325-prog.350	1010-15175	€ 728,-
			5		1010-15176	€ 770,-
			10		1010-15177	€ 810,-

【 InertCap™ Pesticides T.L.(Built-in Transfer Line) 】

ID (mm)	Length (m)	Thickness (μ m)	Transfer Line (m)	Max. (°C)	Cat.No.	Price
0.25	30	0.2	2	iso.325-prog.350	1010-15191	€ 728,-

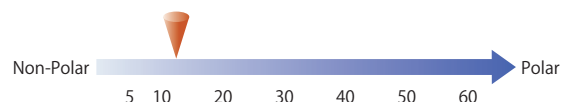
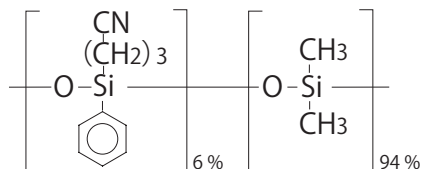
※See page 32 for more information about ProGuard and T.L.

InertCap™ 624

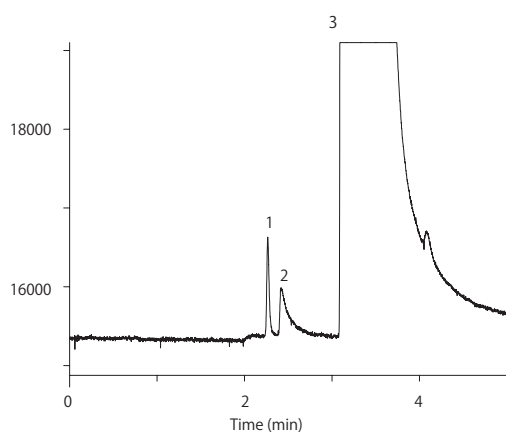
- 6 % Cyanopropylphenyl - 94 % Methylpolysiloxane
- USP Phase G43
- Medium Polar
- Cross-Linked
- Equivalent : DB-624, HP-VOC, Rtx-624, VF-624ms

InertCap 624 is a medium polar column incorporating 6 % cyanopropylphenyl and 94 % methylpolysiloxane, designed for VOC analysis. Corresponding to the USP G43, InertCap 624 is optimal for the analysis of "acetaldehyde-methanol in ethanol" defined in the Japanese Pharmacopeia Fifteenth Edition.

Structure



Impurities in ethanol



System : GC/FID
 Column : InertCap 624 0.32 mm I.D. × 30 m df = 1.80 μm
 Col. Temp. : 40 °C
 Carrier Gas : He 60 kPa
 Injection : Split 1:20 240 °C
 Detection : FID Range 10¹⁰ 240 °C
 Sample Size : 1 μL

1. Acetaldehyde
2. Methanol
3. Ethanol

【 InertCap™ 624 】

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.18	20	1.00	iso.260-prog.260	1010-14535	€ 536,-
	40	1.00	iso.260-prog.260	1010-14555	€ 676,-
0.25	30	1.40	iso.260-prog.260	1010-14646	€ 422,-
	60	1.40	iso.260-prog.260	1010-14666	€ 671,-
0.32	30	1.80	iso.260-prog.260	1010-14747	€ 452,-
		3.00		1010-14748	€ 470,-
	60	1.80	iso.260-prog.260	1010-14767	€ 732,-
0.53	30	3.00	iso.260-prog.260	1010-14948	€ 579,-
	75	3.00	iso.260-prog.260	1010-14978	€ 980,-

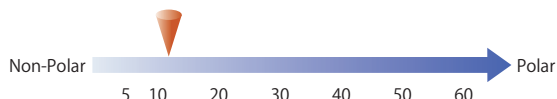
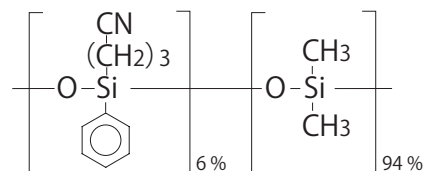
※ Different dimensions are available on request.

InertCap™ 1301

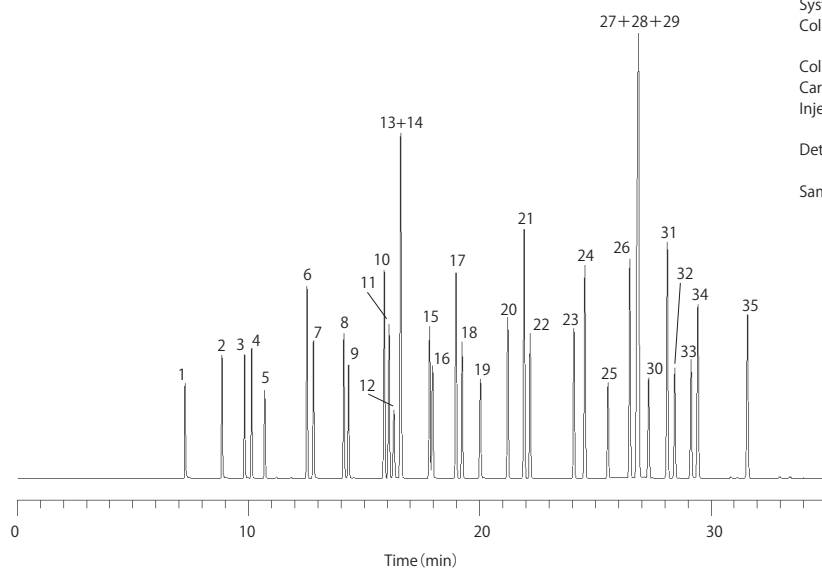
- 6 % Cyanopropylphenyl - 94 % Methylpolysiloxane
- USP Phase G43
- Medium Polar
- Cross-Linked
- Equivalent : DB-1301, HP-1301, Rtx-1301, VF-1301ms

InertCap 1301 is a medium polar column incorporating 6 % cyanopropylphenyl and 94 % methylpolysiloxane. Compared to InertCap 25, polarity of InertCap 1301 is slightly lower. Cyano group contained in the liquid phase offers unique selectivities.

Structure



Solvents



System : GC/FID
 Column : InertCap 1301
 0.25 mm I.D. × 60 m df = 1.00 μm
 Col. Temp. : 40 °C (5 min hold) - 5 °C/min - 200 °C
 Carrier Gas : He 160 kPa
 Injection : Split flow 100 mL/min
 200 °C
 Detection : FID Range 10[^]1
 200 °C
 Sample Size : Mixed evenly
 0.2 μL

- | | | | |
|----------------------------------|---|---|---|
| 1. Methanol | 11. 2-Methyl-1-propanol(Isobutyl alcohol) | 20. 4-Methyl-2-pentanone(MIBK) | 28. <i>m</i> -Xylene |
| 2. Ethanol | 12. 2-Methoxyethanol(Methyl cellosolve) | 21. Toluene | 29. <i>p</i> -Xylene |
| 3. Acetone | 13. Benzene | 22. Isobutyl acetate | 30. Diacetone alcohol |
| 4. 2-Propanol(Isopropyl alcohol) | 14. Isopropyl acetate | 23. <i>n</i> -Butyl acetate | 31. <i>o</i> -Xylene |
| 5. Methyl acetate | 15. 1-Butanol | 24. Ethylcyclohexane | 32. 2-Ethoxyethyl acetate(Cellosolve acetate) |
| 6. <i>n</i> -Hexane | 16. 1-Methoxy-2-propanol
(Propylene glycol monomethyl ether) | 25. 2-Methoxyethyl acetate
(Methyl cellosolve acetate) | 33. 2-Butoxyethanol(Butyl cellosolve) |
| 7. 1-Propanol | 17. Methylcyclohexane | 26. Ethylbenzene | 34. Cyclohexanone |
| 8. 2-Butanone(MEK) | 18. <i>n</i> -Propyl acetate | 27. 1-Methoxy-2-propyl acetate
(Propylene glycol monomethyl ether acetate) | 35. 2-Methylcyclohexanone |
| 9. Ethyl acetate | 19. 2-Ethoxyethanol(Cellosolve) | | |
| 10. Cyclohexane | | | |

[InertCap™ 1301]

ID (mm)	Length (m)	Thickness (μm)	Max. Temp. (°C) iso. - prog.	Cat.No.	Price	
0.18	20	0.18	280 - 300	1010-60031	€ 261,-	
		0.25	280 - 300	1010-60122	€ 261,-	
		0.50	280 - 300	1010-60124	€ 261,-	
		1.00	260 - 280	1010-60125	€ 261,-	
	15	0.25	280 - 300	1010-60142	€ 405,-	
		0.50	280 - 300	1010-60144	€ 405,-	
		1.00	260 - 280	1010-60145	€ 405,-	
		0.25	280 - 300	1010-60162	€ 658,-	
	30	0.50	280 - 300	1010-60164	€ 658,-	
		1.00	260 - 280	1010-60165	€ 658,-	
		60	0.25	280 - 300	1010-60162	€ 658,-
			0.50	280 - 300	1010-60164	€ 658,-
1.00	260 - 280		1010-60165	€ 658,-		

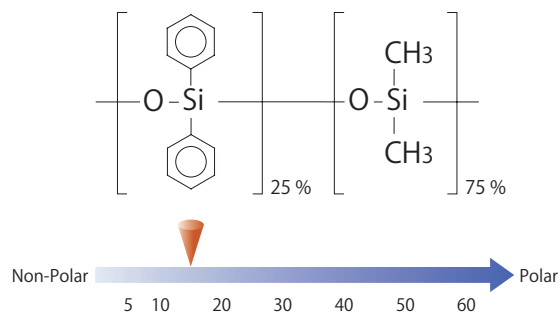
ID (mm)	Length (m)	Thickness (μm)	Max. Temp. (°C) iso. - prog.	Cat.No.	Price		
0.32	15	0.25	280 - 300	1010-60222	€ 364,-		
		0.50	280 - 300	1010-60224	€ 364,-		
		1.00	260 - 280	1010-60225	€ 364,-		
		0.25	280 - 300	1010-60242	€ 438,-		
	30	0.50	280 - 300	1010-60244	€ 438,-		
		1.00	260 - 280	1010-60245	€ 438,-		
		0.25	280 - 300	1010-60262	€ 718,-		
		0.50	280 - 300	1010-60264	€ 718,-		
	60	1.00	260 - 280	1010-60265	€ 718,-		
		0.53	15	1.00	260 - 280	1010-60425	€ 311,-
			30	1.00	260 - 280	1010-60445	€ 524,-

InertCap™ 25

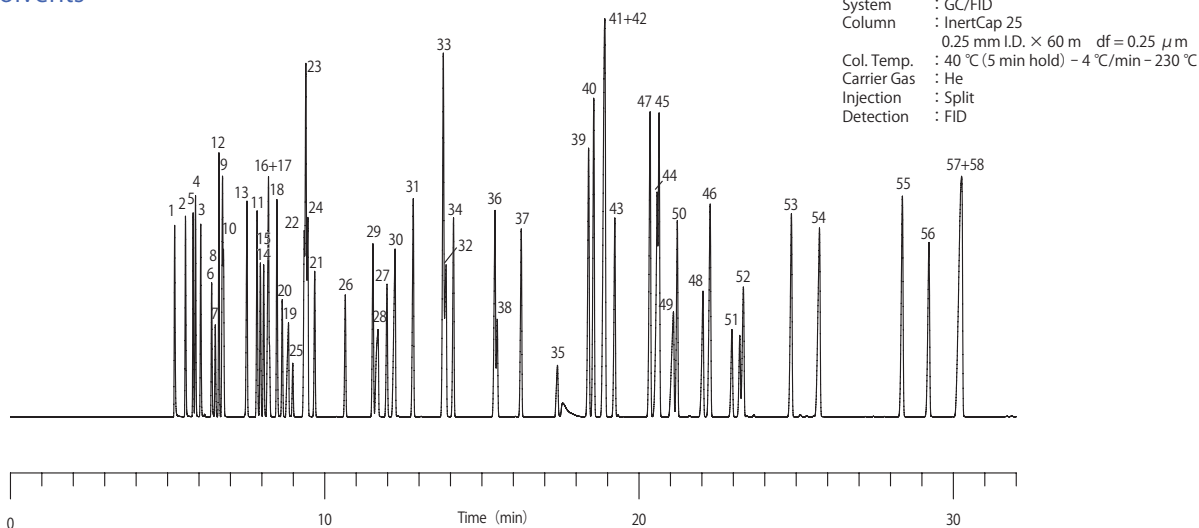
- 25 % Phenyl - 75 % Methylpolysiloxane
- USP Phase G28
- Medium Polar
- Cross-Linked
- No Equivalent

InertCap 25 is a medium polar column incorporating 25 % phenyl and 75 % methylpolysiloxane. With different selectivities compared to other medium polar columns, InertCap 25 is useful to identify and quantitate for a variety of analyses.

Structure



Solvents



- | | | | | |
|--|--------------------------------------|-----------------------------------|-----------------------------|-------------------------------|
| 1. Methanol | 13. 2-Butanol | 25. Carbon Tetrachloride | 37. <i>n</i> -Butyl acetate | 49. Butyl cellosolve |
| 2. Ethanol | 14. <i>cis</i> -1,2-Dichloroethylene | 26. Trichloroethylene | 38. Tetrachloroethylene | 50. <i>n</i> -Amyl acetate |
| 3. Acetone | 15. Ethyl acetate | 27. 1,4-Dioxane | 39. Chlorobenzene | 51. 1,1,2-tetrachloroethane |
| 4. <i>i</i> -Propanol | 16. Chloroform | 28. Ethyl cellosolve | 40. Ethylbenzene | 52. Methylcyclohexanol |
| 5. Ethyl ether | 17. <i>i</i> -Butanol | 29. <i>n</i> -Propyl acetate | 41. <i>m</i> -Xylene | 53. Methylcyclohexanone |
| 6. Methyl acetate | 18. Tetrahydrofuran | 30. <i>i</i> -Amyl alcohol | 42. <i>p</i> -Xylene | 54. Phenol |
| 7. Dichloromethane | 19. Methyl cellosolve | 31. Methyl <i>i</i> -butyl ketone | 43. <i>i</i> -Amyl acetate | 55. <i>o</i> -Dichlorobenzene |
| 8. Carbon disulfide | 20. 1,1,1-Trichloroethane | 32. <i>n</i> -Amyl alcohol | 44. Cyclohexanol | 56. <i>o</i> -Cresol |
| 9. <i>n</i> -Propanol | 21. 1,2-Dichloroethane | 33. Toluene | 45. Styrene | 57. <i>p</i> -Cresol |
| 10. <i>trans</i> -1,2-Dichloroethylene | 22. <i>i</i> -Propyl acetate | 34. <i>i</i> -Butyl acetate | 46. Cyclohexanone | 58. <i>m</i> -Cresol |
| 11. Methyl ethyl ketone | 23. Benzene | 35. <i>N,N</i> -Dimethylformamide | 47. <i>o</i> -Xylene | |
| 12. <i>n</i> -Hexane | 24. <i>n</i> -Butanol | 36. Methyl <i>n</i> -butyl ketone | 48. Cellosolve acetate | |

【 InertCap™ 25 】

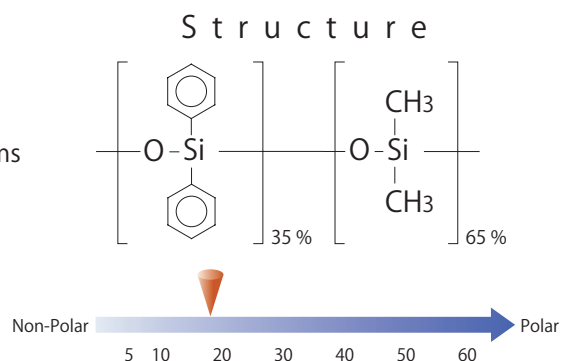
ID (mm)	Length (m)	Thickness (μm)	Max. Temp. (°C) iso. - prog.	Cat.No.	Price
0.25	15	0.25	280 - 300	1010-62122	€ 258,-
		0.50		1010-62124	€ 258,-
		1.00		1010-62125	€ 258,-
	30	0.25	280 - 300	1010-62142	€ 394,-
		0.50		1010-62144	€ 394,-
		1.00		1010-62145	€ 394,-
	60	0.25	280 - 300	1010-62162	€ 642,-
		0.50		1010-62164	€ 642,-
		1.00		1010-62165	€ 642,-

ID (mm)	Length (m)	Thickness (μm)	Max. Temp. (°C) iso. - prog.	Cat.No.	Price
0.32	15	0.25	280 - 300	1010-62222	€ 304,-
		0.50		1010-62224	€ 304,-
		1.00		1010-62225	€ 304,-
	30	0.25	280 - 300	1010-62242	€ 428,-
		0.50		1010-62244	€ 428,-
		1.00		1010-62245	€ 428,-
	60	0.25	280 - 300	1010-62262	€ 703,-
		0.50		1010-62264	€ 703,-
		1.00		1010-62265	€ 703,-
0.53	15	1.00	260 - 280	1010-62425	€ 307,-
	30	1.00	260 - 280	1010-62445	€ 512,-

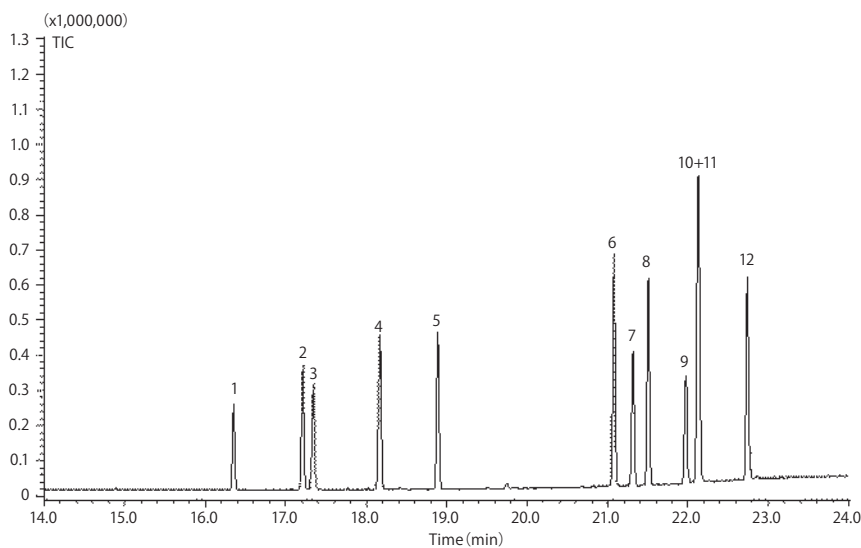
InertCap™ 35

- 35 % Phenyl - 65 % Methylpolysiloxane
- USP Phase G42
- Medium Polar
- Cross-Linked
- Equivalent : DB-35ms, DB-35, HP-35ms, HP-35, Rtx-35, VF-35ms

InertCap 35 is a medium polar column incorporating 35 % phenyl and 65 % methylpolysiloxane. With a stronger polarity than InertCap 25, InertCap 35 is optimal for the analyses of semi volatile compounds or solvents.



Pesticides



System : GC/MS
 Column : InertCap 35
 0.25 mm I.D. × 30 m df = 0.25 μm
 Col. Temp. : 60 °C - 10 °C/min - 290 °C (7 min hold)
 Carrier Gas : He 35cm/sec
 Injection : Split 1:30
 250 °C
 Detection : MS Scan (45 - 500 m/z)
 Interface Temp. 280 °C
 Sample Size : 10 μg/mL in Isooctane
 1 μL

1. α-BHC
2. γ-BHC
3. β-BHC
4. Heptachlor
5. Aldrin
6. p,p'-DDE
7. Dieldrin
8. o,p'-DDD
9. Endrin
10. p,p'-DDD
11. o,p'-DDT
12. p,p'-DDT

[InertCap™ 35]

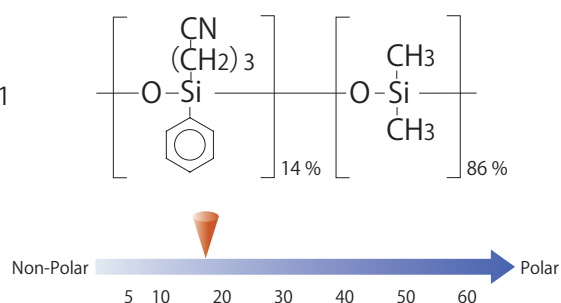
ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.25	15	0.25	iso.280-prog.300	1010-63122	€ 261,-
		0.50		1010-63124	€ 261,-
		1.00		1010-63125	€ 261,-
	30	0.25	iso.280-prog.300	1010-63142	€ 405,-
		0.50		1010-63144	€ 405,-
		1.00		1010-63145	€ 405,-
	60	0.25	iso.280-prog.300	1010-63162	€ 658,-
		0.50		1010-63164	€ 658,-
		1.00		1010-63165	€ 658,-
0.32	15	0.25	iso.280-prog.300	1010-63222	€ 364,-
		0.50		1010-63224	€ 364,-
		1.00		1010-63225	€ 364,-
	30	0.25	iso.280-prog.300	1010-63242	€ 438,-
		0.50		1010-63244	€ 438,-
		1.00		1010-63245	€ 438,-
	60	0.25	iso.280-prog.300	1010-63262	€ 718,-
		0.50		1010-63264	€ 718,-
		1.00		1010-63265	€ 718,-
0.53	15	1.00	iso.260-prog.280	1010-63425	€ 311,-
	30	0.50	iso.280-prog.300	1010-63444	€ 524,-
		1.00	iso.260-prog.280	1010-63445	€ 524,-

InertCap™ 1701

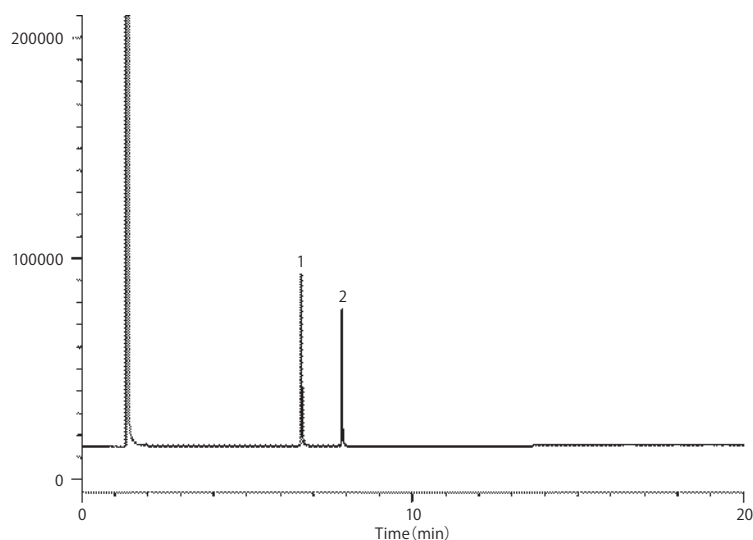
- 14 % Cyanopropylphenyl - 86 % Methylpolysiloxane
- USP Phase G46
- Medium Polar
- Cross-Linked
- Equivalent : DB-1701, HP-1701, Rtx-1701, VF-1701ms, SPB-1701

InertCap 1701 is a medium polar column incorporating 14 % cyanopropylphenyl and 86 % methylpolysiloxane. Containing the same cyano group as InertCap 1301 and with stronger polarity compared to InertCap 25, InertCap 1701 is optimal for pesticides screening analyses.

Structure



Glycol and glycerin



System : GC/FID
 Column : InertCap 1701
 0.32 mm I.D. × 30 m df = 1.00 μm
 Col. Temp. : 100 °C - 7.5 °C - 220 °C (4 min hold)
 Carrier Gas : He 100 kPa
 Injection : Split 1:20 220 °C
 Detection : FID Range 10¹⁰ 250 °C
 Sample Size : 0.5 mg/mL 1 μL

1. Diethylene glycol
 2. Glycerin

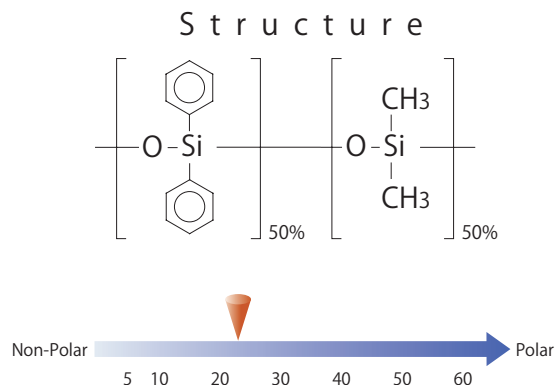
【InertCap™ 1701】

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price	
0.18	20	0.18	iso.280-prog.300	1010-61031	€ call	
0.25	15	0.25	iso.280-prog.300	1010-61122	€ 422,-	
		0.50		1010-61124	€ 261,-	
		1.00	iso.260-prog.280	1010-61125	€ 261,-	
	30	0.25	iso.280-prog.300	1010-61142	€ 405,-	
		0.50		1010-61144	€ 405,-	
		1.00	iso.260-prog.280	1010-61145	€ 405,-	
	60	0.25	iso.280-prog.300	1010-61162	€ 658,-	
		0.50		1010-61164	€ 658,-	
		1.00	iso.260-prog.280	1010-61165	€ 658,-	
	0.32	15	0.25	iso.280-prog.300	1010-61222	€ 364,-
			0.50		1010-61224	€ 364,-
			1.00	iso.260-prog.280	1010-61225	€ 364,-
30		0.25	iso.280-prog.300	1010-61242	€ 438,-	
		0.50		1010-61244	€ 438,-	
		1.00	iso.260-prog.280	1010-61245	€ 438,-	
60		0.25	iso.280-prog.300	1010-61262	€ 718,-	
		0.50		1010-61264	€ 718,-	
		1.00	iso.260-prog.280	1010-61265	€ 718,-	
0.53	15	1.00	iso.260-prog.280	1010-61425	€ 311,-	
	30	1.00	iso.260-prog.280	1010-61445	€ 524,-	

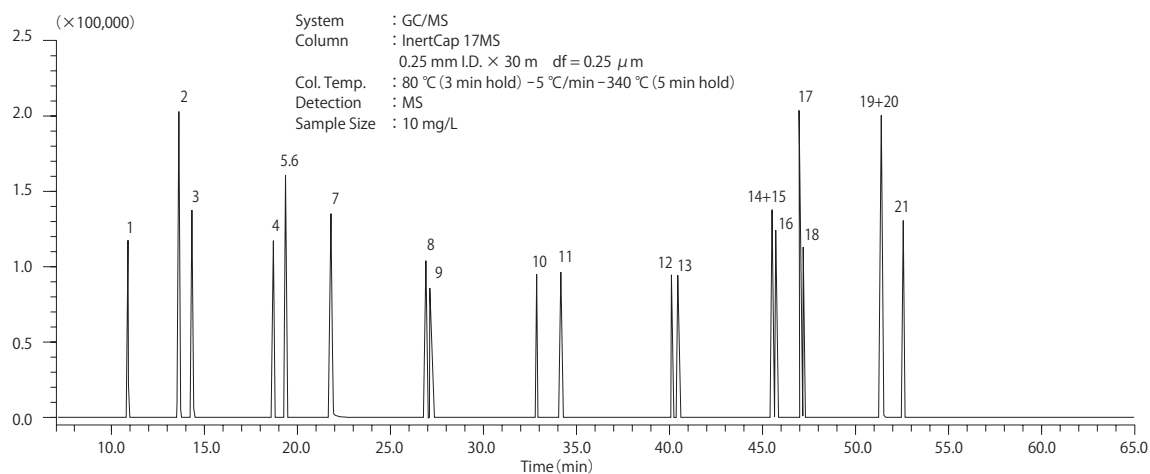
InertCap™ 17MS

- 50 % Phenyl - 50 % Methylpolysiloxane
- USP Phase G3
- Medium Polar
- Cross-Linked
- Ultra Low Bleed
- Equivalent : DB-17ms, Rxi-17, VF-17ms, SPB-17

InertCap 17MS is a medium polar column incorporating 50 % phenyl and 50 % methylpolysiloxane, designed for GC/MS. InertCap 17MS realizes the world highest inertness and lowest bleeding, and is optimal for microanalyses such as pesticides analyses.



■ Aromatic hydrocarbons



- | | | | | |
|------------------------|------------------|--------------------------|----------------------------|----------------------------|
| 1. Naphthalene | 6. Biphenyl | 11. Pyrene | 16. Benzo[e]pyrene | 21. Indeno[1,2,3-cd]pyrene |
| 2. 2-Methylnaphthalene | 7. Fluorene | 12. Chrysene | 17. Benzo[a]pyrene | |
| 3. 1-Methylnaphthalene | 8. Phenanthrene | 13. Benzo[a]anthracene | 18. Benzo[j]fluoranthene | |
| 4. Acenaphthylene | 9. Anthracene | 14. Benzo[b]fluoranthene | 19. Dibenzo[a,h]anthracene | |
| 5. Acenaphthene | 10. Fluoranthene | 15. Benzo[k]fluoranthene | 20. Benzo[g,h,i]perylene | |

【InertCap™ 17MS】

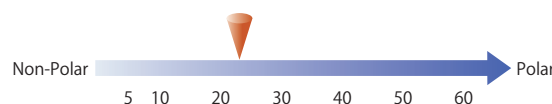
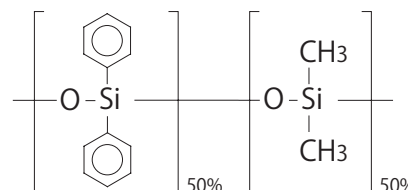
ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.25	15	0.25	iso.320-prog.340	1010-20122	€ 462,-
	30	0.25	iso.320-prog.340	1010-20142	€ 562,-
	60	0.25	iso.320-prog.340	1010-20162	€ 851,-
0.32	15	0.25	iso.320-prog.340	1010-20222	€ 481,-
	30	0.25	iso.320-prog.340	1010-20242	€ 596,-
	60	0.25	iso.320-prog.340	1010-20262	€ 919,-

InertCap™ 17

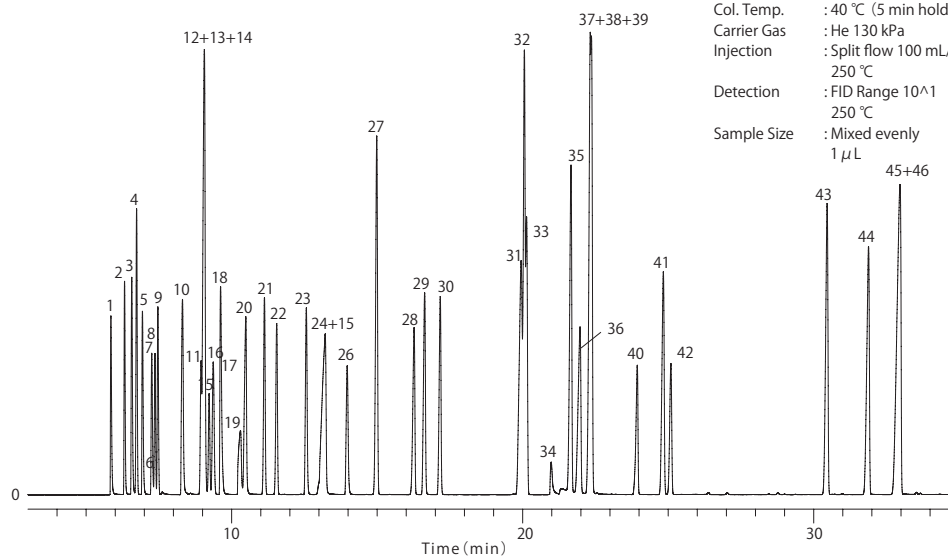
- 50 % Phenyl - 50 % Methylpolysiloxane
- USP Phase G3
- Medium Polar
- Cross-Linked
- Equivalent : DB-17, HP-50, Rtx-50, CP-Sil 24CB, SPB-50

InertCap 17 is a medium polar column incorporating 50 % phenyl and 50 % methylpolysiloxane. With stronger polarity than InertCap 35, InertCap 17 is optimal for general and pesticides analyses.

Structure



Organic solvents



System : GC/FID
 Column : InertCap 17
 0.25 mm I.D. × 60 m df = 0.25 μm
 Col. Temp. : 40 °C (5 min hold) - 4 °C/min - 230 °C (5 min hold)
 Carrier Gas : He 130 kPa
 Injection : Split flow 100 mL/min
 250 °C
 Detection : FID Range 10¹
 250 °C
 Sample Size : Mixed evenly
 1 μL

1. Methanol	11. <i>cis</i> -1,2-Dichloroethylene	21. 1,2-Dichloroethane	31. <i>p</i> -Xylene	41. Cyclohexanone
2. Ethyl ether	12. Methyl ethyl ketone	22. Trichloroethylene	32. <i>m</i> -Xylene	42. 1,1,2-Tetrachloroethane
3. <i>i</i> -Propanol	13. <i>i</i> -Butanol	23. <i>n</i> -Propyl acetate	33. Chlorobenzene	43. <i>o</i> -Dichlorobenzene
4. <i>n</i> -Hexane	14. Ethyl acetate	24. <i>i</i> -Amyl alcohol	34. <i>N,N</i> -Dimethyl formamide	44. <i>o</i> -Cresol
5. Acetone	15. Chloroform	25. Ethyl cellosolve	35. <i>o</i> -Xylene	45. <i>p</i> -Cresol
6. Carbon disulfide	16. 1,1,1-Trichloroethane	26. 1,4-Dioxane	36. 1-Methylcyclohexanol	46. <i>m</i> -Cresol
7. Methyl acetate	17. Carbon tetrachloride	27. Toluene	37. Cyclohexanol	
8. Dichloromethane	18. Tetrahydrofuran	28. Tetrachloroethylene	38. Butyl cellosolve	
9. <i>trans</i> -1,2-Dichloroethylene	19. Methylcellosolve	29. Methyl- <i>n</i> -butyl ketone	39. Styrene	
10. 2-Butanol	20. <i>n</i> -Butanol	30. <i>n</i> -Butyl acetate	40. Cellosolve acetate	

[InertCap™ 17]

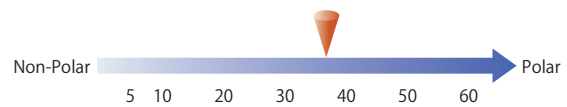
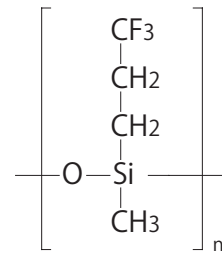
ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.18	20	0.18	iso.320-prog.340	1010-65031	€ call
	15	0.25	iso.320-prog.340	1010-65122	€ 258,-
0.25	30	0.15	iso.320-prog.340	1010-65141	€ 394,-
		0.25	iso.320-prog.340	1010-65142	€ 394,-
	60	0.25	iso.320-prog.340	1010-65162	€ 642,-
0.32	30	0.15	iso.320-prog.340	1010-65241	€ 428,-
		0.25	iso.320-prog.340	1010-65242	€ 428,-
	60	0.25	iso.320-prog.340	1010-65262	€ 703,-
0.53	15	1.00	iso.300-prog.320	1010-65425	€ 307,-
	30	1.00	iso.300-prog.320	1010-65445	€ 512,-

InertCap™ 210

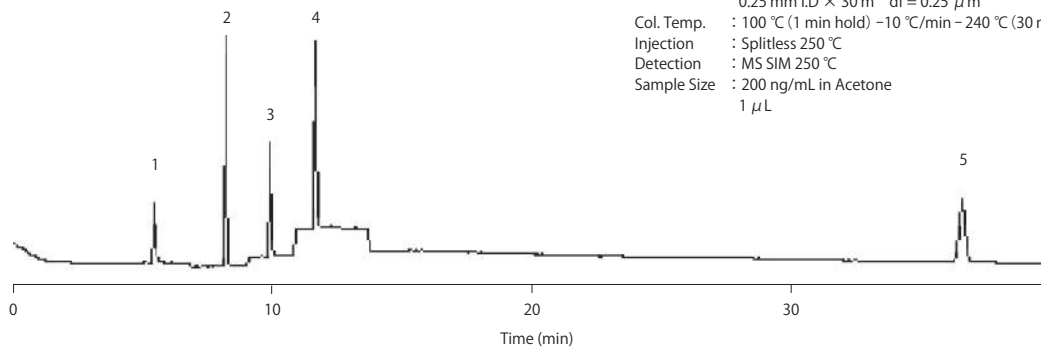
- 50 % Trifluoropropyl - 50 % Methylpolysiloxane
- USP Phase G6
- Medium Polar
- Cross-Linked
- Excellent separation for organophosphorous pesticides
- Equivalent : DB-210, Rtx-200, VF-200ms

InertCap 210 is a medium polar column incorporating 50 % trifluoropropyl and 50 % methylpolysiloxane. With a unique selectivity against polar compounds, InertCap 210 is optimal for analyses such as compounds containing phosphorous-nitrogen.

Structure



Organophosphorous pesticides



System : GC/MS
 Column : InertCap 210
 0.25 mm I.D × 30 m df = 0.25 μm
 Col. Temp. : 100 °C (1 min hold) -10 °C/min -240 °C (30 min hold)
 Injection : Splitless 250 °C
 Detection : MS SIM 250 °C
 Sample Size : 200 ng/mL in Acetone
 1 μL

1. Acephate
2. Fenchlorphos
3. Omethoate
4. Monocrotophos
5. Phos met

【InertCap™ 210】

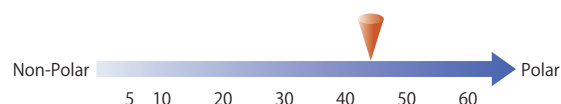
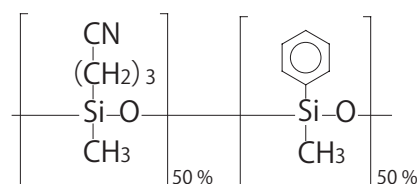
ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Pice
0.25	30	0.25	iso.240-prog.260	1010-66142	€ 454,-
0.32	30	0.25	iso.240-prog.260	1010-66242	€ 465,-
0.53	15	1.00	iso.220-prog.240	1010-66425	€ 420,-
	30	1.00	iso.220-prog.240	1010-66445	€ 614,-

InertCap™ 225

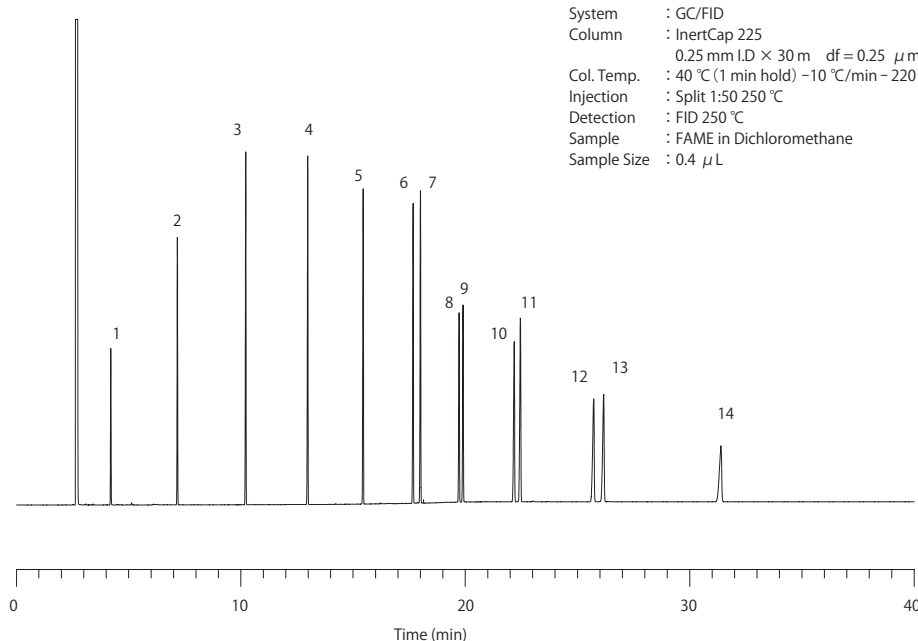
- 50 % Cyanopropylmethyl - 50 % Phenylmethylpolysiloxane
- USP Phase G19
- Medium Polar
- Cross-Linked
- Excellent separation for FAME
- Equivalent : DB-225, HP-225, Rtx-225, CP-Sil 43CB

InertCap 225 is a medium polar column incorporating 50 % cyanopropylmethyl and 50 % phenylmethylpolysiloxane. Cyano group contained in the liquid phase with triple bond retains compounds with high unsaturation degree strong by its dipole function. Therefore InertCap 225 is optimal for geometrical isomer analyses.

Structure



FAME (Fatty Acid Methyl Ester)



System : GC/FID
 Column : InertCap 225
 0.25 mm I.D × 30 m df = 0.25 μm
 Col. Temp. : 40 °C (1 min hold) - 10 °C/min - 220 °C (30 min hold)
 Injection : Split 1:50 250 °C
 Detection : FID 250 °C
 Sample : FAME in Dichloromethane
 Sample Size : 0.4 μL

- | | | |
|-----------------------|--------------------------|--------------------------------------|
| 1. Methyl Butanoate | 6. Methyl Tetradecanoate | 11. Methyl Oleate |
| 2. Methyl Hexanoate | 7. Methyl Myristoleate | 12. Methyl Eicosanoate |
| 3. Methyl Octanoate | 8. Methyl Hexadecanoate | 13. Methyl- <i>cis</i> -11-Eicoseate |
| 4. Methyl Decanoate | 9. Methyl Palmitelaidate | 14. Methyl Docosanoate |
| 5. Methyl Dodecanoate | 10. Methyl Octadecanoate | |

【 InertCap™ 225 】

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.25	30	0.25	iso.220-prog.240	1010-66642	€ 535,-
0.32	30	0.25	iso.220-prog.240	1010-66742	€ 575,-
0.53	30	0.50	iso.220-prog.240	1010-66844	€ 745,-

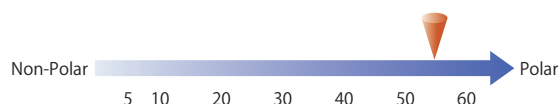
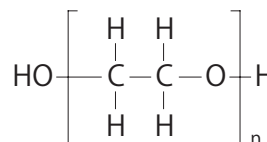
InertCap™ Pure-WAX

- Polyethylene Glycol (PEG)
- USP Phase G16
- Polar
- Cross-Linked
- Equivalent : DB-WAX, HP-INNOWax, Rtx-Wax, Stabilwax

InertCap Pure-WAX is a strong polar column incorporating polyethylene glycol. Newly developed inner treatment technology, InertCap Pure-WAX realized the highest inertness among the market available columns. InertCap Pure-WAX is an optimal column for analyses of acidic compounds and/or basic compounds that existing WAX columns were not capable to analyze.

【 Comparison data 】

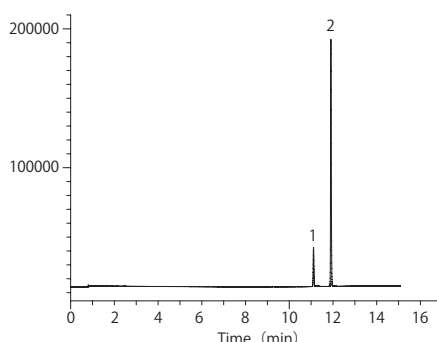
Structure



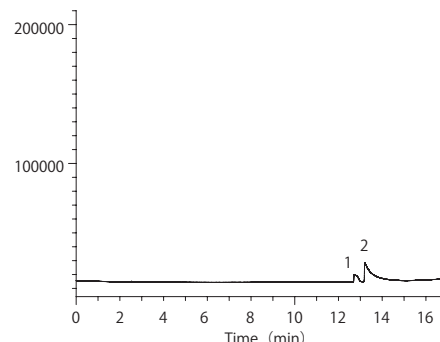
■ Acidic compounds

System : GC/FID
 Column : 0.25 mm I.D. × 30 m df = 0.25 μm
 Col.Temp. : 90 °C (5min hold) - 10 °C/min - 240 °C
 Carrier Gas : He 100 kPa
 Injection : Split flow 100 mL/min 240 °C
 Detection : FID Range 10¹⁰ 240 °C
 Sample Size : 5 mg/mL 0.4 μL

1. Acrylic acid
2. Methacrylic acid



InertCap Pure-WAX

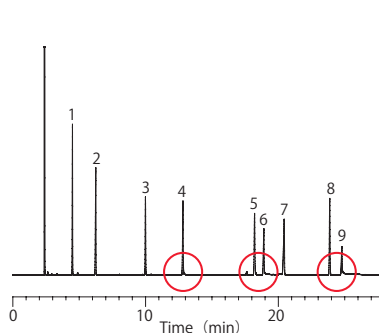


DB-WAX

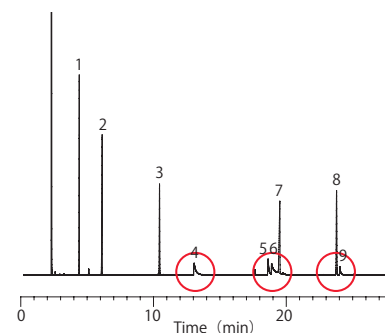
■ Basic compounds

System : GC/FID
 Column : 0.25 mm I.D. × 30 m df = 0.25 μm
 Col.Temp. : 60 °C - 4 °C/min - 250 °C
 Injection : 250 °C
 Detection : 250 °C
 Sample Size : 0.1 mg/mL in methanol 0.2 μL

1. *n*-Undecane
2. *n*-Dodecane
3. 4,6-Dimethylpyrimidine
4. 1-Aminooctane
5. *N,N*-Dicyclohexylamine
6. 1-Aminododecane
7. *n*-Heptadecane
8. 2,6-Dimethylaniline
9. 1-Aminododecane



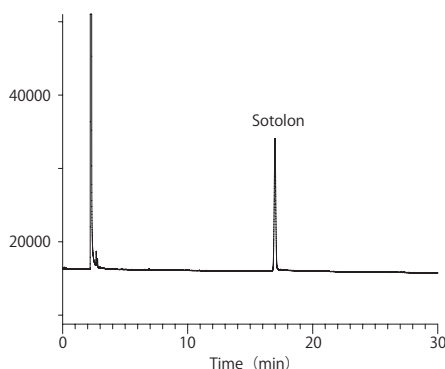
InertCap Pure-WAX



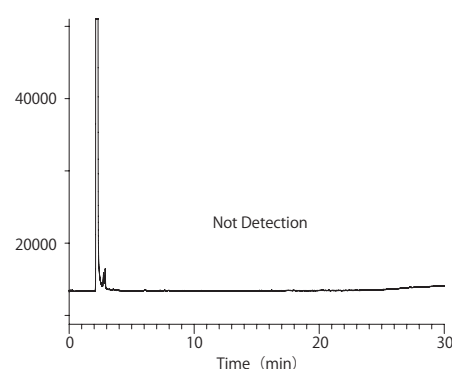
DB-WAX

■ Metal coordination compounds

System : GC/FID
 Column : 0.25 mm I.D. × 30 m df = 0.25 μm
 Col.Temp. : 160 °C Isothermal
 Carrier Gas : He 100 kPa
 Injection : Split flow 50 mL/min 240 °C
 Detection : FID Range 10¹⁰ 240 °C
 Sample Size : 1 mg/mL in Ethanol
 1 μL



InertCap Pure-WAX

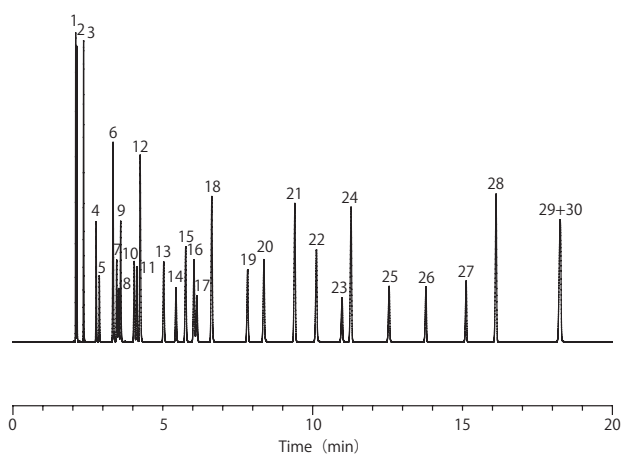


DB-WAX

Solvents

System : GC/FID
 Column : InertCap Pure-WAX
 0.25 mm I.D. × 30 m df = 0.25 μm
 Col. Temp. : 40 °C (5 min hold) – 5 °C/min – 200 °C
 Carrier Gas : He 100 kPa
 Injection : Split 1:80 250 °C
 Detection : FID Range 10¹⁰ 260 °C
 Sample Size : 0.1 μL

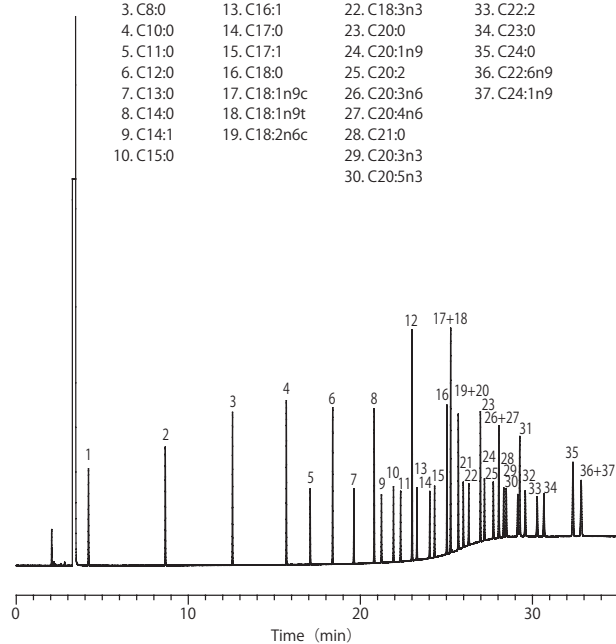
1. Hexane	11. iso-Propanol	21. Ethylbenzene
2. Cyclopentane	12. Benzene	22. n-Butanol
3. Cyclohexane	13. n-Propylacetate	23. Methylcellosolve
4. Acetone	14. Trichloroethylene	24. o-Xylene
5. Methylacetate	15. Methyl iso-butyl ketone	25. Ethylcellosolve
6. Cycloheptane	16. iso-Butylacetate	26. Methylcellosolve acetate
7. Ethylacetate	17. Tetrachloroethylene	27. Ethylcellosolve acetate
8. Methanol	18. Toluene	28. α-Methylstyrene
9. Methyl ethyl ketone	19. n-Butylacetate	29. n-Butylcellosolve
10. Ethanol	20. iso-Butanol	30. Cyclohexanol



Fatty acid methylester

System : GC/FID
 Column : InertCap Pure-WAX
 0.25 mm I.D. × 30 m df = 0.25 μm
 Col. Temp. : 50 °C (5 min hold) – 5 °C/min – 260 °C (30 min hold)
 Carrier Gas : He 100 kPa
 Injection : Split 1:80 250 °C
 Detection : FID Range 10¹⁰ 260 °C
 Sample Size : 0.1 μL

1. C4:0	11. C15:1	20. C18:2n6t	31. C22:0
2. C6:0	12. C16:0	21. C18:3n6	32. C22:1n9
3. C8:0	13. C16:1	22. C18:3n3	33. C22:2
4. C10:0	14. C17:0	23. C20:0	34. C23:0
5. C11:0	15. C17:1	24. C20:1n9	35. C24:0
6. C12:0	16. C18:0	25. C20:2	36. C22:6n9
7. C13:0	17. C18:1n9c	26. C20:3n6	37. C24:1n9
8. C14:0	18. C18:1n9t	27. C20:4n6	
9. C14:1	19. C18:2n6c	28. C21:0	
10. C15:0		29. C20:3n3	
		30. C20:5n3	



InertCap™ Pure-WAX

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.18	20	0.18	iso.260-prog.260	1010-68031	€ 536,-
	40	0.18		1010-68051	€ 708,-
0.25	30	0.25	iso.260-prog.260	1010-68142	€ 566,-
		0.50		1010-68144	€ 566,-
	60	0.25	iso.260-prog.260	1010-68162	€ 744,-
		0.50		1010-68164	€ 744,-
0.32	30	0.25	iso.260-prog.260	1010-68242	€ 609,-
		0.50		1010-68244	€ 609,-
	60	0.25	iso.240-prog.260	1010-68262	€ 762,-
		0.50		1010-68264	€ 762,-
0.53	15	1.00	iso.240-prog.240	1010-68425	€ 527,-
	30	1.00	iso.240-prog.240	1010-68445	€ 645,-
	60	1.00	iso.240-prog.240	1010-68465	€ 954,-

InertCap™ Pure-WAX ProGuard (Built-in Guard Column)

ID (mm)	Length (m)	Thickness (μm)	Guard Column (m)	Max. Temperature (°C)	Cat.No.	Price
0.25	30	0.25	2	iso.260-prog.260	1010-68490	€ 630,-
			5		1010-68491	€ 672,-
			10		1010-68494	€ 712,-

InertCap™ Pure-WAX T.L. (Built-in Transfer Line)

ID (mm)	Length (m)	Thickness (μm)	Transfer Line (m)	Max. Temperature (°C)	Cat.No.	Price
0.25	30	0.25	2	iso.260-prog.260	1010-68492	€ 630,-
	60	0.25	2	iso.260-prog.260	1010-68493	€ 806,-

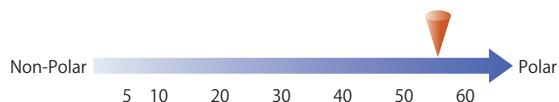
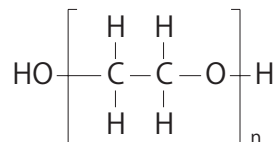
※ See page 32 for more information about ProGuard and T.L.

InertCap™ WAX

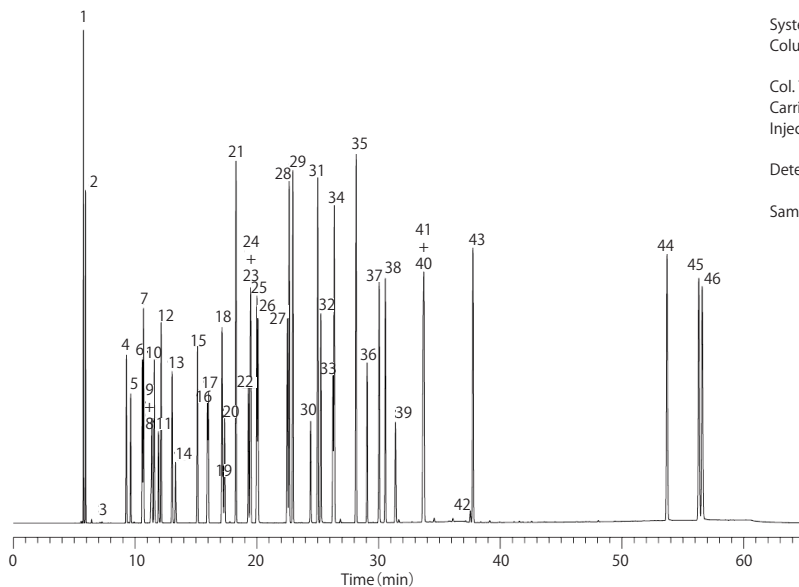
- Polyethylene Glycol (PEG)
- USP Phase G16
- Polar
- Cross-Linked
- Equivalent : DB-WAX, HP-INNOWax, Rtx-Wax, Stabilwax

InertCap WAX is a strong polar column incorporating polyethylene glycol. With a slightly stronger polarity than InertCap Pure-WAX, InertCap WAX demonstrates a high separation. It is optimal for analyses of strong polar samples such as solvent.

Structure



Solvents



System : GC/FID
 Column : InertCap WAX
 0.25 mm I.D. × 60 m df = 0.25 μm
 Col. Temp. : 40 °C (5 min hold) - 4 °C/min - 230 °C (5 min hold)
 Carrier Gas : He 130 kPa
 Injection : Split flow 100 mL/min
 250 °C
 Detection : FID Range 10^{^1}
 250 °C
 Sample Size : 1.0 μL

- | | | | | |
|---------------------------------------|--------------------------------------|------------------------------------|------------------------------------|-------------------------------|
| 1. <i>n</i> -Hexane | 11. Methanol | 21. Toluene | 31. <i>o</i> -Xylene | 41. Cyclohexanol |
| 2. Ethyl ether | 12. Methyl ethyl ketone | 22. 1,4-Dioxane | 32. <i>i</i> -Amyl alcohol | 42. 1,1,2,2-Tetrachloroethane |
| 3. Carbon disulfide | 13. <i>i</i> -Propanol | 23. <i>n</i> -Butyl acetate | 33. Ethyl cellosolve | 43. <i>o</i> -Dichlorobenzene |
| 4. Acetone | 14. Dichloromethane | 24. 1,2-Dichloroethane | 34. Chlorobenzene | 44. <i>o</i> -Cresol |
| 5. Methyl acetate | 15. <i>n</i> -Propyl acetate | 25. Methyl- <i>n</i> -butyl ketone | 35. Styrene | 45. <i>p</i> -Cresol |
| 6. <i>trans</i> -1,2-Dichloroethylene | 16. <i>cis</i> -1,2-Dichloroethylene | 26. <i>i</i> -Butanol | 36. Cellosolve acetate | 46. <i>m</i> -Cresol |
| 7. Tetrahydrofuran | 17. Trichloroethylene | 27. <i>n</i> -Butanol | 37. Cyclohexanone | |
| 8. Carbon tetrachloride | 18. 2-Butanol | 28. <i>p</i> -Xylene | 38. 1-Methylcyclohexanol | |
| 9. 1,1,1-Trichloroethane | 19. Chloroform | 29. <i>m</i> -Xylene | 39. <i>N,N</i> -Dimethyl formamide | |
| 10. Ethyl acetate | 20. Tetrachloroethylene | 30. Methyl cellosolve | 40. Butyl cellosolve | |

[InertCap™ WAX]

ID (mm)	Length (m)	Thickness (μm)	Max. Temp. (°C) iso. - prog.	Cat.No.	Price	
0.25	15	0.25	250 - 260	1010-67122	€ 258,-	
		0.50		1010-67144	€ 394,-	
	30	0.25	250 - 260	1010-67142	€ 394,-	
		0.50		1010-67162	€ 642,-	
		0.25		250 - 260	1010-67164	€ 642,-
		0.50				

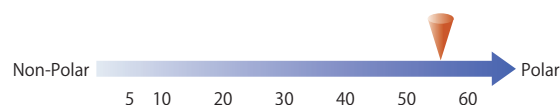
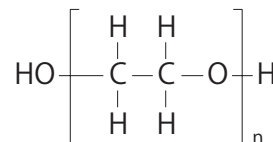
ID (mm)	Length (m)	Thickness (μm)	Max. Temp. (°C) iso. - prog.	Cat.No.	Price	
0.32	15	0.25	250 - 260	1010-67222	€ 340,-	
		0.50		1010-67244	€ 428,-	
	30	0.25	250 - 260	1010-67242	€ 428,-	
		0.50		1010-67262	€ 703,-	
		0.25		250 - 260	1010-67264	€ 703,-
		0.50				
0.53	15	1.00	230 - 240	1010-67425	€ 307,-	
		2.00		1010-67427	€ 307,-	
	30	1.00	230 - 240	1010-67445	€ 512,-	
		2.00		1010-67447	€ 512,-	
		3.00		1010-67449	€ 512,-	
		1.00		230 - 240	1010-67465	€ 822,-

InertCap™ WAX-HT

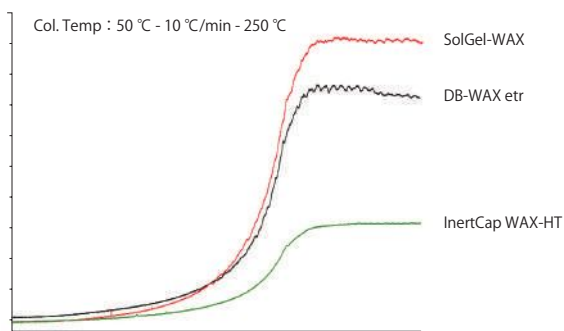
- Polyethylene Glycol (PEG)
- USP Phase G16
- Polar
- Cross-Linked
- Equivalent : DB-WAXetr, SolGel-WAX

InertCap WAX-HT is a strong polar column incorporating polyethylene glycol. By increasing the heat resistance of liquid phase, InertCap WAX-HT realized the maximum temperature 280 °C. Being optimal for the analyses of polar samples such as solvents, InertCap WAX-HT can also fit for the analyses of high-boiling compounds.

Structure

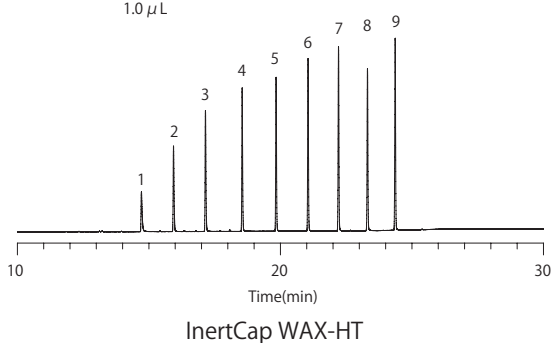


Comparison of column bleed

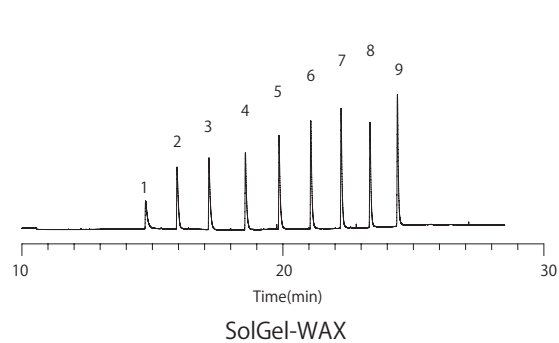


Short-chain fatty acid

System : GC/FID
 Column : InertCap WAX-HT 0.25 mm I.D. × 30 m df = 0.25 μm
 Col. Temp. : 40 °C (5 min hold) - 10 °C/min - 240 °C
 Carrier Gas : He 100 kPa
 Injection : Split flow 50 mL/min 240 °C
 Detection : FID Range 10¹⁰ 240 °C
 Sample Size : 1000 μg/mL in Acetone
 1.0 μL



1. Acetic Acid 6. Heptyric Acid
 2. Propionic Acid 7. Caprylic Acid
 3. Butyric Acid 8. Pelargonic Acid
 4. Valeric Acid 9. Capric Acid
 5. Caproic Acid



【InertCap™ WAX-HT】

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.25	30	0.25	iso.270-prog.280	1010-68542	€ 566,-
		0.50	iso.260-prog.270	1010-68544	€ 566,-
	60	0.25	iso.270-prog.280	1010-68562	€ 744,-
		0.50	iso.260-prog.270	1010-68564	€ 744,-

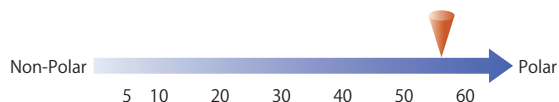
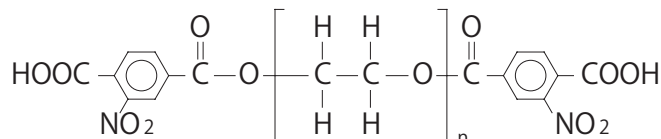
ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.32	30	0.25	iso.270-prog.280	1010-68642	€ 609,-
		0.50	iso.260-prog.270	1010-68644	€ 609,-
	60	0.25	iso.270-prog.280	1010-68662	€ 762,-
		0.50	iso.260-prog.270	1010-68664	€ 762,-
0.53	15	1.00	iso.250-prog.260	1010-68725	€ 527,-
	30	1.00	iso.250-prog.260	1010-68745	€ 645,-
	60	1.00	iso.250-prog.260	1010-68765	€ 954,-

InertCap™ FFAP

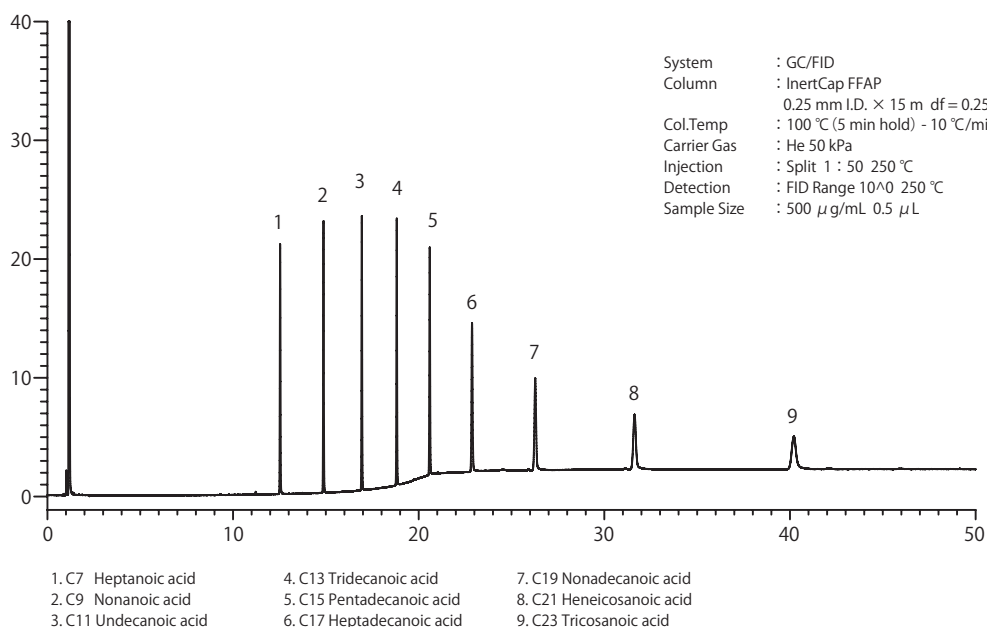
- Nitroterephthalic acid modified Polyethylene Glycol
- USP Phase G35
- Polar
- Cross-Linked
- Equivalent : DB-FFAP, HP-FFAP, CP-WAX 58 (FFAP) CB

InertCap FFAP is a strong polar column incorporating nitroterephthalic acid modified polyethylene glycol. As the liquid phase shows acidity, it is possible to analyze volatile fatty acid without having a derivatization. InertCap FFAP is optimal for the analyses of acidic compounds.

Structure



■ Odd free fatty acids



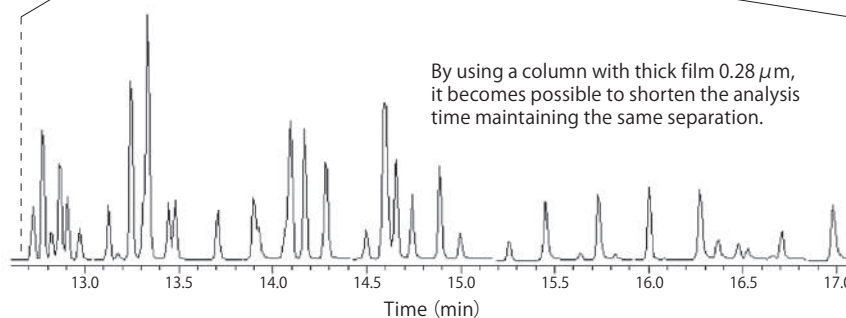
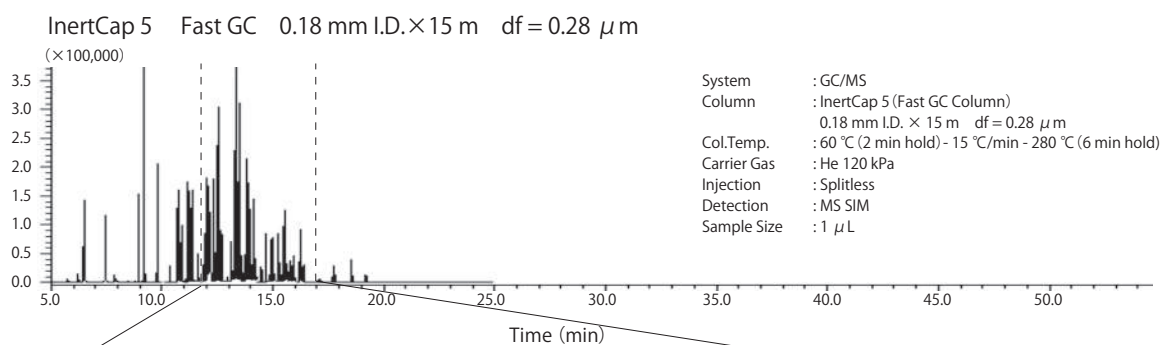
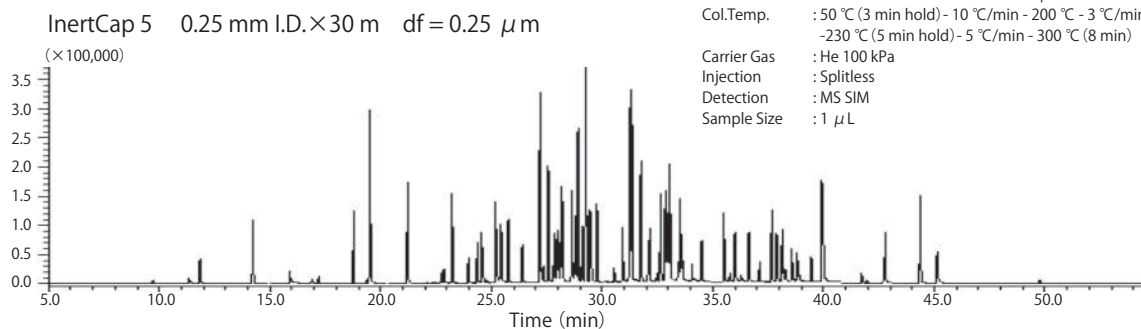
【InertCap™ FFAP】

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.25	15	0.25	iso.240-prog.250	1010-28622	€ 258,-
		0.50	iso.240-prog.250	1010-28642	€ 394,-
				1010-28644	€ 394,-
	60	0.25	iso.240-prog.250	1010-28662	€ 642,-
		0.50		1010-28664	€ 642,-
		1.00		1010-28666	€ 642,-
0.32	15	0.25	iso.240-prog.250	1010-28722	€ 378,-
		0.50	iso.240-prog.250	1010-28742	€ 428,-
				1010-28744	€ 428,-
	30	1.00	iso.230-prog.240	1010-28745	€ 428,-
		0.25	iso.240-prog.250	1010-28762	€ 703,-
				1010-28764	€ 703,-
	60	0.50	iso.230-prog.240	1010-28765	€ 703,-
		1.00		1010-28924	€ 307,-
		1.00		1010-28925	€ 307,-
0.53	15	0.25	iso.240-prog.250	1010-28942	€ 512,-
		0.50		1010-28944	€ 512,-
		1.00		1010-28945	€ 512,-
	30	0.25	iso.240-prog.250	1010-28942	€ 512,-
		0.50		1010-28944	€ 512,-
		1.00		1010-28945	€ 512,-

InertCap™ Fast GC Column

InertCap Fast GC is a column of ID 0.18 mm. Maintaining separation ability, InertCap Fast GC realizes fast analyses and best productivity with the existing general GC instruments.

61 Pesticides



※See page 51-52 for InertCap Fast GC applications.

【InertCap™ Fast GC Column】

Phase	ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
InertCap 1	0.18	15	0.18	iso.325-prog.350	1010-11021	€ 512,-
			0.28		1010-11022	€ 512,-
		20	0.18	iso.325-prog.350	1010-11031	€ 536,-
			0.28		1010-11032	€ 536,-
InertCap 5MS/Sil	0.18	20	0.18	iso.325-prog.350	1010-15031	€ 511,-
InertCap 5	0.18	15	0.18	iso.325-prog.350	1010-18021	€ 414,-
			0.28		1010-18022	€ 414,-
		20	0.18	iso.325-prog.350	1010-18031	€ 484,-
			0.28		1010-18032	€ 484,-

※Other phases available upon request.

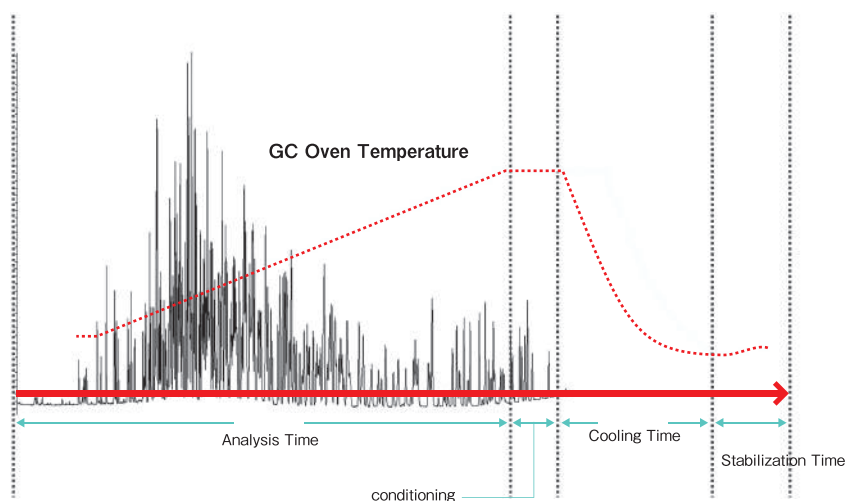
InertCap™ Fast GC Column

■ Effectiveness of InertCap Fast GC Column

Reducing the cost of GC, GC/MS

With InertCap Fast GC columns, it takes only half of what it used to take for pesticides analyses. Numbers of samples can be analyzed by using existing general GC instruments together with InertCap Fast GC columns. There is no need for special high pressure injector and anyone can easily use the column.

■ Pesticides



Downsizing Example

0.25 mm I.D. × 30 m df = 0.25 μ m



0.18 mm I.D. × 20 m df = 0.18 μ m

0.25 mm I.D. × 30 m df = 0.40 μ m



0.18 mm I.D. × 20 m df = 0.28 μ m



Special Columns · Other Columns

● InertCap™ for Amines.....	026
● InertCap CHIRAMIX™	027
● AQUATIC	028
● AQUATIC-2	029
● Tailor-made Columns	030
● Built-in Guard Column/Transfer Line Column ..	032

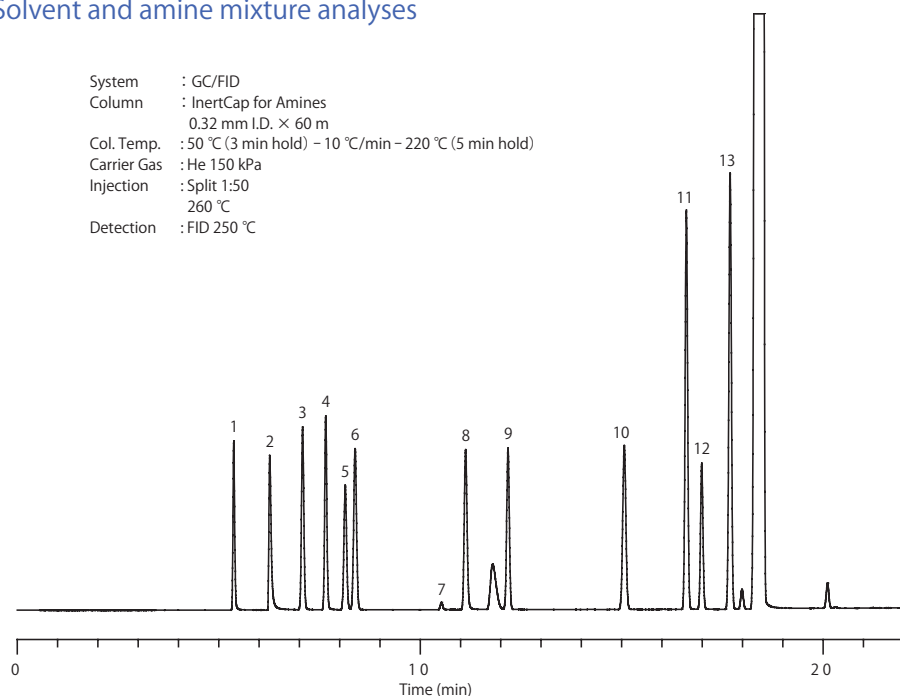
InertCap™ for Amines

- Cross-Linked
- Excellent for amine compounds from C2 ~ C10 analyses
- Ideal for the simultaneous analyses of mixed sample such as alcohol etc.
- Equivalent : CP-Volamine

InertCap for Amines shows excellent performances for the amine compounds from C2 ~ C10. Basic compounds can be perfectly eluted without being adsorbed in the column. Unlike other amines special columns, InertCap for Amines can simultaneously elute general solvents such as alcohol due to our unique neutral inert treatment technique.

Solvent and amine mixture analyses

System : GC/FID
 Column : InertCap for Amines
 0.32 mm I.D. × 60 m
 Col. Temp. : 50 °C (3 min hold) – 10 °C/min – 220 °C (5 min hold)
 Carrier Gas : He 150 kPa
 Injection : Split 1:50
 260 °C
 Detection : FID 250 °C



- 1 Methanol
- 2 Dimethylamine
- 3 Ethanol
- 4 Acetonitrile
- 5 Acetone
- 6 Isopropanol
- 7 Acetic acid
- 8 Diethylamine
- 9 Ethylacetate
- 10 Triethylamine
- 11 Pyridine
- 12 Dimethylformamide
- 13 Toluene

【InertCap™ for Amines】

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.32	15	—	iso.265-prog.300	1010-69229	€ 519,-
	30	—	iso.265-prog.300	1010-69249	€ 681,-
	60	—	iso.265-prog.300	1010-69269	€ 1005,-

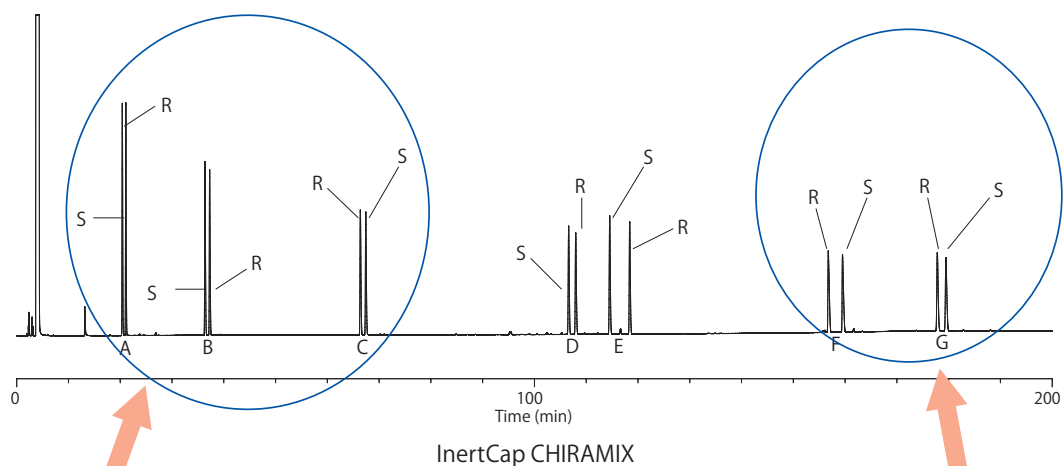
InertCap CHIRAMIX™

- Excellent for enantiomers separation
- Coated with more than 2 kinds of cyclodextrin derivatives
- Sharp peaks
- GL Sciences'original

InertCap CHIRAMIX is a specialized column for enantiomer analyses coated with a mixture consisting of more than 2 kinds of cyclodextrin derivatives. Compared to existing columns that is coated by only 1 kind of cyclodextrin, InertCap CHIRAMIX can effectively analyze wide range of compounds in a short time as the 1st choice column.

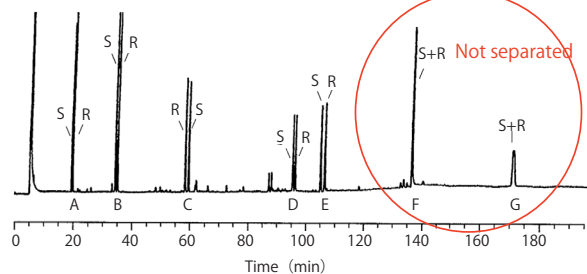
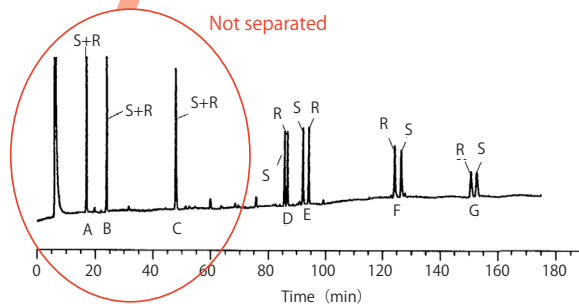
※InertCap CHIRAMIX was jointly developed with T. Hasegawa Co., Ltd.
 ※CHIRAMIX is a brand name of T. Hasegawa Co., Ltd.

Enantiomer Analysis



System : GC
 Col. Temp. : 60 °C - 0.7 °C/min - 180 °C (50 min hold)
 Carrier Gas : He 70 kPa
 Injection : Split 1:50
 Detection : FID
 Sample Size : 0.4 μL

A : α-pinene
 B : limonene
 C : linalool
 D : α-damascone
 E : α-ionone
 F : δ-jasmine lactone
 G : γ-dodeca lactone



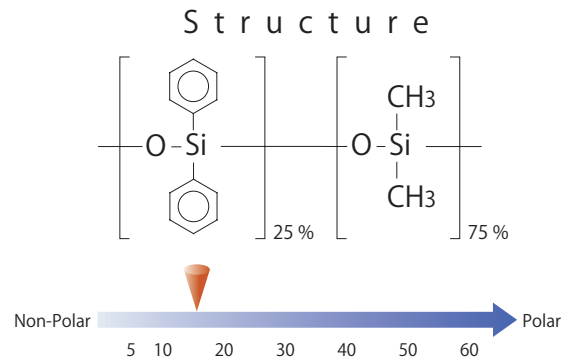
【InertCap CHIRAMIX™】

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.25	30	0.25	iso180-prog.200	1010-69142	€ 948,-

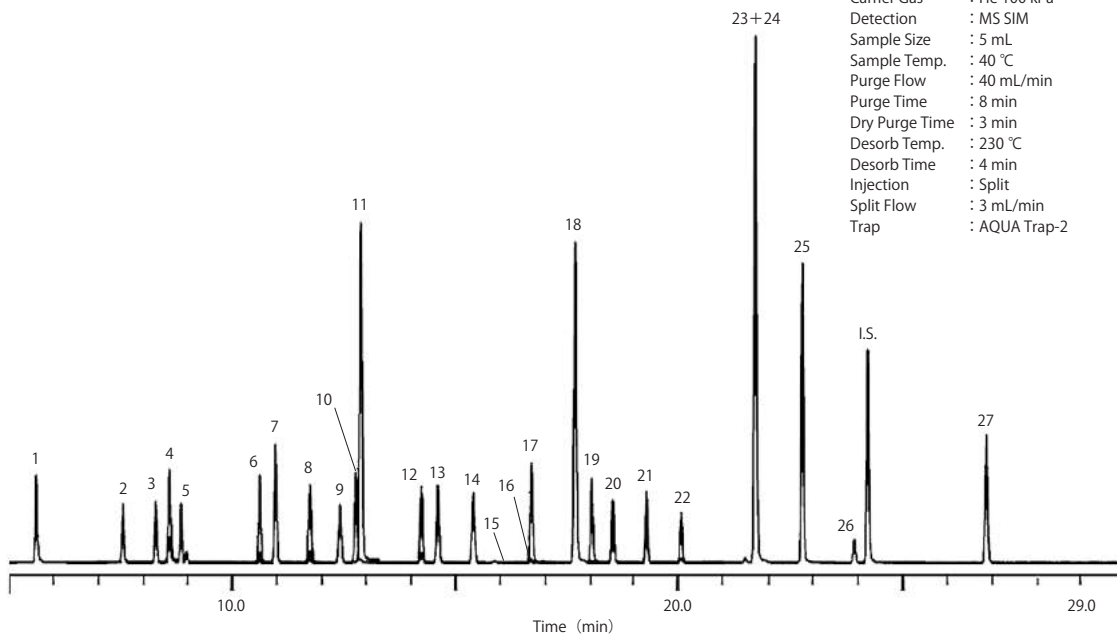
AQUATIC

- 25 % Phenyl-75 % Methylpolysiloxane
- USP Phase G28
- Medium polar
- Cross-Linked
- No Equivalent

AQUATIC is a medium polar column incorporating 25 % phenyl and 75 % methylpolysiloxane, especially designed for the analyses of volatile organic compounds in water. As the column polarity is optimized, AQUATIC enables high separations. Analysis data with 33 compounds is attached to every column, and each column is guaranteed for its performance and reproducibility. AQUATIC is optimal for VOCs simultaneous analyses by Purge and Trap.



■ Volatile compounds in water



System : GC/MS P&T
 Column : AQUATIC
 0.25 mm I.D. × 60 m df = 1.0 μm
 Col. Temp. : 40 °C (1 min hold) - 4 °C/min - 100 °C
 - 10 °C/min - 200 °C (5 min hold)
 Carrier Gas : He 100 kPa
 Detection : MS SIM
 Sample Size : 5 mL
 Sample Temp. : 40 °C
 Purge Flow : 40 mL/min
 Purge Time : 8 min
 Dry Purge Time : 3 min
 Desorb Temp. : 230 °C
 Desorb Time : 4 min
 Injection : Split
 Split Flow : 3 mL/min
 Trap : AQUA Trap-2

- | | | | |
|-------------------------------------|--------------------------|---------------------------------------|-----------------------------------|
| 1. Vinyl chloride | 8. 1,1,1-Trichloroethane | 15. 1,4-Dioxane | 22. Dibromochloromethane |
| 2. 1,1-Dichloroethene | 9. Carbon tetrachloride | 16. Epichlorohydrin | 23. <i>m</i> -Xylene |
| 3. Dichloromethane | 10. 1,2-Dichloroethane | 17. <i>cis</i> -1,3-Dichloropropene | 24. <i>p</i> -Xylene |
| 4. MTBE | 11. Benzene | 18. Toluene | 25. <i>o</i> -Xylene |
| 5. <i>trans</i> -1,2-Dichloroethene | 12. Trichloroethene | 19. <i>trans</i> -1,3-Dichloropropene | 26. Bromoform |
| 6. <i>cis</i> -1,2-Dichloroethene | 13. 1,2-Dichloropropane | 20. 1,1,2-Trichloroethane | I.S. <i>p</i> -Bromofluorobenzene |
| 7. Chloroform | 14. Bromodichloromethane | 21. Tetrachloroethene | 27. <i>p</i> -Dichlorobenzene |

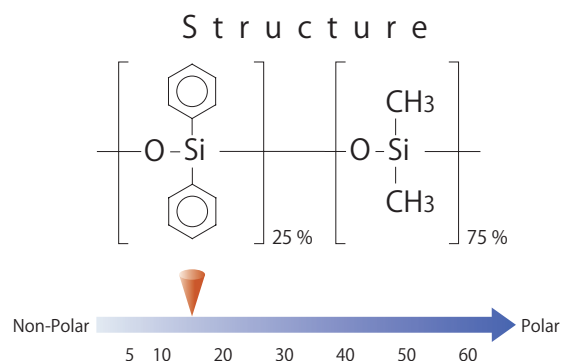
[AQUATIC]

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.25	60	1.00	iso.200-prog.220	1010-29165	€ 705,-
0.32	60	1.40	iso.200-prog.220	1010-29266	€ 770,-
0.53	75	2.00	iso.200-prog.220	1010-29477	€ 1030,-

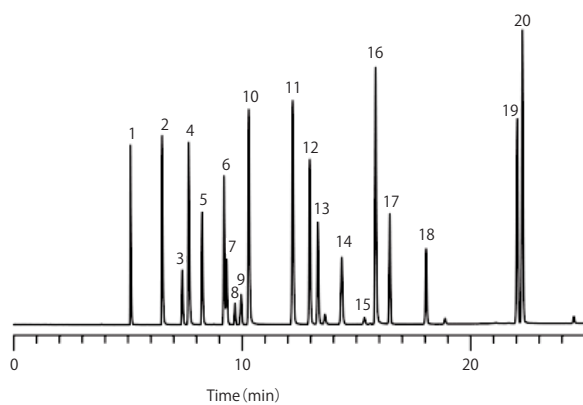
AQUATIC-2

- 25% Phenyl -75% Methylpolysiloxane
- USP Phase G28
- Medium polar
- Cross-Liked
- No Equivalent

AQUATIC-2 endures up to 260 °C. Separation pattern is almost same as AQUATIC. Selectivity to a few compounds may be slightly differ from the AQUATIC.



Solvents



System : GC/FID
 Column : AQUATIC-2
 0.25 mm I.D. × 60 m df = 1.4 μm
 Col. Temp. : 40 °C (5 min hold) - 4 °C/min - 120 °C - 10 °C/min - 250 °C
 Carrier Gas : He 200 kPa
 Injection : Split 1:80
 Detection : FID
 Sample Size : 1 μL

- | | | | | |
|-----------------|--------------------|------------------------|-------------------------|------------------------|
| 1. Methanol | 5. Acetone | 9. <i>n</i> -Hexane | 13. Ethylacetate | 17. 1,2-Dichloroethane |
| 2. Ethanol | 6. Acetonitrile | 10. <i>n</i> -Propanol | 14. Cyclohexane | 18. Trichloroethylene |
| 3. Diethylether | 7. Methylacetate | 11. 2-Butanol | 15. Carbontetrachloride | 19. Isobutylacetate |
| 4. 2-Propanol | 8. Dichloromethane | 12. MEK | 16. 1-Butanol | 20. Toluene |

【 AQUATIC-2 】

ID (mm)	Length (m)	Thickness (μm)	Max. Temperature (°C)	Cat.No.	Price
0.25	30	1.40	iso.260-prog.260	1010-19146	€ 443,-
	60	1.40	iso.260-prog.260	1010-19166	€ 705,-
0.32	30	1.80	iso.260-prog.260	1010-19247	€ 475,-
	60	1.80	iso.260-prog.260	1010-19267	€ 770,-
0.53	30	3.00	iso.260-prog.260	1010-19448	€ 608,-
	75	3.00	iso.260-prog.260	1010-19478	€ 1030,-

Tailor-made Columns

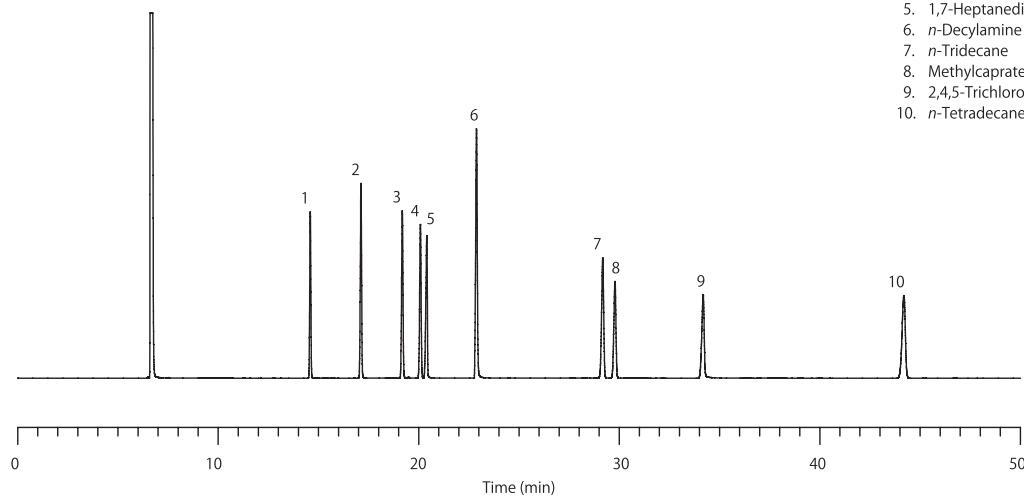
For your unique applications...!



Based on our column manufacturing technologies built after a long time experience, GL Sciences Inc. is grateful to make custom made columns. We attach inspection report to each column and guarantee the performance. We can also make guard column or transfer line "built-in" columns upon your request.

Example: 100 m Column

InertCap 1 0.25 mm I.D. × 100 m $df = 0.50 \mu\text{m}$



1. *n*-Undecane
2. *n*-Nonanol
3. Naphthalene
4. *n*-Dodecane
5. 1,7-Heptanediol
6. *n*-Decylamine
7. *n*-Tridecane
8. Methylcaprate
9. 2,4,5-Trichlorophenol
10. *n*-Tetradecane

Tailor-made Column Request Form

■ To: GL Sciences International Department

E-mail : world@glsciences.co.jp

for Europe: info@glsciences.eu

Company

Department

Address

Name

TEL

FAX

E-mail

■ Capillary Column Details

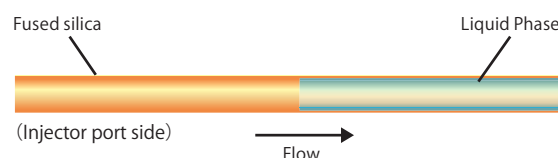
Phase	_____	Film Thickness	_____ μm
I.D.	_____ mm	Guard Column (if necessary)	_____ m
Length	_____ m	Transfer Line (if necessary)	_____ m

※Unable to supply guard column/transfer line for the following columns:
InertCap 210、InertCap 225、
InertCap WAX、AQUATIC、
AQUATIC-2
All columns with ID 0.53 mm

Built-in Guard Column & Transfer Line

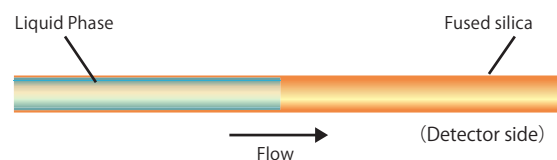
“Built-in Guard Column” InertCap™ ProGuard

InertCap ProGuard is a "guard column built-in" analytical capillary column. When analyzing samples high in matrix such as food, the guard column traps foreign substances and protects analytical column. By cutting the edge of the guard column, a longer analytical column life can be obtained. Also InertCap ProGuard acts as a retention gap column. The guard column is inert, therefore there is no need to worry when analyzing highly adsorptive compounds. There is also no worries about leakage as no connector union is used.



“Built-in Transfer Line” InertCap™ T.L.

InertCap T.L. is a "transfer line built-in" analytical column. As there is no coating to the column where touches detector which is always high in temperature, it realizes low bleeding and avoids liquid degeneration. The transfer line is inert therefore there is no need to worry when analyzing highly adsorptive compounds. There is also no worries about leakage as no connector union is used.



【InertCap™ ProGuard】

Phase	ID (mm)	Length (m)	Thickness (µm)	Guard Column L (m)	Max. Temperature (°C)	Cat.No.	Price
InertCap 1MS	0.25	30	0.25	2	iso.325-prog.350	1010-12172	€ 558,-
				5		1010-12173	€ 598,-
				10		1010-12174	€ 640,-
InertCap 1	0.25	30	0.25	2	iso.325-prog.350	1010-11172	€ 558,-
				5		1010-11173	€ 598,-
				10		1010-11174	€ 640,-
InertCap 5MS/Sil	0.25	30	0.25	2	iso.325-prog.350	1010-15172	€ 558,-
				5		1010-15173	€ 598,-
				10		1010-15174	€ 640,-
InertCap 5MS/NP	0.25	30	0.25	2	iso.325-prog.350	1010-18941	€ 558,-
				5		1010-18942	€ 598,-
				10		1010-18943	€ 640,-
InertCap 5	0.25	30	0.25	2	iso.325-prog.350	1010-18172	€ 558,-
				5		1010-18173	€ 598,-
				10		1010-18174	€ 640,-
InertCap Pesticides	0.25	30	—	2	iso.325-prog.350	1010-15175	€ 728,-
				5		1010-15176	€ 770,-
				10		1010-15177	€ 810,-
InertCap Pure-WAX	0.25	30	0.25	2	iso.260-prog.260	1010-68490	€ 630,-
				5		1010-68491	€ 672,-
				10		1010-68494	€ 712,-

【InertCap™ T.L.】

Phase	ID (mm)	Length (m)	Thickness (µm)	Transfer Line L (m)	Max. Temperature (°C)	Cat.No.	Price
InertCap 1MS	0.25	30	0.25	2	iso.325-prog.350	1010-12192	€ 558,-
InertCap 5MS/Sil	0.25	30	0.25	2	iso.325-prog.350	1010-15192	€ 604,-
InertCap Pesticides	0.25	30	—	2	iso.325-prog.350	1010-15191	€ 728,-
InertCap Pure-WAX	0.25	30	0.25	2	iso.260-prog.260	1010-68492	€ 630,-
	0.25	60	0.25	2	iso.260-prog.260	1010-68493	€ 806,-

GC Accessories

● Leak Detector	034
● Capillary Cutter/Union	035
● Carrier Gas Purifier	039
● Guard Column • Retention Gap Column	040
● GC Consumables	
Agilent	042
Shimadzu	044
Thermo Scientific	046
OPTIC Multi Mode Inlet System	048

GC Accessories

Leak Detector LD239



LD239 is a pocket-sized gas leak detector. It detects gas leaks by taking advantage of the difference between air and thermal conductivity. LD239 detects gas leaks instantly when changing capillary columns as well as at other occasions. Leaks are indicated on the LCD monitor and by an alarming sounds. There is no need to worry about contamination of the pipes or columns as may be the case if using gas leak detection liquid.

While an aspiration pump and rechargeable battery are being installed, you can easily carry the handy sized LD239 and detect gas leaks even in narrow places.

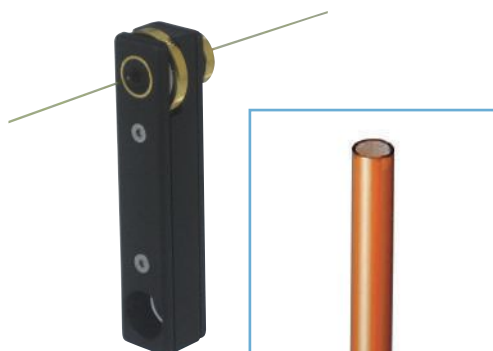
<Specifications>

Detector	: Thermal conductivity cell
Battery	: Rechargeable Lithium Ion batteries
Operating temperature range	: 10 - 40°C (non-condensing)
Target gases	: Helium, Hydrogen, CO ₂ , Argon, Neon and other non-corrosive gases. For safety reasons, LD239 should not be used: 1) in places with a risk of fire, explosion or large flammable gas leaks; 2) in places with insufficient ventilation when attempting to detect trace amounts of flammable gases; 3) in places that are contaminated with dust or combustible fumes.
Sensitivity	: Standard range - minimum 0.005 ml/min (He) High range - minimum 0.0005 ml/min (He)
Overall size	: 50(W) x 19.5(D) x 111(H) mm
Net weight	: Approx. 95 g

*The sensitivity should be dependent on the difference between the thermal conductivities of gas and air, and a large difference results in a high sensitivity. Also, the kinds of gas and humidity should influence the sensitivity.

Description	Cat.No.	Price
Leak Detector LD239	2702-19340	€ 1300,-

Capillary Fineness Cutter



A diamond blade finely cuts the silica capillary tube vertically. The built-in magnifier is to check how the tube is cut, and the diamond blades can be replaced.

Description	Cat.No.	Price
Capillary Fine Cutter GC/LC (Black)	3001-31020	€ 415,-
Capillary Fine Cutter GC/LC replacement blade	3001-31021	€ 180,-

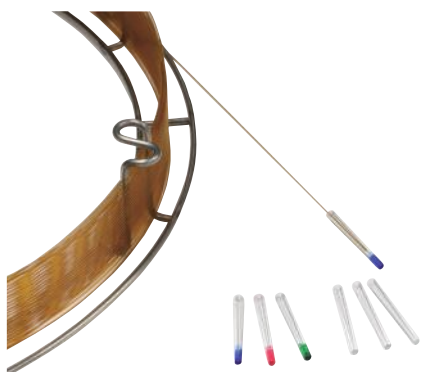
Ceramic Tube Cutter



The ceramic tube cutter cuts a silica capillary column safely and firmly.

Description	Unit (pcs)	Cat.No.	Price
Ceramic Tube cutter	5	1010-41136	€ 27,-

Fused Silica End Cap



Description	Color	Unit (set)	Cat.No.	Price
Fused Silica End Cap (I.D. 0.15 mm~0.53 mm)	Red	5	1010-41140	€ 70,-
	Green	5	1010-41141	€ 70,-
	Blue	5	1010-41142	€ 70,-

GC Accessories

Inner Seal Connector



A quartz union for connecting the fused silica capillary tubes. also convenient for connecting guard column to an analytical column, and splitting sample flow onto two detectors.

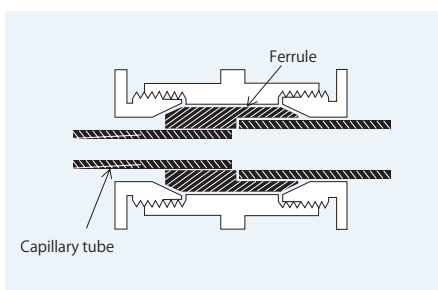
Description	Column ID (mm)	Column OD (mm)	Unit(pcs)	Cat.No.	Price
Inner Seal Connector	0.55~0.53	0.35~0.7	5	1010-45026	€ 56,-
Inner Seal Y Connector	0.25~0.53	0.35~0.7	1	1010-45030	€ 105,-

Micro Unions



This is the micro union with zero dead volume. Polyimide resin is adapted for the ferrule for better heat resistance and chemical resistance.

1 set (Cat.No.3001-25803~25858) ⇒ Body 1 pcs, Male Screw 2 pcs, Ferrule 2 pcs
 Ferrule (Cat.No.3001-25881~25896) ⇒ Replacement ferrule 2 pcs



【Micro Union】

Column ID (mm)	Column OD (mm)	1 set Cat.No.	Ferrule Cat.No.
0.10	0.2-0.3	3001-25803	3001-25881
0.25	0.3-0.4	3001-25804	3001-25882
0.32	0.4-0.5	3001-25805	3001-25883
0.53	0.7-0.8	3001-25808	3001-25884

【Micro Reducing Union】

Column ID (mm)	Column OD (mm)	1 set Cat.No.	Ferrule Cat.No.
0.10-0.25	0.3-0.4	3001-25834	3001-25891
0.10-0.32	0.3-0.5	3001-25835	3001-25892
0.10-0.53	0.3-0.8	3001-25838	3001-25893
0.25-0.32	0.4-0.5	3001-25845	3001-25894
0.25-0.53	0.4-0.8	3001-25848	3001-25895
0.32-0.53	0.5-0.8	3001-25858	3001-25896

【Screw Wrench】

Description	Unit (pcs)	Cat.No.
Screw Wrench	2	3001-25860

Capillary Mini Unions



Mini Union Structure

This capillary mini union offers least active spots and dead volume. Graphite ferrule MOGF/005 is for capillary tubes below O.D. 0.5 mm (I.D. 0.32 mm)

Mini Union			Graphite Ferrule (10 pcs)		Graphite Vespel Ferrule (10 pcs)	
Model	Column size (mm)	Cat.No.	Model	Cat.No.	Model	Cat.No.
MVSU/003	I.D.0.1 O.D.~0.3	3001-25950			MGVF/003	3001-25973
MVSU/004	I.D.0.25 O.D.~0.4	3001-25951	MOGF/005	3001-25965	MGVF/004	3001-25974
MVSU/005	I.D.0.32 O.D.~0.5	3001-25952			MGVF/005	3001-25975
MVSU/008	I.D.0.53 O.D.~0.8	3001-25953	MOGF/008	3001-25968	MGVF/008	3001-25978

Description	Cat.No.
Screw wrench for mini union 3/16×1/4 (2 pcs)	3001-25954

Pin Vice Drill Set



Description	Cat.No.
Pin Vice Drill Set	3001-24625

Septum Puller



Clean injection port septum is a must for high sensitivity analysis. Replacing it with bare hands can severely influence the analysis result. With Septum Puller, septum can be replaced easily without touching it by hand. Septum Puller can also be used for removing pieces of the broken septa from the injection port.

Description	Cat.No.
Septum Puller	3001-12720

GC Accessories

Ferrule Removal Kit



Each kit has two tools: one for removing 0.4 mm adaptor ferrules and one for removing 0.8 mm adaptor ferrules.

Description	Cat.No.	Price
Ferrule Removal Kit	3001-12740	€ 58,-

Ferrule Removal Tool

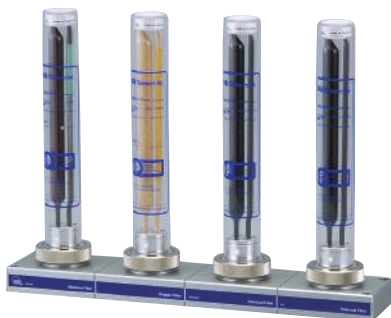


This tool helps you getting the ferrule out of the nut.

Description	Cat.No.	Price
Ferrule Removal Tool	3001-12745	€ 215,-



Carrier Gas Purifier



3001-18319

Super Clean™ Filter and Base Plate Kits

Description	qty	Cat.No.
1 Triple Filter Kit - 1/8 inch Brass Includes (1) 1 position base plate with 1/8 inch Brass inlet/outlet fittings and (1) Oxygen/Moisture/Hydrocarbon Trap	Kit	3001-18313
1 Triple Helium Specific Filter Kit - 1/8 inch Brass Includes (1) 1 position base plate with 1/8 inch Brass inlet/outlet fittings and (1) Oxygen/Moisture/Hydrocarbon Helium Specific Trap	Kit	3001-18314
2 Combi Filter Kit - 1/8 inch Brass Includes (1) 2 position base plate with 1/8 inch Brass inlet/outlet fittings and (2) Hydrocarbon/Moisture Trap	Kit	3001-18315
4 Filters Kit - 1/8 inch Brass Includes (1) 4 position base plate with 1/8 inch Brass inlet/outlet fittings and (1) Moisture Trap, (1) Oxygen Trap, and (2) Hydrocarbon Traps	Kit	3001-18319



3001-18350



3001-18355

Super Clean™ Replacement Filters

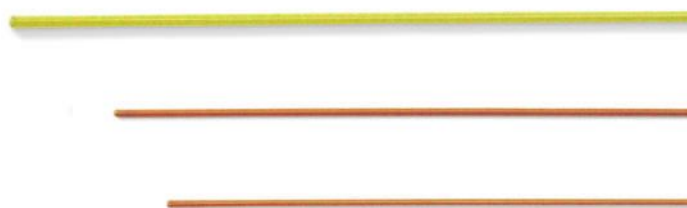
Description	qty	Cat.No.
Moisture Filter	ea.	3001-18350
Oxygen Filter	ea.	3001-18351
Hydrocarbon Filter	ea.	3001-18352
Combi (Hydrocarbon/Moisture) Filter	ea.	3001-18353
Triple (Oxygen/Moisture/Hydrocarbon) Filter	ea.	3001-18354
Triple (Oxygen/Moisture/Hydrocarbon) Helium-Specific Filter	ea.	3001-18355

Super Clean™ Filters Base Plates

Description	qty	Cat.No.
Base Plate 1 Position - 1/8 inch Brass	ea.	3001-18300
Base Plate 2 Position - 1/8 inch Brass	ea.	3001-18301
Base Plate 3 Position - 1/8 inch Brass	ea.	3001-18303
Base Plate 4 Position - 1/8 inch Brass	ea.	3001-18304

Guard Column • Retention Gap Column

(Fused Silica Capillary Tube)



Purpose

Guard Column

Injecting samples with contamination or nonvolatile compounds directly to a column causes active spots and/or degeneration of the column. Even with on-column methods, splitless and split injection can not prevent a column from degeneration and damage.

To protect a column from such damages, it is effective to connect a 2 m fused silica capillary tube to the inlet of the analytical column and replace them as the contamination gets accumulated.

Retention Gap Column

A retention gap column prevents GC analyses from broad peak band or multiple peaks of one compound.

Transfer Line

A transfer line can be used for GC/MS, LC/MS, GC/FTIR, LC/GC, Multi - Dimensional GC, or sniffer adaptors.

[Deactivated Fused Silica Capillary Tube]

ID (mm)	OD (mm)	10 m	Price	25 m	Price	50 m	Price
		Cat.No.		Cat.No.		Cat.No.	
0.005	0.150	1010-35102	€ 348,-	1010-35105	€ 654,-	-	-
	0.375	1010-35142	€ 452,-	1010-35145	€ 882,-	-	-
0.010	0.150	1010-35202	€ 348,-	1010-35205	€ 654,-	-	-
	0.375	1010-35242	€ 384,-	1010-35245	€ 732,-	-	-
0.015	0.150	1010-35302	€ 380,-	1010-35305	€ 728,-	-	-
	0.375	1010-35342	€ 548,-	1010-35345	€ 1106,-	-	-
0.020	0.150	1010-35402	€ 300,-	1010-35405	€ 540,-	-	-
	0.375	1010-35442	€ 358,-	1010-35445	€ 660,-	-	-
0.025	0.150	1010-35502	€ 348,-	1010-35505	€ 654,-	-	-
	0.375	1010-35542	€ 384,-	1010-35545	€ 732,-	-	-
0.030	0.150	1010-35602	€ 654,-	1010-35605	€ 654,-	-	-
	0.375	1010-35642	€ 734,-	1010-35645	€ 734,-	-	-
0.040	0.150	1010-35702	€ 728,-	1010-35705	€ 728,-	-	-
	0.375	1010-35742	€ 548,-	1010-35745	€ 1106,-	-	-
0.050	0.150	1010-35802	€ 350,-	1010-35805	€ 656,-	-	-
	0.375	1010-35842	€ 316,-	1010-35845	€ 514,-	-	-
0.075	0.150	1010-35902	€ 238,-	1010-35905	€ 418,-	-	-
	0.375	1010-35942	€ 316,-	1010-35945	€ 514,-	-	-
0.100	0.200	1010-36012	€ 264,-	1010-36015	€ 438,-	1010-36017	€ 766,-
	0.375	1010-36042	€ 244,-	1010-36045	€ 394,-	1010-36047	€ 676,-
0.150	0.375	1010-36132	€ 280,-	1010-36135	€ 418,-	1010-36137	€ 696,-
0.180	0.350	1010-36172	€ 188,-	1010-36175	€ 282,-	1010-36177	€ 428,-
0.200	0.350	1010-36222	€ 210,-	1010-36225	€ 300,-	1010-36227	€ 462,-
0.250	0.350	1010-36322	€ 180,-	1010-36325	€ 206,-	1010-36327	€ 282,-
0.320	0.450	1010-36452	€ 180,-	1010-36455	€ 214,-	1010-36457	€ 294,-
0.530	0.660	1010-36682	€ 230,-	1010-36685	€ 304,-	-	-

[Undeactivated Fused Silica Capillary Tube]

ID (mm)	OD (mm)	10 m	Price	25 m	Price	50 m	Price
		Cat.No.		Cat.No.		Cat.No.	
0.005	0.150	1010-31102	€ 244,-	1010-31105	€ 552,-	-	-
	0.375	1010-31142	€ 342,-	1010-31145	€ 766,-	-	-
0.010	0.150	1010-31202	€ 244,-	1010-31205	€ 552,-	-	-
	0.375	1010-31242	€ 280,-	1010-31245	€ 622,-	-	-
0.015	0.150	1010-31302	€ 274,-	1010-31305	€ 624,-	-	-
	0.375	1010-31342	€ 432,-	1010-31345	€ 978,-	-	-
0.020	0.150	1010-31402	€ 198,-	1010-31405	€ 442,-	-	-
	0.375	1010-31442	€ 250,-	1010-31445	€ 558,-	-	-
0.025	0.150	1010-31502	€ 244,-	1010-31505	€ 552,-	-	-
	0.375	1010-31542	€ 280,-	1010-31545	€ 628,-	-	-
0.030	0.150	1010-31602	€ 244,-	1010-31605	€ 552,-	-	-
	0.375	1010-31642	€ 282,-	1010-31645	€ 628,-	-	-
0.040	0.150	1010-31702	€ 274,-	1010-31705	€ 624,-	-	-
	0.375	1010-31742	€ 432,-	1010-31745	€ 986,-	-	-
0.050	0.150	1010-31802	€ 250,-	1010-31805	€ 550,-	-	-
	0.375	1010-31842	€ 258,-	1010-31845	€ 474,-	-	-
0.075	0.150	1010-31902	€ 160,-	1010-31905	€ 346,-	-	-
	0.375	1010-31942	€ 258,-	1010-31945	€ 474,-	-	-
0.100	0.200	1010-32012	€ 170,-	1010-32015	€ 354,-	1010-32017	€ 660,-
	0.375	1010-32042	€ 230,-	1010-32045	€ 410,-	1010-32047	€ 720,-
0.150	0.375	1010-32132	€ 230,-	1010-32135	€ 410,-	1010-32137	€ 720,-
0.180	0.350	1010-32172	€ 174,-	1010-32175	€ 274,-	1010-32177	€ 462,-
0.200	0.350	1010-32222	€ 184,-	1010-32225	€ 296,-	1010-32227	€ 494,-
0.250	0.350	1010-32322	€ 144,-	1010-32325	€ 204,-	1010-32327	€ 318,-
0.320	0.450	1010-32452	€ 148,-	1010-32455	€ 212,-	1010-32457	€ 332,-
0.530	0.660	1010-32682	€ 164,-	1010-32685	€ 250,-	-	-

GC Accessories

Agilent Consumables

Inlet liners



To avoid scratches and contamination from air, liners for Agilent adopt blister package used for all the medical tablets. Due to the inertness treatment under 420 °C, the liners avoid sample adsorption and dissolve, and are effective for highly sensitive analyses.

Type	Shape	Details	Deactivated	Unit (pcs)	Agilent P/N	Cat.No.
Split		Single taper Quartz wool (fixed) Focus liner	Yes	5	5183-4712	3001-41237
				25	5183-4713	3001-41257
		Straight Quartz wool	Yes	5	5183-4691	3001-41229
				25	5183-4692	3001-41233
Splitless		Single taper Quartz wool	Yes	5	5183-4693	3001-41260
				25	5183-4694	3001-41261
		Single taper	Yes	5	5183-4695	3001-41248
				25	5183-4696	3001-41258
		Double taper	Yes	5	5183-4705	3001-41262
				25	5183-4706	3001-41263
Focus liner		Quartz wool (fixed)	Yes	5	210-4004-5	3001-41235
				25	—	3001-41236

O-ring for liner

Description	Material	ID (mm) x Thickness (mm)	Unit (pcs)	Cat.No.
O-ring for liner	Viton	4.8 × 1.9	20	3007-11205

Ferrules



The graphite vespel ferrule is suitable for GC/MS with mechanical strength and the graphite ferrule for general GC.

Both types have excellent stability when the temperature increases and chemical resistance. Blister package is adapted for graphite vespel ferrule.

Description	Model	Purpose	Column	Unit(pcs)	Agilent P/N	Cat.No.
15% Graphite/85% Vespel Ferrule (Short ferrule)	GVS-0.4	GC Injector• Detector	0.10~0.25 mm	10	5181-3323	3007-41140
	GVS-0.5		0.32 mm	10	5062-3514	3007-41150
	GVS-0.8		0.53 mm	10	5062-3512	3007-41180
15% Graphite/85% Vespel Ferrule (Long ferrule)	GVL-0.4	MS Interface connection	0.10~0.25 mm	10	5062-3508	3007-31144
	GVL-0.5		0.32 mm	10	5062-3506	3007-31145
	GVL-0.8		0.53 mm	10	5062-3538	3007-31148
Graphite ferrule (Short ferrule)	GF-0.5	GC Injector• Detector	0.10~0.32 mm	10	5080-8853	3007-31305
	GF-0.8		0.53 mm	10	500-2118	3007-31308

Septa



There are ultra low bleed septum, LB•S types, that takes up to 350 °C at the injection port and general purpose gray septum.

Description	Size (mm)	Purpose	Agilent P/N	Material	Unit (pcs)	Cat.No.
LB•S Septa	11 (7/16 inch)	High temperature/ sensitivity	-	Bronze silicon	25	3007-41135
Gray Septa		General purpose	5080-8896	Grey silicon	24	3007-41523

GC Accessories

Shimadzu Consumables

Inlet liners



Some of these liners are treated under 420 °C for inertness treatment and in the blister package. It is effective for the analyses of adsorptive samples.

Type	Shape	GC model	Deactivated	Unit(pcs)	Shimadzu P/N	Cat.No.
Split		G C -2010/GC-2014	No	1	221-41444-01	3001-16138*
		GC-17A	No	1	221-41444	3001-16320*
				5	221-41444-84	3001-16312*
		GC-14A•14B/GC-2014	No	1	221-32544-01	3001-16120*
Splitless		GC-2010/GC-2014	No	1	221-48335-01	3001-16139*
				5	—	3001-16140*
				25	—	3001-16141*
		G C -17A	No	1	221-41544	3001-16321*
			No	5	221-41544-84	3001-16315*
		GC-14A/14B/GC-2014	No	1	221-32544	3001-16121*
Direct		G C -17A	No	1	221-41599	3001-16319*
		GC-9A/12A/15A/16A (Attachment)	No	1	221-38107	3001-16129*
Focus Liner		GC-14A/14B Quartz Wool fixed	Yes	5	—	3001-16323
		GC-17A Quartz Wool fixed	Yes	5	—	3001-16322
		GC-2010 Quartz Wool fixed	Yes	5	—	3001-16324
			Yes	25	—	3001-16326

※Not in the blister package

O-ring for liner

Description	Material	ID (mm) × Thickness (mm)	Unit (pcs)	Cat.No.
O-ring for liner	Viton	3.8 × 1.9	20	3007-11204

Ferrules



The graphite vespel ferrule is suitable for GC/MS with mechanical strength and the graphite ferrule for general GC.

Both types have excellent stability when the temperature increases and chemical resistance. Blister package is adapted for graphite vespel ferrule.

Description	Model	Purpose	Column ID	Unit (pcs)	Cat.No.
15 % Graphite/85 % Vespel Ferrule	GVL-0.4	GCMS_QP2010	0.10~0.25 mm	10	3007-31144
	GVL-0.5	Injector • MS Interface QP5000/5050	0.32 mm	10	3007-31145
	GVL-0.8	Wide bore MS Interface	0.53 mm	10	3007-31148
Graphite Ferrule	G-0.5	GC14A,GC17A,GC2010,GC2014	0.10~0.32 mm	10	3007-14005*
	G-0.8	Injector•Detector	0.53 mm	10	3007-14008*

※Not in the blister package

Septa



Description	Shape	Purpose	Material	Unit (pcs)	Cat.No.
LB • S Septa	Cap type	High temperature/sensitivity	Bronze silicon	25	3007-16105
Septa for high temperature		Mid-High temperature	Bronze silicon	25	3007-16103
Septa for heat resistance		Mid-High temperature	Pink silicon	25	3007-16102
Standard Septa		General analyses	Yellow silicon	20	3007-16101

GC Accessories



Thermo Scientific Consumables

Inlet liners

- For Trace GC, Focus GC



To avoid scratches and contamination from air, liners for Thermo Scientific adapt blister package used for all the medical tablets. Due to the inertness treatment under 420 °C, the liners avoid sample adsorption and dissolve, and are effective for highly sensitive analyses.

Type	Shape	Size (mm) I.D.×O.D.×Length	Deactivated	Unit (pcs)	Thermo Scientific P/N	Cat.No.
Splitless		3×8×105	Yes	5	45350032	3001-41102
		5×8×105	Yes	5	45350033	3001-41104

Ferrules



The graphite vespel ferrule is mechanically strong when the temperature is increasing. Blister package is adapted for all types.

Description	Model	Purpose	Column ID	Unit (pcs)	Cat.No.
15 %Graphite/85 % Vespel Ferrule	GVL-0.4	MS Interface	0.10~0.25 mm	10	3007-31144
	GVL-0.5		0.32 mm	10	3007-31145
	GVL-0.8		0.53 mm	10	3007-31148
15 %Graphite /85 % Vespel Ferrule	Trace/Focus 0.4	Trace/Focus GC Injector•Detector	0.10~0.25 mm	10	3007-41154
	Trace/Focus 0.5		0.32 mm	10	3007-41155
	Trace/Focus 0.8		0.53 mm	10	3007-41158
Brass nut for injector port	—	Trace GC Injector	—	2	3001-24371

Septa

These are ultra low bleed septum that takes up to 350 °C at the injection port.











Description	Size (mm)	Purpose	Material	Unit (pcs)	Cat.No.
LB•S Septa	17	High temperature/sensitivity	Bronze silicon	25	3007-41136


GC Accessories

OPTIC Consumables

Inlet liners

Shape	Details	Deactivated (InertMask)	Unit (pcs)	Cat.No.	Price
	Fritted liner, frit on 15 mm	Yes	5	2414-1002	€ 297,-
		No	5	2414-1001	€ 187,-
	Liner for split injections (single necked)	Yes	-	n/a	n/a
		No	5	2414-1003	€ 97,-
	Empty liner for splitless injections	Yes	5	2414-1006	€ 320,-
		No	5	2414-1005	€ 210,-
	Baffled splitless liner	Yes	-	n/a	n/a
		No	5	2414-1009	€ 310,-
	Fritted liner on 20 mm with single taper	Yes	-	n/a	n/a
		No	5	2414-1011	€ 255,-
	Fritted Liner packed with Chromosorb W	Yes	-	n/a	n/a
		No	5	2414-1020	€ 350,-
	Sintered glass liner with taper	Yes	5	2414-1008	€ 495,-
		No	5	2414-1007	€ 385,-
	LINEX DMI Liner	Yes	5	2414-1014	€ 380,-
		No	5	2414-1013	€ 270,-

DMI

Shape	Description	Unit (pcs)	Cat.No.	Price
	OPTIC DMI Sample Insert 30µl	100	2406-1010	€ 120,-

Septa

Description	Unit (pcs)	Cat.No.	Price
OPTIC Ultra Low Bleed Septum ULB-S-11, 11mm	50	3007-41126	€ 143,-
OPTIC Ultra Low Bleed Shimadzu Septum ULB-S-S, plug type septa	50	3007-16107	€ 143,-

O-ring for liner

Description	Unit (pcs)	Cat.No.	Price
OPTIC non-stick O-ring Viton, plasma treated	10	2406-1018	€ 34,-

Ferrules & Nuts

Description	Column ID	Unit (pcs)	Cat.No.	Price
OPTIC Graphite Ferrule for 0.53 mm ID Column	0.53 mm	10	2406-1003	€ 71,-
OPTIC Graphite Ferrule for 0.1 - 0.32 mm ID Column	0.1 - 0.32 mm	10	2406-1004	€ 71,-
OPTIC Stainless Steel Inlet Bottom Nut		5	2406-2047	€ 123,-

Description	Column ID	Unit (pcs)	Cat.No.	Price
OPTIC Inlet Metal Ferrule, Column ID 0.53mm	0.53 mm	10	2406-1007	€ 135,-
OPTIC Inlet Metal Ferrule, Column ID 0.32mm	0.32 mm	10	2406-1006	€ 135,-
OPTIC Inlet Metal Ferrule, Column ID 0.25mm	0.25 mm	5	2406-1005	€ 135,-
OPTIC Inlet Bottom Nut for Metal Ferrule		5	2406-2049	€ 153,-

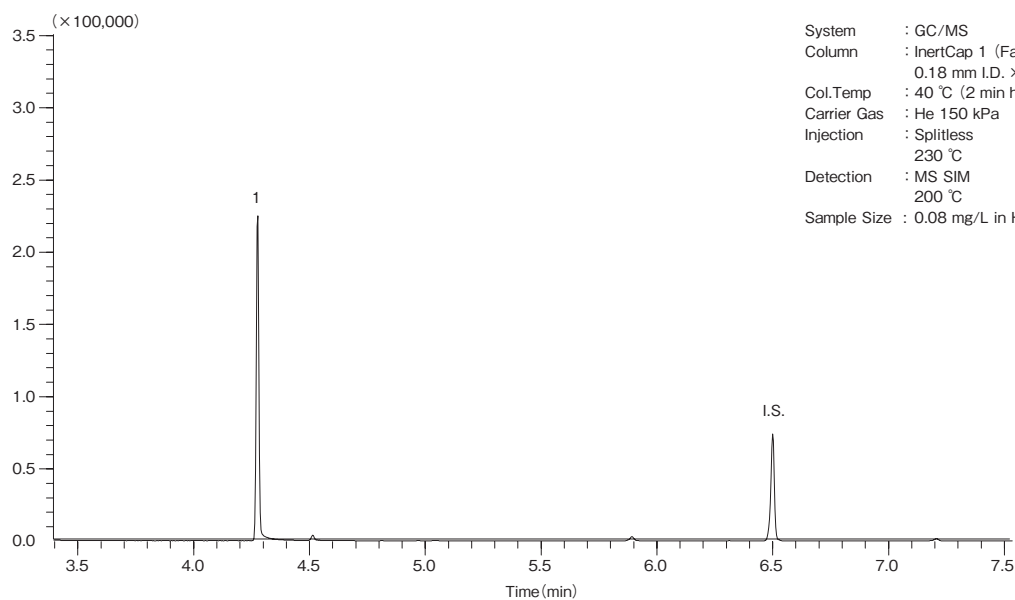
A p p l i c a t i o n s

Applications

Contents

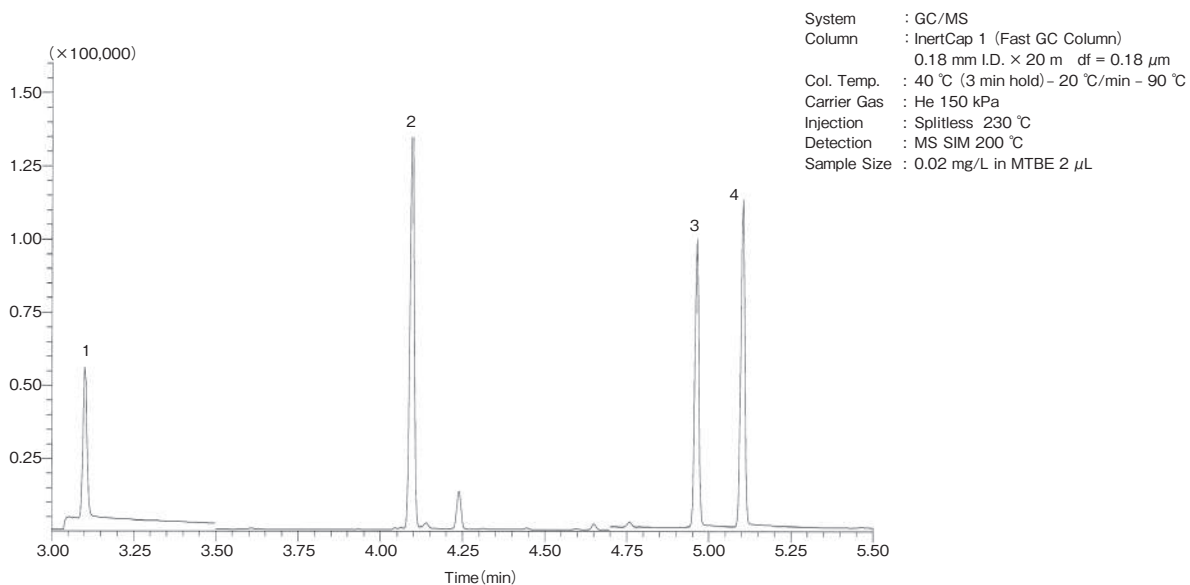
Chromatogram	GC	Column	Page
Formaldehyde in water (Fast GC)	GC/MS	InertCap 1 (Fast GC Column)	51
Halogenoacetic acids in water (Fast GC)	GC/MS	InertCap 1 (Fast GC Column)	51
Phenols in water (Fast GC)	GC/MS	InertCap 1 (Fast GC Column)	52
VOCs in water	GC/MS P&T (AQUA PT 5000J)	AQUATIC	52
Pesticides	GC/MS	InertCap Pesticides	53
VOCs	GC/MS	AQUATIC	54
Indoor air	GC/MS Thermal Desorption (T-Dex II)	InertCap 1MS	54
Outgas released from LSI materials	GC/MS Thermal Desorption (T-Dex II)	InertCap 1MS	55
Phthalate esters	GC/MS	InertCap 1	55
Residual solvents in pharmaceuticals Class3	GC/FID	InertCap 624	56
Residual solvents in pharmaceuticals Class3	GC/FID	InertCap Pure-WAX	56
Fragrances	GC/FID	InertCap Pure-WAX	57
Lavender (Optical isomers)	GC/FID	InertCap CHIRAMIX	57
Indole/Skatole	GC/FID	InertCap 5	58
FAME	GC/FID	InertCap Pure-WAX	58
VOC & Amines	GC/FID	InertCap for Amines	59
Magnesium Stearate by Japanese Pharmacopeia	GC/FID	InertCap WAX-HT	60
Hydrocarbons C2-C4	GC/FID	InertCap 1	60
Diesel	GC/MS	InertCap 1	61
Kerosene	GC/MS	InertCap 1	61
Organic solvents 46 compounds	GC/FID	InertCap 1	62
Organic solvents 46 compounds	GC/FID	InertCap 5	62
Organic solvents 46 compounds	GC/FID	InertCap 1701	63
Organic solvents 46 compounds	GC/FID	InertCap 17	63
Organic solvents 46 compounds	GC/FID	InertCap WAX	64
Organic solvents 58 compounds	GC/FID	InertCap 5MS/Sil	64
Organic solvents 58 compounds	GC/FID	InertCap 25	65
Organic solvents 58 compounds	GC/FID	InertCap WAX	65

Formaldehyde in water (Fast GC)



1. Formaldehyde
 (Deriv. by PFBOA)
 I.S. 1-Chlorodecane

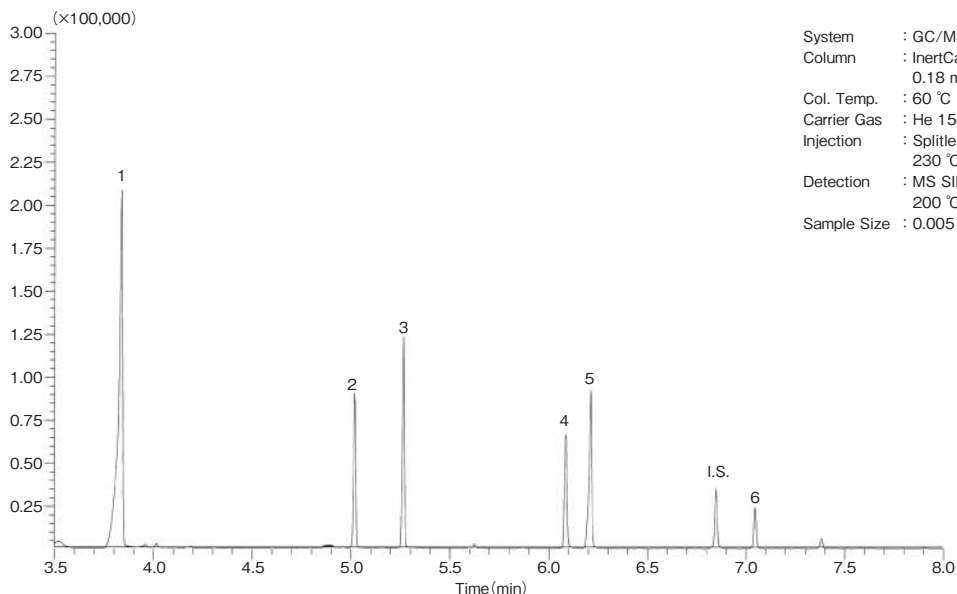
Halogenoacetic acids in water (Fast GC)



1. Chloroacetic acid
 2. Dichloroacetic acid
 3. 1,2,3-Trichloropropane
 4. Trichloroacetic acid
 (Methylester Deriv. by Diazomethane)

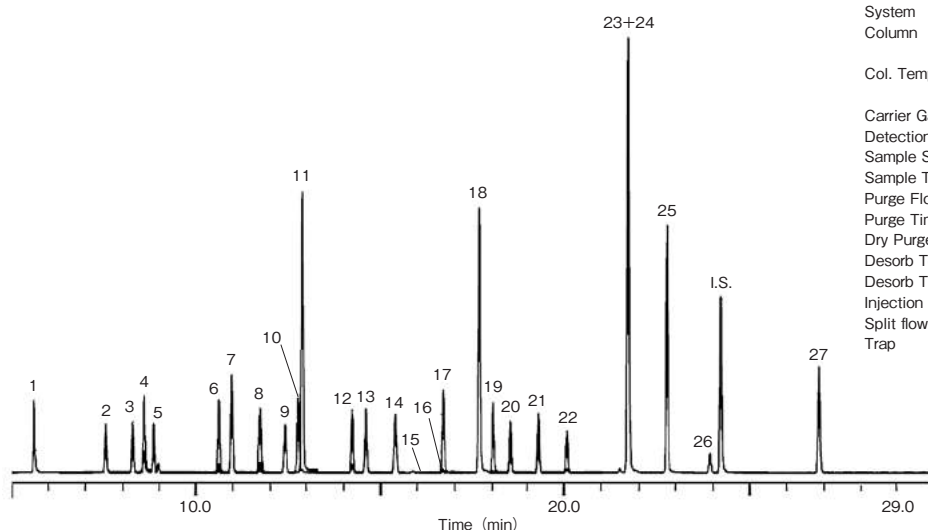
Applications

Phenols in water (Fast GC)



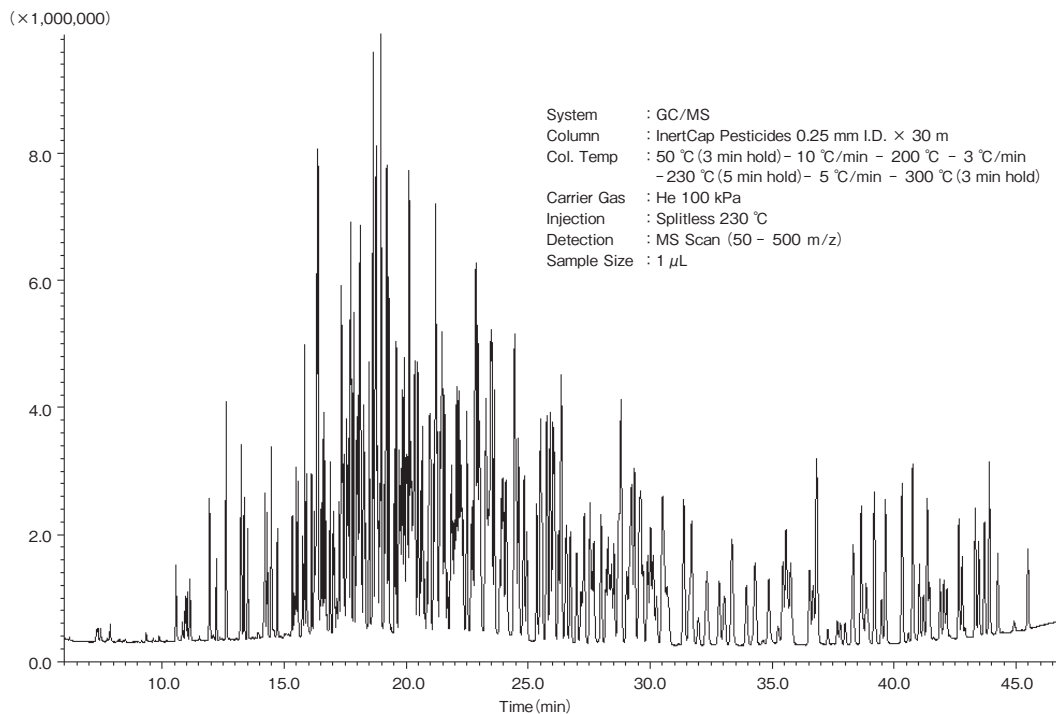
- | | |
|-----------------------|--------------------------|
| 1. Phenol | 5. 2,4-Dichlorophenol |
| 2. 2-Chlorophenol | 6. 2,4,6-Trichlorophenol |
| 3. 4-Chlorophenol | (TMS Deriv. by BSTFA) |
| 4. 2,6-Dichlorophenol | I.S. Acenaphthene |

VOCs in water



- | | | | |
|-------------------------------------|--------------------------|---------------------------------------|-----------------------------------|
| 1. Vinyl chloride | 8. 1,1,1-Trichloroethane | 15. 1,4-Dioxane | 22. Dibromochloromethane |
| 2. 1,1-Dichloroethene | 9. Carbon Tetrachloride | 16. Epichlorohydrin | 23. <i>m</i> -Xylene |
| 3. Dichloromethane | 10. 1,2-Dichloroethane | 17. <i>cis</i> -1,3-Dichloropropene | 24. <i>p</i> -Xylene |
| 4. MTBE | 11. Benzene | 18. Toluene | 25. <i>o</i> -Xylene |
| 5. <i>trans</i> -1,2-Dichloroethene | 12. Trichloroethene | 19. <i>trans</i> -1,3-Dichloropropene | 26. Bromoform |
| 6. <i>cis</i> -1,2-Dichloroethene | 13. 1,2-Dichloropropane | 20. 1,1,2-Trichloroethane | 27. <i>p</i> -Dichlorobenzene |
| 7. Chloroform | 14. Bromodichloromethane | 21. Tetrachloroethene | I.S. <i>p</i> -Bromofluorobenzene |

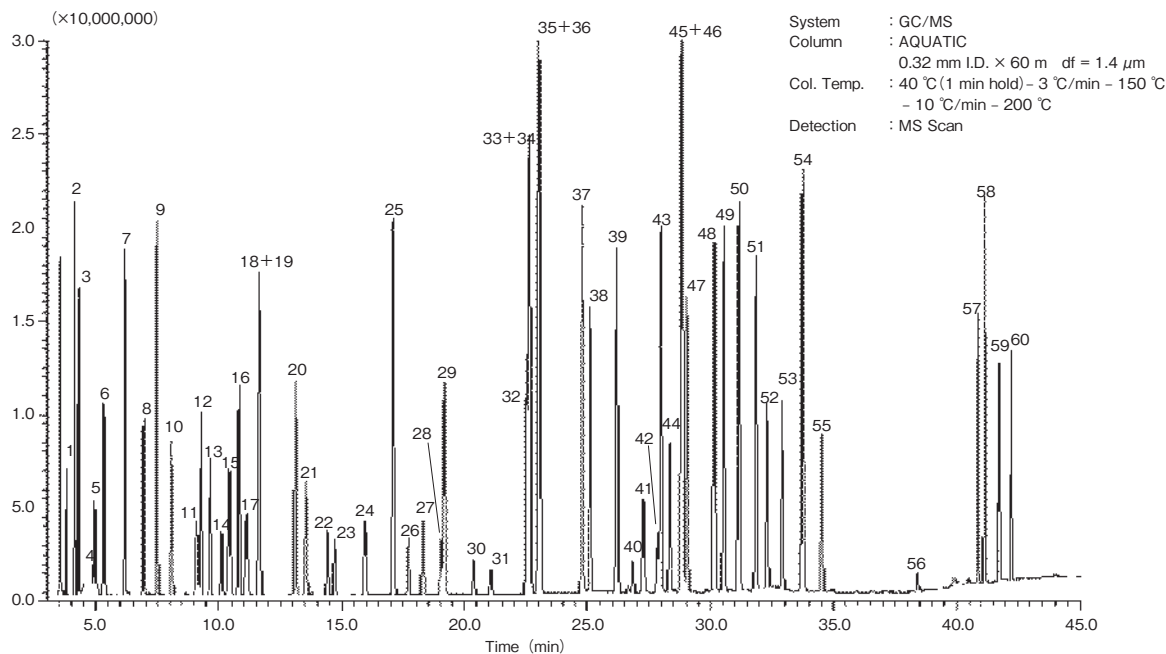
Pesticides



Compound	R.T.	Compound	R.T.	Compound	R.T.	Compound	R.T.	Compound	R.T.	Compound	R.T.
DCIP	7:20	Cyanophos	17:37	Quinoclamine(ACN)	19:55	Butachlor	22:14	Edifenphos	26:01	Furametypr metabolite	31:42
Clofentezine	9:20	Fonofos	17:39	Metorachlor	19:55	alpha-Endosulfan	22:17	Cyanofenphos	26:02	Amirtraz	31:59
Dichlorvos	10:34	Propyzamide	17:43	Chlorpyrifhos	20:00	Fenothiocarb	22:20	Quinoxifen	26:05	Cyhalothrin-2	32:17
Nereistoxin oxalate	10:57	Pyroquilon	17:43	Thiobencarb	20:02	Ditalimfos	22:29	Propiconazole1	26:05	Fenarimol	32:20
Alidochlor	11:09	Diazinon	17:45	Chlorothal-dimethyl	20:07	Butamifos	22:30	Trifloxystrobin	26:15	Pyrazophos	32:50
Dichlobenil	11:57	Phosphamidon E	17:47	Fenthion	20:08	Napropamide	22:40	Propiconazole2	26:20	Aziphos-ethyl	33:03
EPTC	12:14	Pyrimethanil	17:51	Diethioncarb	20:08	Fenamiphos	22:44	Pyriminobac methyl E	26:22	Dialifos	33:21
Biphenyl	12:37	Chlorthalonil	17:52	Fenproprymolf	20:11	Chlorfenson	22:49	Lenacil	26:22	Acinathrin	33:22
Butylate	13:14	Disulfoton	17:57	Parathion	20:14	Hexaconazole	22:49	Chloridazon	26:32	Pyraclof	33:57
Mevingfos	13:15	Prohydrojasmon	17:59	Cyanazin	20:16	Flutoranil	22:52	Pyraflufen-ethyl	26:34	Fenoxaprop-ethyl	34:17
Chlormefos	13:22	Isazophos	18:01	Triadimenol	20:19	Prothiofos	22:52	Terbufos	26:44	Spirodiclofen	34:19
Etridiazole	13:31	Tefluthrin	18:04	Tetraconazole	20:21	Metominostrobin-E	22:56	Tebuconazole	26:59	Bitteranol-1	34:52
Thiocyclam	14:10	Etrinfos	18:07	Isocarboxiphos	20:22	Prethiachlor	22:56	Propargite-1	27:10	Permethrin-1	35:15
Methacrifos	14:13	Triallat	18:07	Fthalide	20:29	Isoprothiolan	23:00	Propargite-2	27:14	Bitteranol-2	35:17
Crimidine	14:19	o-BHC	18:07	Nitrothal isopropyl	20:29	Fludioxonil	23:01	Captafol	27:17	Fluquiclonazole	35:27
OPP	14:29	Terbacil	18:08	Carbetamide	20:31	Profenofos	23:03	Diflufenican	27:19	Pyridaben	35:34
Molinate	14:44	Phenothiol	18:10	Bromopos methyl	20:36	Uniconazole-P	23:14	Piperonyl butoxide	27:32	Oxapocconazole	35:40
Tecnazene	15:20	Tebupirimfos	18:15	Diphenamid	20:40	Oxadiazon	23:16	Nitralin	27:37	Permethrin-2	35:46
Omethoate	15:25	Iprobenfos	18:18	Fosthiazate 1	20:41	Tribufos	23:18	Bioresmethrin	27:42	Etobenzanil	36:32
Etobenzanil metaboliti	15:30	Oxabetrinil	18:20	Fosthiazate 2	20:46	Thifluzamide	23:21	Pyributicarb	27:59	Cafenstrol	36:41
Xylfycarb	15:30	MCPB	18:29	Thiamethoxam	20:52	Myclobutanil	23:24	Chlormethoxylin	28:12	Butafenacil	36:49
Proquachlor	15:34	MCPB ethyl	18:29	Pendimethalin	20:56	Buprofezin	23:27	Pyridafenthion	28:17	Fenbuconazole	36:51
Demeton-S-methyl	15:46	Phosphamidon Z	18:38	Chlorfenvinphos-E	20:58	Flusilazole	23:28	Bromuconazole-1	28:21	Cyfluthrin-1	37:17
Diphenylamine	15:50	Dichlofenthion	18:39	Cyprodinil	21:00	Oxylfluorfen	23:30	Iprodione	28:25	Cyfluthrin-2	37:41
Ethoprofos	15:55	Dimethenamid	18:39	Pencconazole	21:08	Dicorbutrazole	23:31	Phosmet	28:31	Cyfluthrin-3	37:48
Ethalfuralin	16:08	Benfuresate	18:39	Fipronil	21:12	Bupirimate	23:31	Tetramethrin-1	28:33	Cyfluthrin-4	37:59
Naled	16:09	Terbufos	18:44	Dimethametryn	21:12	Azaconazole	23:37	EPN	28:41	Cypermethrin-1	38:16
Chlorpropham	16:14	Bromobutide	18:46	Isafenphos	21:13	Kresoxim methyl	23:37	Bromopropylate	28:44	Halfenprox	38:19
Phenmedipham	16:17	Acetochlor	18:46	Tolyfluanid	21:13	Chlorfenapyr	23:51	Bifenhrin	28:48	Cypermethrin-2	38:39
Dichlolluanid metabolite	16:17	Chlorpyrifhos methyl	18:47	Pyrifenoxy-1	21:15	Cyflufenamid	23:55	Piperophos	28:49	Quizalofop-ethyl	38:39
Trifluralin	16:20	Propanil	18:47	Chlorfenvinphos-Z	21:17	Cyproconazole1	23:55	Tetramethrin-2	29:03	Cypermethrin-3	38:45
Dicrotophos	16:20	Oxapocconazole formyl	18:50	Mecarbam	21:23	Isoxathion	23:59	Fenoxycarb	29:09	Flucytrinate-1	38:51
Salithion	16:21	Metribuzin	18:51	Ethyclozate	21:24	Cyproconazole2	23:59	Bifenazate	29:12	Flucytrinate-2	38:51
Flusilazole metaboliti	16:21	Simeconazole	18:58	Allethrin-1	21:25	Nitrofen	24:05	Etoxazole	29:15	Cypermethrin-4	38:56
Benfluralin	16:23	Alachlor	18:58	Phenthoate	21:27	Xoxanil	24:06	Fenproprathrin	29:21	Ethofenprox	39:12
2,6-Dichlorobenzamide	16:23	Tolclofos methyl	18:58	Allethrin-2	21:27	beta-Endosulfan	24:26	Indanofan	29:22	Silafluofen	39:39
Sulfotep	16:24	Parathion methyl	18:58	Quinalphos	21:29	Chlorpropylate	24:27	Bromuconazole-2	29:33	Pyrimidifen	40:20
Cadussafos	16:32	Simetryn	19:07	Diclocymet-1	21:29	Chlorbenzilate	24:27	Anilofos	29:34	Flumioxazin	40:46
Phorate	16:37	Metalaxyl	19:10	Captan	21:29	Pyriminobac methyl Z	24:31	Tebufenpyrad	29:37	Esfenvalerate	40:46
alpha-BHC	16:41	Fenchlorphos	19:12	Dimepiperate	21:34	Fensulfothion	24:36	Bifenox	29:42	Fluvinalate-1	41:12
Thiometon	16:53	Vinclozolin	19:13	Procymidon	21:35	Diniconazole	24:36	Clomeprop	29:54	Fenvalerate-1	41:21
Dimethoate	16:53	Amethryn	19:13	Triadimenol-1	21:36	Oxadixyl	24:48	Furametypr	30:01	Fenvalerate-2	41:21
Dichloran	17:01	Cinmethylin	19:13	Folpet	21:42	Ethion	24:50	Ettoxazole metabolite	30:01	Fluvinalate-2	41:27
Desmedipham	17:09	Methopryn	19:17	Methoprene	21:49	Chlorthiophos	24:57	Tetraflon	30:08	Difenoconazole-1	41:53
Simazine	17:16	Dithiopyr	19:18	Ferimzone E, Z	21:51	Fluacrypyrim	25:21	Iprodione metabolite	30:16	Difenoconazole-2	42:02
Quintozene	17:20	Pirimiphos methyl	19:32	Triadimenol-2	21:52	Sulprofos	25:30	Leptophos	30:29	Pyraoxifen	42:10
Atrazin	17:21	Fenitrothion	19:36	Methidathion	21:55	Mespronil	25:31	Phosalone	30:31	Indoxacarb IMP	42:39
Swep	17:21	Terbutryn	19:36	Chinomethionate	21:59	Triazophos	25:35	Phenothrin	30:36	Deltamethrin	42:47
beta-BHC	17:23	Dimethylvinphos-E	19:42	Diclocymet-2	22:02	Benalaxyl	25:45	Pentoxazone	30:41	Azoxystrobin	43:20
Dimethipin	17:24	Dimethylvinphos-Z	19:42	Propaphos	22:04	Azamethiphos	25:45	Aziphos Methyl	30:46	Dimethomorph-1	43:28
gamma-BHC	17:27	Dichlolluanid	19:44	Pyrifenoxy-2	22:04	CNP	25:47	Pyriproxyfen	31:23	Fenoxadone	43:42
Dioxathion	17:28	Espirocarb	19:47	Tetraclorvinphos	22:08	Carbofenthothion	25:54	Mefenacet	31:23	Tetrahydropyridate	43:54
Tolyfluanid metabolite	17:32	Malathion	19:51	Trichiamide	22:10	Formothion	25:54	Cyhalothrin-1	31:36	Dimethomorph-2	44:15
Terbufos	17:34	Bromacil	19:51	Pacrobutrazole	22:10	Cafentrazone-ethyl	25:55	Cyhalofop-butyl	31:42	Fluthiacet-methyl	45:29

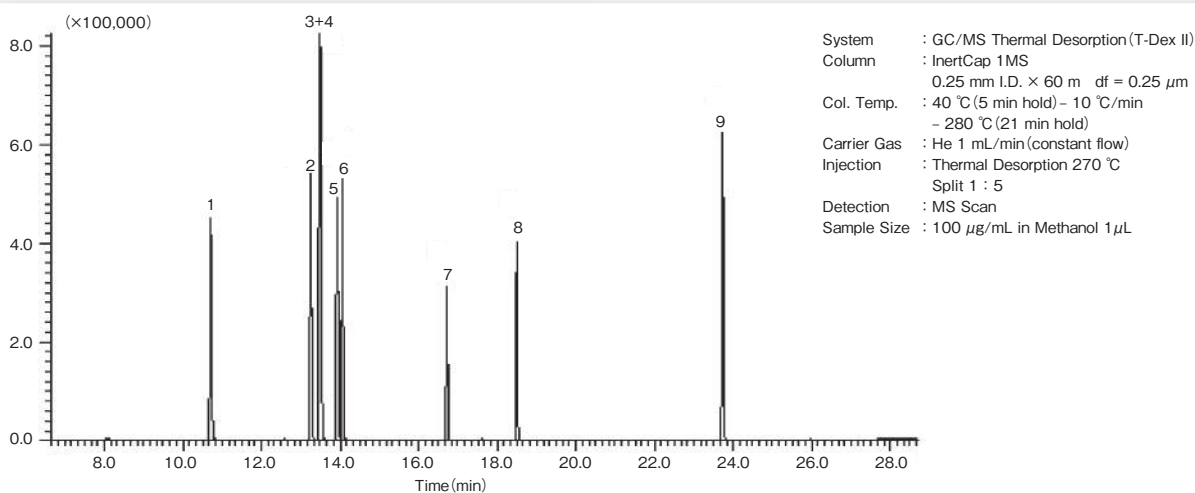
Applications

VOCs



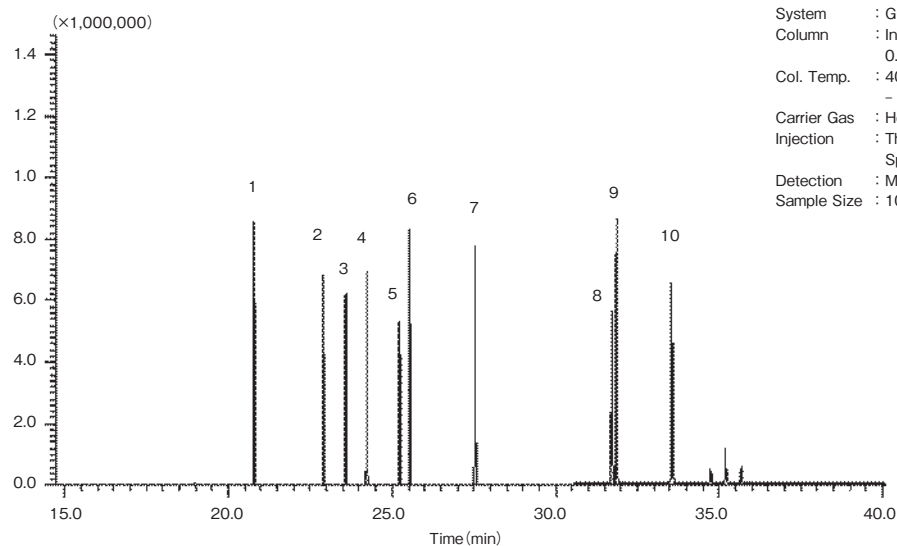
- | | | | | |
|-------------------------------------|--|--|-------------------------------|---------------------------------|
| 1. Dichlorodifluoromethane | 13. Chloroform | 25. Toluene | 37. <i>o</i> -Xylene | 49. 1,2,4-Trimethylbenzene |
| 2. Chloromethane | 14. Bromochloromethane | 26. <i>trans</i> -1,3-Dichloro-1-propene | 38. Styrene | 50. <i>sec</i> -Butylbenzene |
| 3. Vinylchloride | 15. 1,1,1-Trichloroethane | 27. 1,1,2-Trichloroethane | 39. <i>i</i> -Propylbenzene | 51. 4-Isopropyltoluene |
| 4. Bromomethane | 16. 1,1-Dichloropropene | 28. 1,3-Dichloropropane | 40. Bromoform | 52. 1,3-Dichlorobenzene |
| 5. Chloroethane | 17. Carbon Tetrachloride | 29. Tetrachloroethene | 41. 1,1,2,2-Tetrachloroethane | 53. 1,4-Dichlorobenzene |
| 6. Trichlorofluoromethane | 18. 1,2-Dichloroethane | 30. Dibromochloromethane | 42. 1,2,3-Trichloropropane | 54. <i>n</i> -Butylbenzene |
| 7. 1,1-Dichloroethene | 19. Benzene | 31. 1,2-Dibromoethane | 43. <i>n</i> -Propylbenzene | 55. 1,2-Dichlorobenzene |
| 8. Dichloromethane | 20. Trichloroethene | 32. Chlorobenzene | 44. Bromobenzene | 56. 1,2-Dibromo-3-chloropropane |
| 9. <i>trans</i> -1,2-Dichloroethene | 21. 1,2-Dichloropropane | 33. 1,1,1,2-Tetrachloroethane | 45. 2-Chlorotoluene | 57. 1,2,4-Trichlorobenzene |
| 10. 1,1-Dichloroethane | 22. Bromodichloromethane | 34. Ethylbenzene | 46. 1,3,5-Trimethylbenzene | 58. Hexachloro-1,3-butadiene |
| 11. 2,2-Dichloropropane | 23. Dibromomethane | 35. <i>m</i> -Xylene | 47. 4-Chlorotoluene | 59. Naphthalene |
| 12. <i>cis</i> -1,2-Dichloroethene | 24. <i>cis</i> -1,3-Dichloro-1-propene | 36. <i>p</i> -Xylene | 48. <i>tert</i> -Butylbenzene | 60. 1,2,3-Trichlorobenzene |

Indoor air



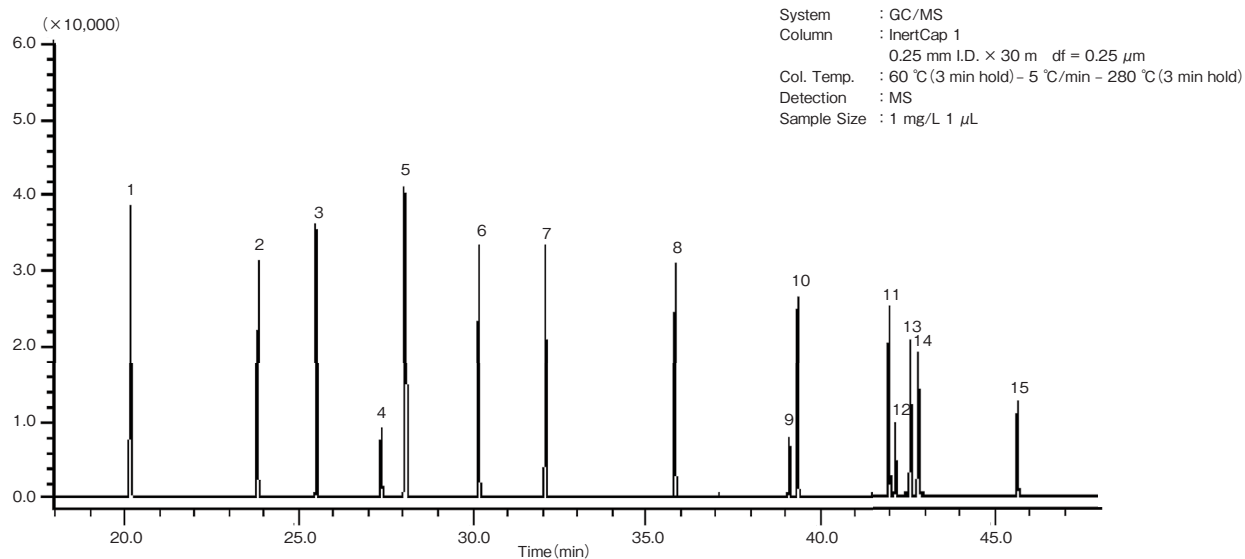
- | | | | | |
|-----------------|---------------------|---------------------|------------------------------|----------------|
| 1. Toluene | 3. <i>m</i> -Xylene | 5. Styrene | 7. <i>p</i> -Dichlorobenzene | 9. Tetradecane |
| 2. Ethylbenzene | 4. <i>p</i> -Xylene | 6. <i>o</i> -Xylene | 8. Nonanal | |

Outgas released from LSI materials



- | | |
|--|--|
| 1. D6 (Hexamethylcyclotrisiloxane) | 6. DBA : Di- <i>n</i> -butyl adipate |
| 2. BHT : Butylated hydroxytoluene | 7. DBP : Di- <i>n</i> -butyl phthalate |
| 3. DEP : Diethyl phthalate | 8. TPP : Triphenyl phosphate |
| 4. TBP : Tributyl phosphate | 9. DOA : Di (2-ethylhexyl) adipate |
| 5. TCEP : Tris (2-chloroethyl) phosphate | 10. DOP : Di (2-ethylhexyl) phthalate |

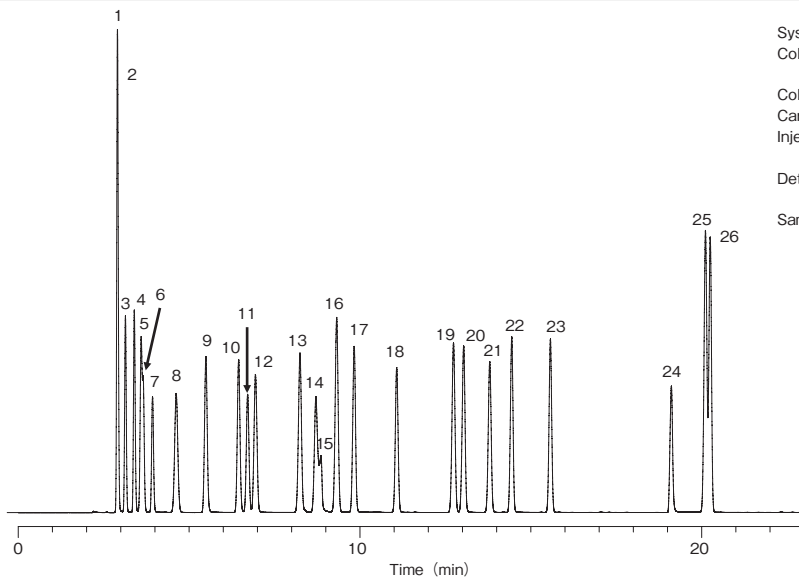
Phthalate esters



- | | | |
|-----------------------------------|----------------------------------|-------------------------------|
| 1. Dimethyl phthalate | 6. Di-isobutyl phthalate | 11. Dicyclohexyl phthalate |
| 2. Diethyl phthalate | 7. Di- <i>n</i> -butyl phthalate | 12. Diphenyl phthalate |
| 3. Di-isopropyl phthalate | 8. Dipentyl phthalate | 13. Diheptyl phthalate |
| 4. Diallyl phthalate | 9. Butylbenzyl phthalate | 14. Di-2-ethylhexyl phthalate |
| 5. Di- <i>n</i> -propyl phthalate | 10. Dihexyl phthalate | 15. Dioctyl phthalate |

Applications

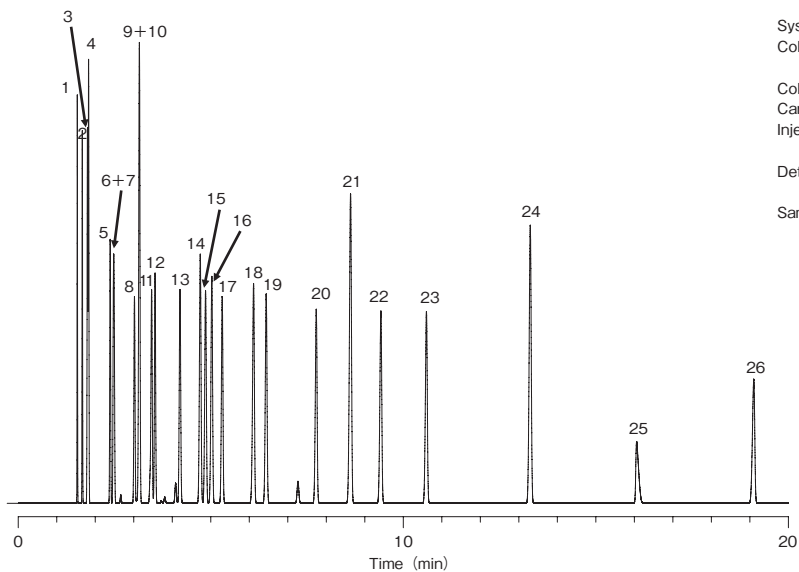
Residual solvents in pharmaceuticals Class3



System : GC/FID
 Column : InertCap 624
 0.53 mm I.D. × 30 m df = 3.00 μm
 Col. Temp. : 40 °C (5min hold) – 5 °C/min – 130 °C
 Carrier Gas : He 20 kPa
 Injection : Split flow 200 mL/min
 240 °C
 Detection : FID Range 10¹
 240 °C
 Sample Size : Mixed evenly 0.4 μL

- | | | | | |
|------------------|-------------------------|----------------------|------------------------|-------------|
| 1. Ethanol | 7. Methyl acetate | 13. i-Butanol | 19. MIBK | 25. Cumene |
| 2. Pentane | 8. Methyl t-butyl ether | 14. i-Propyl acetate | 20. i-Amyl alcohol | 26. Anisole |
| 3. Ethyl ether | 9. 1-Propanol | 15. Acetic acid | 21. i-Butyl acetate | |
| 4. Acetone | 10. MEK | 16. Heptane | 22. n-Amyl alcohol | |
| 5. 2-Propanol | 11. Ethyl acetate | 17. n-Butanol | 23. Butyl acetate | |
| 6. Ethyl formate | 12. sec-Butanol | 18. Propyl acetate | 24. Dimethyl sulfoxide | |

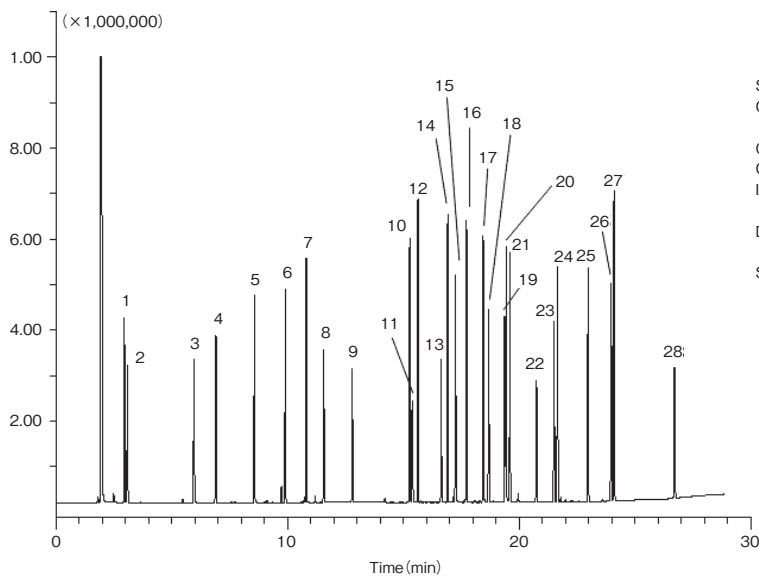
Residual solvents in pharmaceuticals Class3



System : GC/FID
 Column : InertCap Pure-WAX
 0.53 mm I.D. × 30 m df = 1.00 μm
 Col. Temp. : 40 °C – 5 °C/min – 140 °C
 Carrier Gas : He 20 kPa
 Injection : Split flow 200 mL/min
 240 °C
 Detection : FID Range 10¹
 240 °C
 Sample Size : Mixed evenly 0.4 μL

- | | | | | |
|-------------------------|----------------------|---------------------|--------------------|------------------------|
| 1. Pentane | 7. Ethyl acetate | 13. Propyl acetate | 19. i-Butanol | 25. Acetic acid |
| 2. Ethyl ether | 8. Ethyl formate | 14. MIBK | 20. n-Butanol | 26. Dimethyl sulfoxide |
| 3. Methyl t-butyl ether | 9. MEK | 15. i-Butyl acetate | 21. Cumene | |
| 4. Heptane | 10. i-Propyl acetate | 16. sec-Butanol | 22. i-Amyl alcohol | |
| 5. Acetone | 11. 2-Propanol | 17. 1-Propanol | 23. n-Amyl alcohol | |
| 6. Methyl acetate | 12. Ethanol | 18. Butyl acetate | 24. Anisole | |

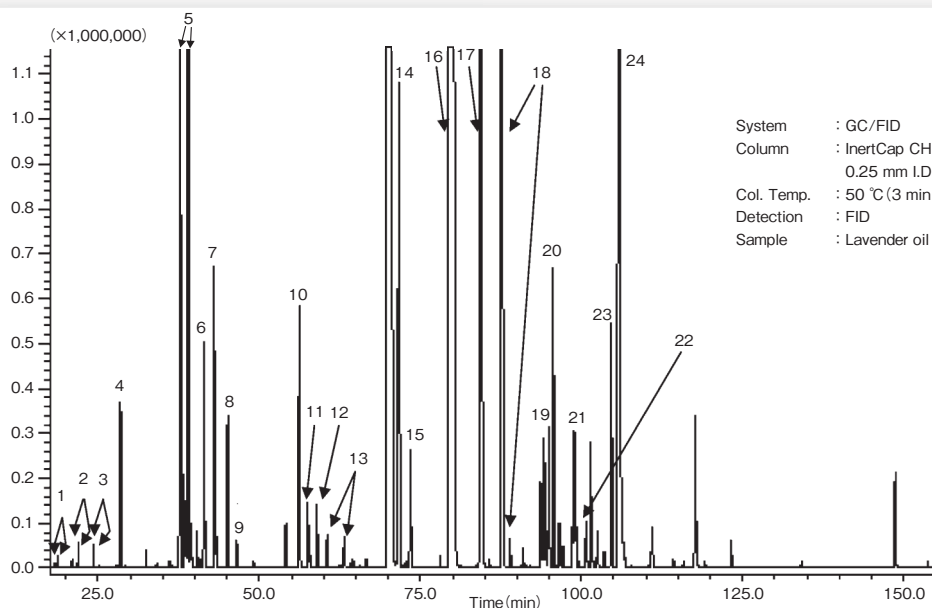
Fragrances



System : GC/FID
 Column : InertCap Pure-WAX
 0.25 mm I.D. × 30 m df = 0.25 μm
 Col. Temp. : 40 °C (5 min) – 10 °C/min – 260 °C (3 min)
 Carrier Gas : He 100 kPa
 Injection : Split flow 20 ml/min
 250 °C
 Detection : FID Range 10¹⁰
 260 °C
 Sample Size : 1 μL

- | | | | | |
|------------------|-------------------------|------------------------|---------------------|----------------------|
| 1. Butyraldehyde | 7. Amyl alcohol | 13. Butyric acid | 19. Hexanoic acid | 25. Eugenol |
| 2. Ethyl acetate | 8. 1-Octanal | 14. dl-Menthol | 20. α-Ionone | 26. γ-Undecalactone |
| 3. 1-Propanol | 9. Allyl isothiocyanate | 15. Citronelly acetate | 21. Geraniol | 27. Cinnamyl alcohol |
| 4. Butyl acetate | 10. Benzaldehyde | 16. α-Borneol | 22. Maltol | 28. Vanillin |
| 5. 1-Butanol | 11. Propionic acid | 17. Methyl salicylate | 23. Anisaldehyde | |
| 6. 1,8-Cineol | 12. Linalool | 18. n-Decanol | 24. Cinnam aldehyde | |

Lavender (Optical isomers)

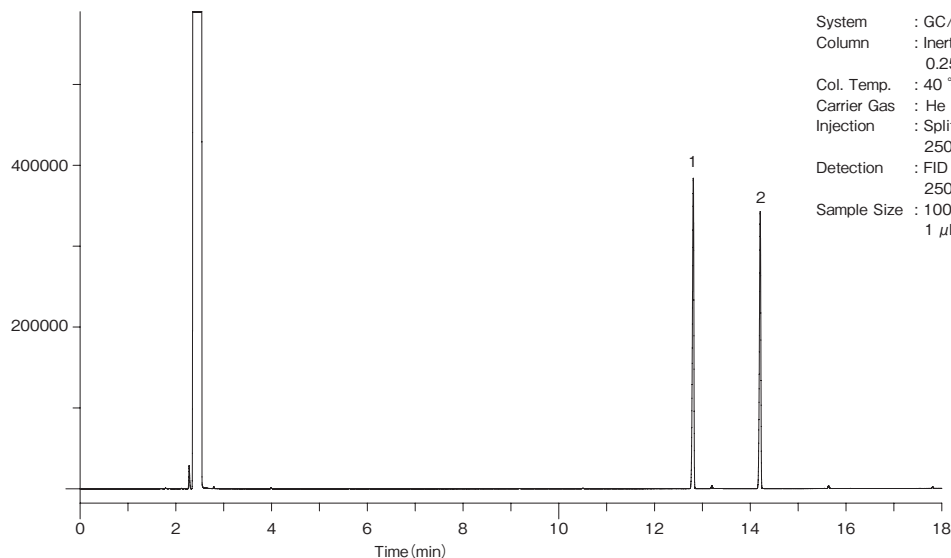


System : GC/FID
 Column : InertCap CHIRAMIX
 0.25 mm I.D. × 30 m df = 0.25 μm
 Col. Temp. : 50 °C (3 min hold) – 0.7 °C/min – 180 °C (40 min hold)
 Detection : FID
 Sample : Lavender oil

- | | | | | |
|--------------|--------------------------|-------------------------------|---------------------|-------------------|
| 1. α-Thujene | 6. 1,8-Cineole | 11. 3-Octanol | 16. Linalyl acetate | 21. α-Santalene |
| 2. α-Pinene | 7. 3-Octanone | 12. 1-Octen-3-ol | 17. Geranyl acetate | 22. α-Bergamotene |
| 3. Camphene | 8. Hexyl acetate | 13. (trans/cis)-Linalool oxid | 18. Terpinen-4-ol | 23. Neryl acetate |
| 4. β-Pinene | 9. Terpinolene | 14. Linalool | 19. Borneol | 24. Caryophyllene |
| 5. β-Ocimene | 10. 1-Octen-3-yl acetate | 15. Hexyl butyrate | 20. α-Terpineol | |

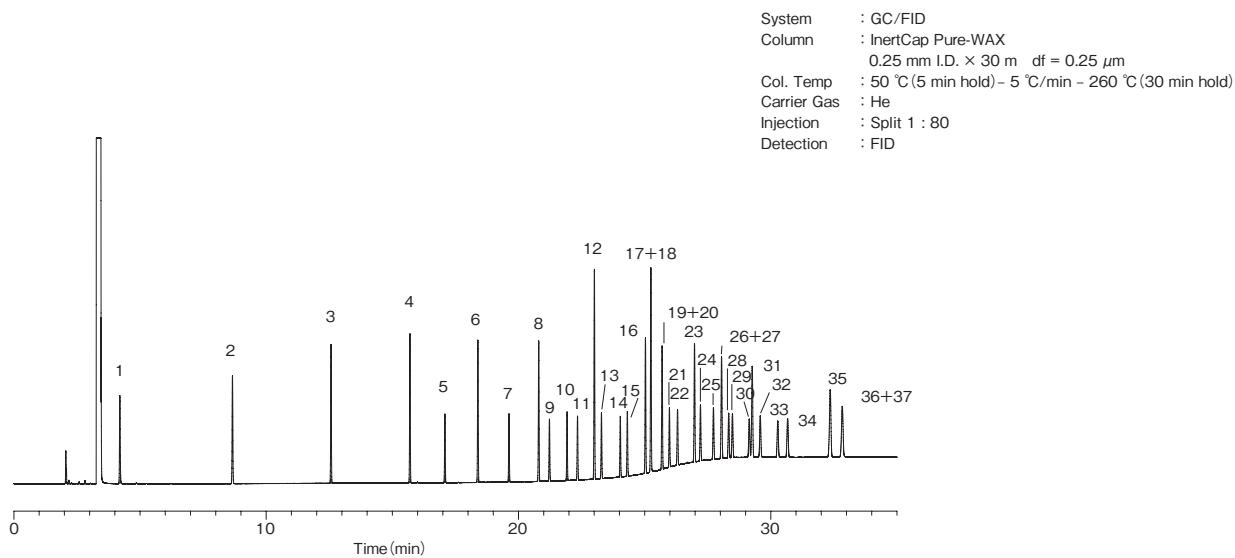
Applications

Indole/Skatole



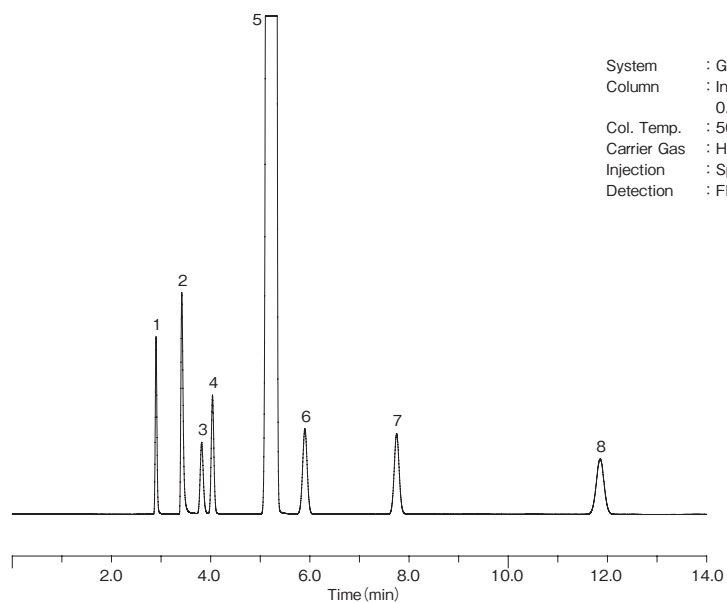
1. Indole
2. Skatole

FAME



- | | | | | | | |
|----------|-----------|--------------|--------------|-------------|-------------|-------------|
| 1. C4:0 | 7. C13:0 | 13. C16:1 | 19. C18:2n6c | 25. C20:2 | 31. C22:0 | 37. C24:1n9 |
| 2. C6:0 | 8. C14:0 | 14. C17:0 | 20. C18:2n6t | 26. C20:3n6 | 32. C22:1n9 | |
| 3. C8:0 | 9. C14:1 | 15. C17:1 | 21. C18:3n6 | 27. C20:4n6 | 33. C22:2 | |
| 4. C10:0 | 10. C15:0 | 16. C18:0 | 22. C18:3n3 | 28. C21:0 | 34. C23:0 | |
| 5. C11:0 | 11. C15:1 | 17. C18:1n9c | 23. C20:0 | 29. C20:3n3 | 35. C24:0 | |
| 6. C12:0 | 12. C16:0 | 18. C18:1n9t | 24. C20:1n9 | 30. C20:5n3 | 36. C22:6n3 | |

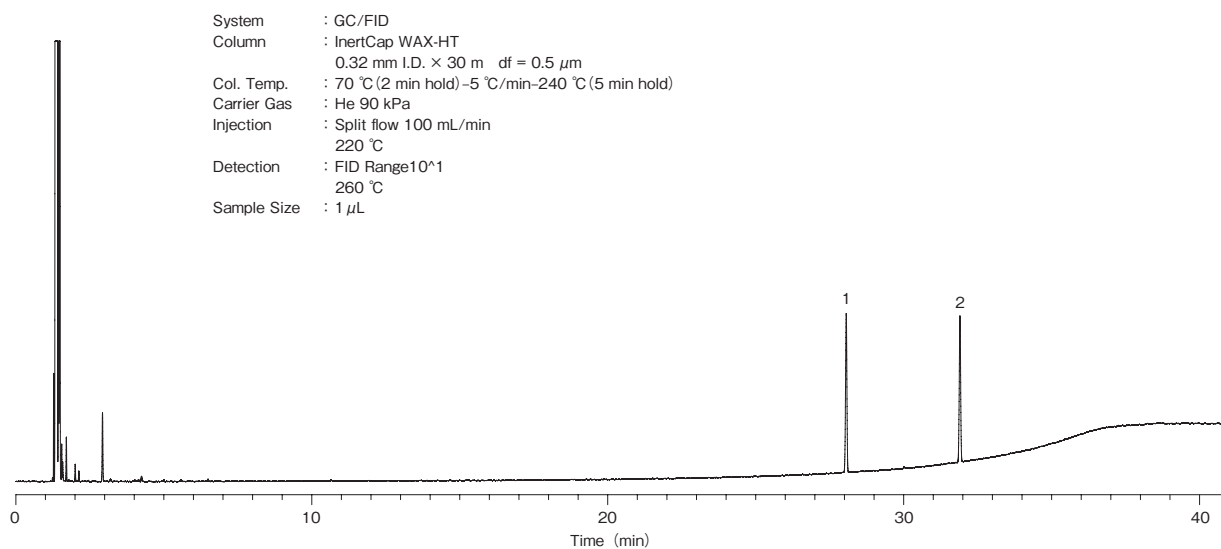
VOC & Amines



- | | |
|-------------------------|-----------------------|
| 1. Methanol | 6. <i>n</i> -Pentane |
| 2. Dimethylamine (DMA) | 7. <i>n</i> -Propanol |
| 3. Trimethylamine (TMA) | 8. <i>n</i> -Hexane |
| 4. Ethanol | |
| 5. iso-Propanol | |

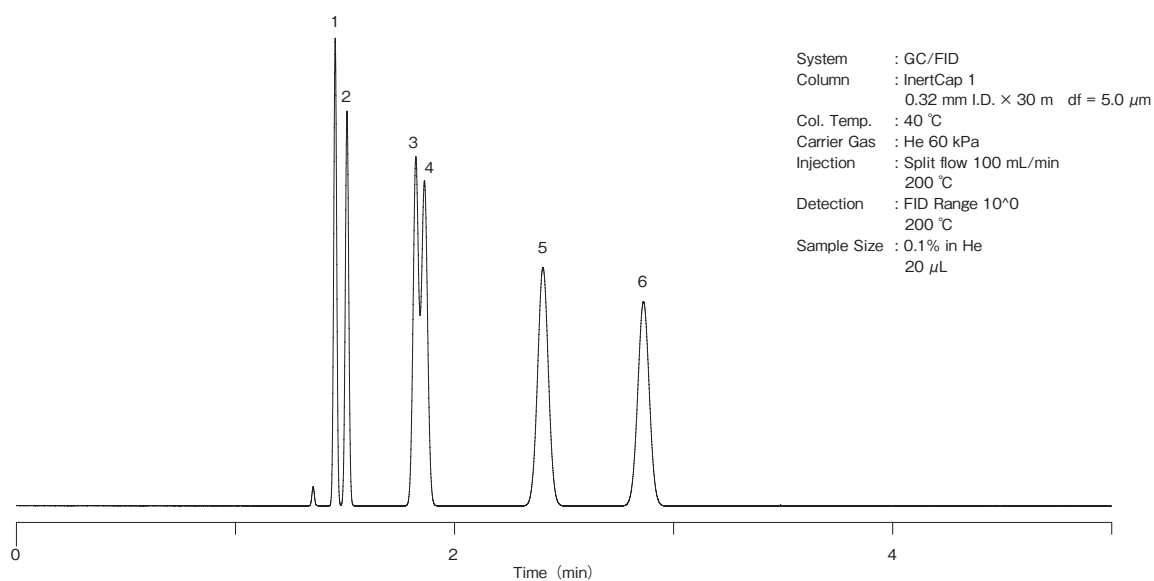
Applications

Magnesium stearate by Japanese Pharmacopeia



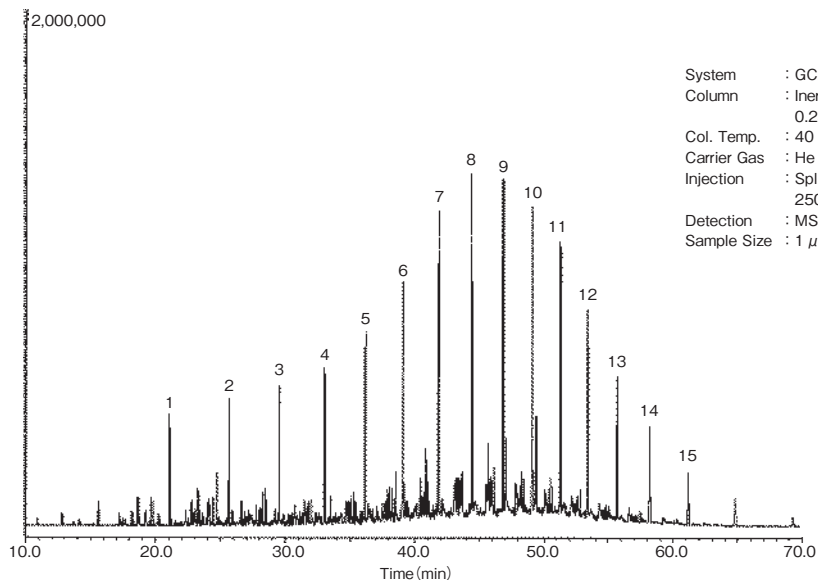
1. Methyl palmitate
2. Methyl stearate

Hydrocarbons C2-C4



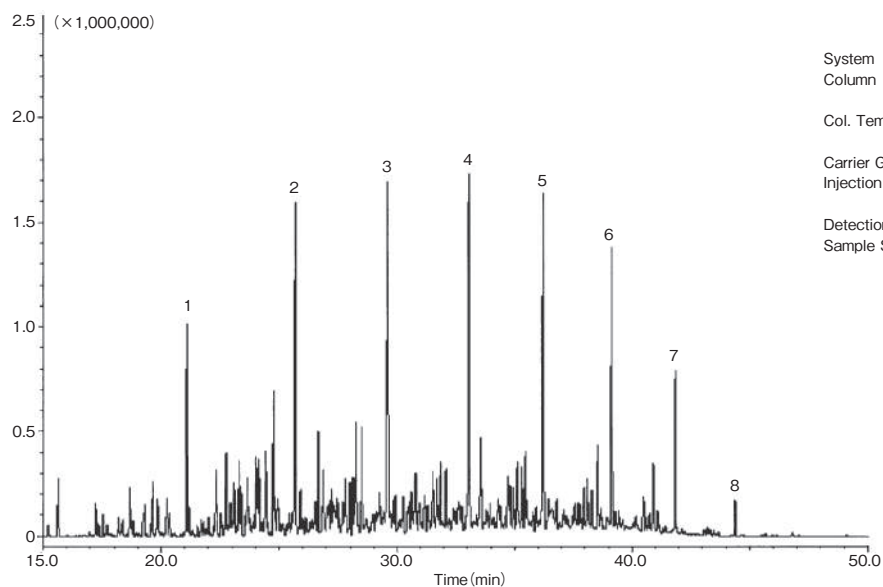
1. Ethylene
2. Ethane
3. Propylene
4. Propane
5. iso-Butane
6. n-Butane

Diesel



- | | | |
|--------------|----------------|-----------------|
| 1. Nonane | 6. Tetradecane | 11. Nonadecane |
| 2. Decane | 7. Pentadecane | 12. Eicosane |
| 3. Undecane | 8. Hexadecane | 13. Heneicosane |
| 4. Dodecane | 9. Heptadecane | 14. Docosane |
| 5. Tridecane | 10. Octadecane | 15. Tricosane |

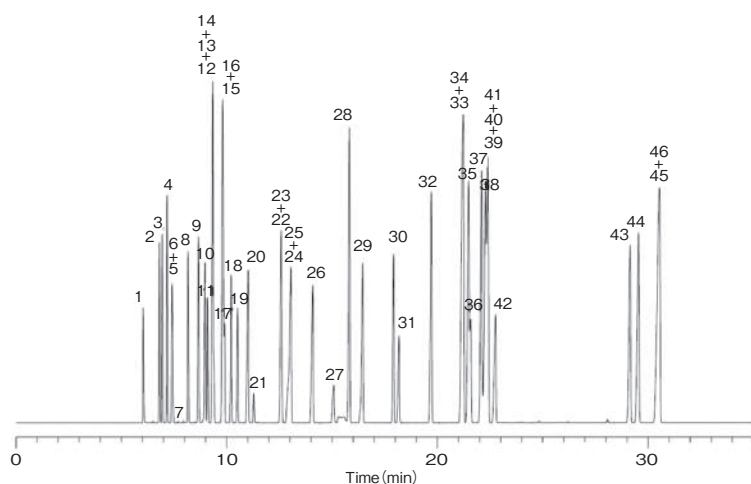
Kerosene



- | | |
|--------------|----------------|
| 1. Nonane | 6. Tetradecane |
| 2. Decane | 7. Pentadecane |
| 3. Undecane | 8. Hexadecane |
| 4. Dodecane | |
| 5. Tridecane | |

Applications

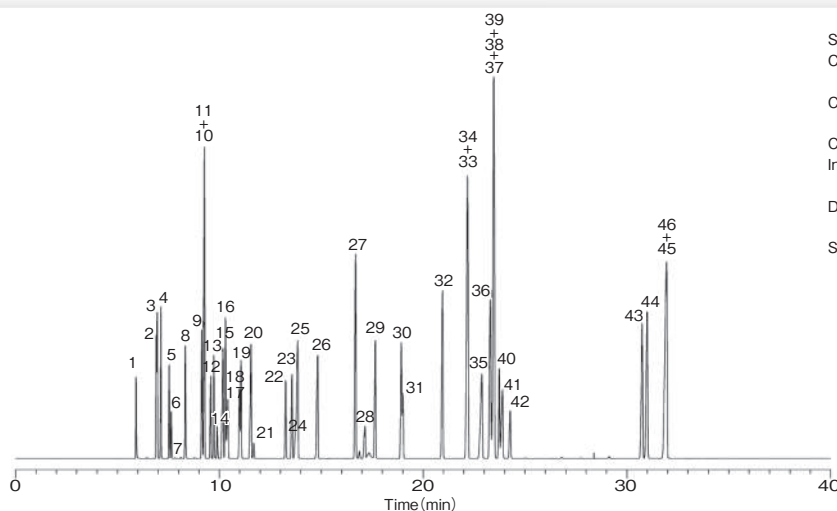
Organic solvents 46 compounds



System : GC/FID
 Column : InertCap 1
 0.25 mm I.D. × 60 m df = 0.40 μm
 Col. Temp. : 40 °C (5 min hold) – 4 °C/min
 – 230 °C (5 min hold)
 Carrier Gas : He 130 kPa
 Injection : Split 100 mL/min
 250 °C
 Detection : FID Range 10¹¹
 250 °C
 Sample Size : Mixed evenly 1 μL

1. Methanol	11. <i>cis</i> -1,2-Dichloroethylene	21. Carbon Tetrachloride	31. Tetrachloroethylene	41. Cellosolve acetate
2. Acetone	12. Ethyl acetate	22. 1,4-Dioxane	32. Chlorobenzene	42. Butyl cellosolve
3. <i>i</i> -Propanol	13. <i>n</i> -Hexane	23. Trichloroethylene	33. <i>m</i> -Xylene	43. <i>o</i> -Dichlorobenzene
4. Ethyl ether	14. Chloroform	24. Ethyl cellosolve	34. <i>p</i> -Xylene	44. <i>o</i> -Cresol
5. Dichloromethane	15. Tetrahydrofuran	25. <i>n</i> -Propyl acetate	35. Cyclohexanone	45. <i>p</i> -Cresol
6. Methyl acetate	16. <i>i</i> -Butanol	26. <i>i</i> -Amyl alcohol	36. Cyclohexanol	46. <i>m</i> -Cresol
7. Carbon disulfide	17. Methyl cellosolve	27. <i>N,N</i> -Dimethyl formamide	37. Styrene	
8. <i>trans</i> -1,2-Dichloroethylene	18. 1,2-Dichloroethane	28. Toluene	38. 1-Methylcyclohexanol	
9. Methyl ethyl keton	19. 1,1,1-Trichloroethane	29. Methyl- <i>n</i> -butyl ketone	39. <i>o</i> -Xylene	
10. 2-Butanol	20. <i>n</i> -Butanol	30. <i>n</i> -Butyl acetate	40. 1,1,2,2-Tetrachloroethane	

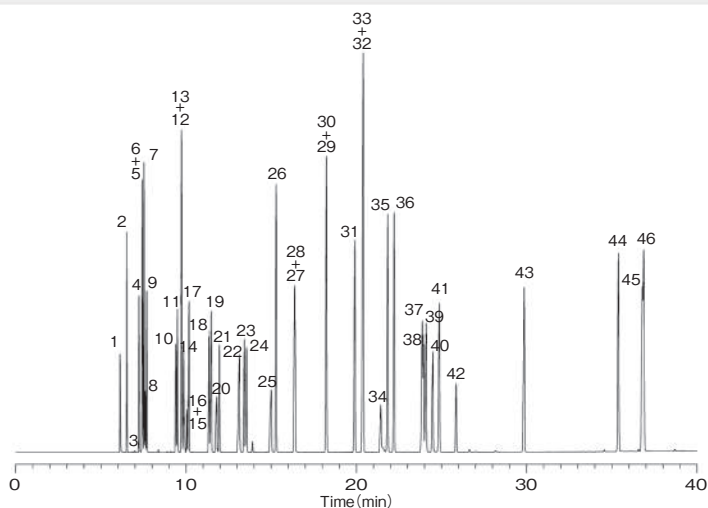
Organic solvents 46 compounds



System : GC/FID
 Column : InertCap 5
 0.25 mm I.D. × 60 m df = 0.40 μm
 Col. Temp. : 40 °C (5 min hold) – 4 °C/min
 – 230 °C (5 min hold)
 Carrier Gas : He 130 kPa
 Injection : Split 100 mL/min
 250 °C
 Detection : FID Range 10¹¹
 250 °C
 Sample Size : Mixed evenly 1 μL

1. Methanol	11. <i>n</i> -Hexane	21. Carbon Tetrachloride	31. Tetrachloroethylene	41. Butyl cellosolve
2. Acetone	12. <i>cis</i> -1,2-Dichloroethylene	22. Trichloroethylene	32. Chlorobenzene	42. 1,1,2,2-Tetrachloroethane
3. <i>i</i> -Propanol	13. Ethyl acetate	23. 1,4-Dioxane	33. <i>m</i> -Xylene	43. <i>o</i> -Dichlorobenzene
4. Ethyl ether	14. Chloroform	24. Ethyl cellosolve	34. <i>p</i> -Xylene	44. <i>o</i> -Cresol
5. Methyl acetate	15. <i>i</i> -Butanol	25. <i>n</i> -Propyl acetate	35. Cyclohexanol	45. <i>p</i> -Cresol
6. Dichloromethane	16. Tetrahydrofuran	26. <i>i</i> -Amyl alcohol	36. Styrene	46. <i>m</i> -Cresol
7. Carbon disulfide	17. Methyl cellosolve	27. Toluene	37. Cyclohexanone	
8. <i>trans</i> -1,2-Dichloroethylene	18. 1,1,1-Trichloroethane	28. <i>N,N</i> -Dimethyl formamide	38. 1-Methylcyclohexanol	
9. Methyl ethyl keton	19. 1,2-Dichloroethane	29. Methyl- <i>n</i> -butyl ketone	39. <i>o</i> -Xylene	
10. 2-Butanol	20. <i>n</i> -Butanol	30. <i>n</i> -Butyl acetate	40. Cellosolve acetate	

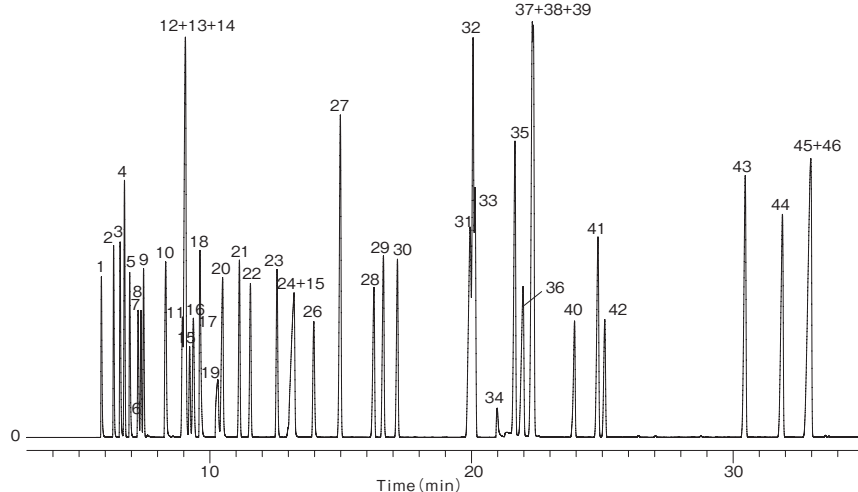
Organic solvents 46 compounds



System : GC/FID
 Column : InertCap 1701
 0.25 mm I.D. × 60 m df = 0.25 μm
 Col. Temp. : 40 °C (5 min hold) – 4 °C/min
 – 230 °C (5 min hold)
 Carrier Gas : He 130 kPa
 Injection : Split 100 mL/min
 250 °C
 Detection : FID Range 10¹¹
 250 °C
 Sample Size : Mixed evenly 1 μL

- | | | | | |
|---------------------------------------|---------------------------|------------------------------------|------------------------------------|-------------------------------|
| 1. Methanol | 11. Ethyl acetate | 21. Trichloroethylene | 31. Chlorobenzene | 41. Cyclohexanone |
| 2. Ethyl ether | 12. Tetrahydrofuran | 22. <i>n</i> -Butanol | 32. <i>m</i> -Xylene | 42. 1,1,2,2-Tetrachloroethane |
| 3. Carbon disulfide | 13. Methyl ethyl keton | 23. <i>n</i> -Propyl acetate | 33. <i>p</i> -Xylene | 43. <i>o</i> -Dichlorobenzene |
| 4. Acetone | 14. 1,1,1-Trichloroethane | 24. 1,4-Dioxane | 34. <i>N,N</i> -Dimethyl formamide | 44. <i>o</i> -Cresol |
| 5. <i>i</i> -Propanol | 15. Carbon Tetrachloride | 25. Ethyl cellosolve | 35. <i>o</i> -Xylene | 45. <i>p</i> -Cresol |
| 6. Methyl acetate | 16. Chloroform | 26. Toluene | 36. Styrene | 46. <i>m</i> -Cresol |
| 7. <i>n</i> -Hexane | 17. 2-Butanol | 27. Tetrachloroethylene | 37. 1-Methylcyclohexanol | |
| 8. Dichloromethane | 18. 1,2-Dichloroethane | 28. <i>i</i> -Amyl alcohol | 38. Cellosolve acetate | |
| 9. <i>trans</i> -1,2-Dichloroethylene | 19. <i>i</i> -Butanol | 29. Methyl- <i>n</i> -butyl ketone | 39. Cyclohexanol | |
| 10. <i>cis</i> -1,2-Dichloroethylene | 20. Methyl cellosolve | 30. <i>n</i> -Butyl acetate | 40. Butyl cellosolve | |

Organic solvents 46 compounds

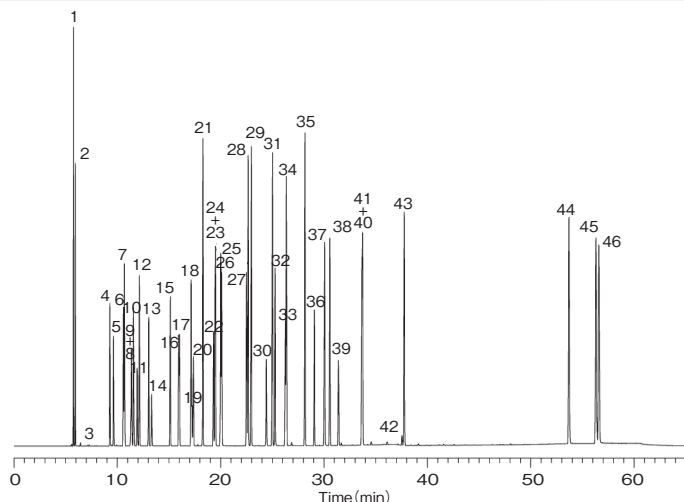


System : GC/FID
 Column : InertCap 17
 0.25 mm I.D. × 60 m df = 0.25 μm
 Col. Temp. : 40 °C (5 min hold) – 4 °C/min
 – 230 °C (5 min hold)
 Carrier Gas : He 130 kPa
 Injection : Split flow 100 mL/min
 250 °C
 Detection : FID Range 10¹¹
 250 °C
 Sample Size : Mixed evenly 1 μL

- | | | | | |
|---------------------------------------|--------------------------------------|------------------------------------|------------------------------------|-------------------------------|
| 1. Methanol | 11. <i>cis</i> -1,2-Dichloroethylene | 21. 1,2-Dichloroethane | 31. <i>p</i> -Xylene | 41. Cyclohexanone |
| 2. Ethyl ether | 12. Methyl ethyl keton | 22. Trichloroethylene | 32. <i>m</i> -Xylene | 42. 1,1,2,2-Tetrachloroethane |
| 3. <i>i</i> -Propanol | 13. <i>i</i> -Butanol | 23. <i>n</i> -Propyl acetate | 33. Chlorobenzene | 43. <i>o</i> -Dichlorobenzene |
| 4. <i>n</i> -Hexane | 14. Ethyl acetate | 24. <i>i</i> -Amyl alcohol | 34. <i>N,N</i> -Dimethyl formamide | 44. <i>o</i> -Cresol |
| 5. Acetone | 15. Chloroform | 25. Ethyl cellosolve | 35. <i>o</i> -Xylene | 45. <i>p</i> -Cresol |
| 6. Carbon disulfide | 16. 1,1,1-Trichloroethane | 26. 1,4-Dioxane | 36. 1-Methylcyclohexanol | 46. <i>m</i> -Cresol |
| 7. Methyl acetate | 17. Carbon Tetrachloride | 27. Toluene | 37. Cyclohexanol | |
| 8. Dichloromethane | 18. Tetrahydrofuran | 28. Tetrachloroethylene | 38. Butyl cellosolve | |
| 9. <i>trans</i> -1,2-Dichloroethylene | 19. Methyl cellosolve | 29. Methyl- <i>n</i> -butyl ketone | 39. Styrene | |
| 10. 2-Butanol | 20. <i>n</i> -Butanol | 30. <i>n</i> -Butyl acetate | 40. Cellosolve acetate | |

Applications

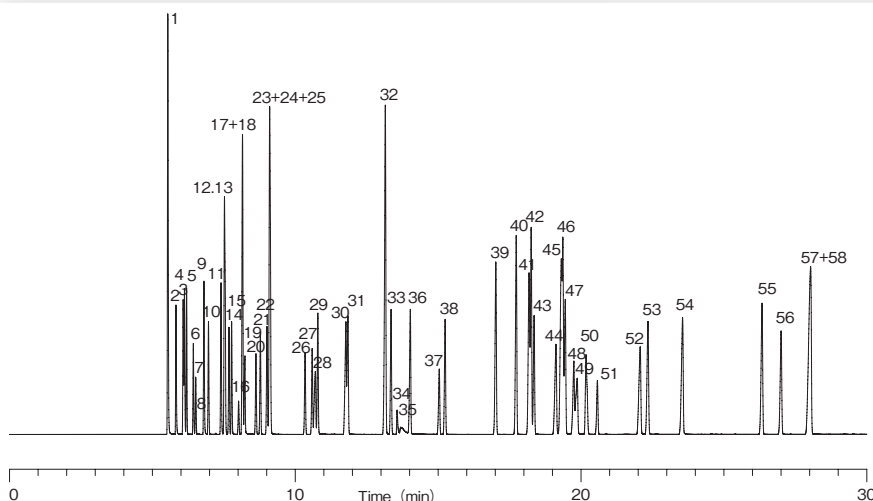
Organic solvents 46 compounds



System : GC/FID
 Column : InertCap WAX
 0.25 mm I.D. × 60 m df = 0.25 μm
 Col. Temp. : 40 °C (5 min hold) – 4 °C/min
 – 230 °C (5 min hold)
 Carrier Gas : He 130 kPa
 Injection : Split flow 100 mL/min
 250 °C
 Detection : FID Range 10*1
 250 °C
 Sample Size : Mixed evenly 1 μL

- | | | | | |
|---------------------------------------|--------------------------------------|------------------------------------|------------------------------------|-------------------------------|
| 1. <i>n</i> -Hexane | 11. Methanol | 21. Toluene | 31. <i>o</i> -Xylene | 41. Cyclohexanol |
| 2. Ethyl ether | 12. Methyl ethyl ketone | 22. 1,4-Dioxane | 32. <i>i</i> -Amyl alcohol | 42. 1,1,2,2-Tetrachloroethane |
| 3. Carbon disulfide | 13. <i>i</i> -Propanol | 23. <i>n</i> -Butyl acetate | 33. Ethyl cellosolve | 43. <i>o</i> -Dichlorobenzene |
| 4. Acetone | 14. Dichloromethane | 24. 1,2-Dichloroethane | 34. Chlorobenzene | 44. <i>o</i> -Cresol |
| 5. Methyl acetate | 15. <i>n</i> -Propyl acetate | 25. Methyl- <i>n</i> -butyl ketone | 35. Styrene | 45. <i>p</i> -Cresol |
| 6. <i>trans</i> -1,2-Dichloroethylene | 16. <i>cis</i> -1,2-Dichloroethylene | 26. <i>i</i> -Butanol | 36. Cellosolve acetate | 46. <i>m</i> -Cresol |
| 7. Tetrahydrofuran | 17. Trichloroethylene | 27. <i>n</i> -Butanol | 37. Cyclohexanone | |
| 8. Carbon Tetrachloride | 18. 2-Butanol | 28. <i>p</i> -Xylene | 38. 1-Methylcyclohexanol | |
| 9. 1,1,1-Trichloroethane | 19. Chloroform | 29. <i>m</i> -Xylene | 39. <i>N,N</i> -Dimethyl formamide | |
| 10. Ethyl acetate | 20. Tetrachloroethylene | 30. Methyl cellosolve | 40. Butyl cellosolve | |

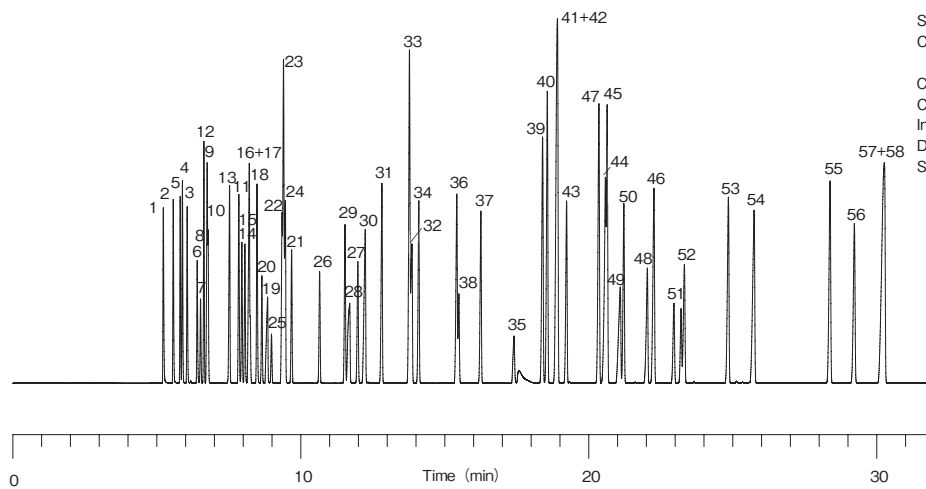
Organic solvents 58 compounds



System : GC/FID
 Column : InertCap 5MS/Sil
 0.25 mm I.D. × 60 m df = 0.25 μm
 Col. Temp. : 40 °C (5 min hold) – 4 °C/min – 230 °C
 Carrier Gas : He
 Injection : Split
 Detection : FID
 Sample : Mixed evenly

- | | | | | |
|--|--------------------------------------|-----------------------------------|-----------------------------|-------------------------------|
| 1. Methanol | 13. 2-Butanol | 25. Carbon Tetrachloride | 37. <i>n</i> -Butyl acetate | 49. Butyl cellosolve |
| 2. Ethanol | 14. <i>cis</i> -1,2-Dichloroethylene | 26. Trichloroethylene | 38. Tetrachloroethylene | 50. <i>n</i> -Amyl acetate |
| 3. Acetone | 15. Ethyl acetate | 27. 1,4-Dioxane | 39. Chlorobenzene | 51. 1,1,2,2-tetrachloroethane |
| 4. <i>i</i> -Propanol | 16. Chloroform | 28. Ethyl cellosolve | 40. Ethylbenzene | 52. Methylcyclohexanol |
| 5. Ethyl ether | 17. <i>i</i> -Butanol | 29. <i>n</i> -Propyl acetate | 41. <i>m</i> -Xylene | 53. Methylcyclohexanone |
| 6. Methyl acetate | 18. Tetrahydrofuran | 30. <i>i</i> -Amyl alcohol | 42. <i>p</i> -Xylene | 54. Phenol |
| 7. Dichloromethane | 19. Methyl cellosolve | 31. Methyl <i>i</i> -butyl ketone | 43. <i>i</i> -Amyl acetate | 55. <i>o</i> -Dichlorobenzene |
| 8. Carbon disulfide | 20. 1,1,1-Trichloroethane | 32. <i>n</i> -Amyl alcohol | 44. Cyclohexanol | 56. <i>o</i> -Cresol |
| 9. <i>n</i> -Propanol | 21. 1,2-Dichloroethane | 33. Toluene | 45. Styrene | 57. <i>p</i> -Cresol |
| 10. <i>trans</i> -1,2-Dichloroethylene | 22. <i>i</i> -Propyl acetate | 34. <i>i</i> -Butyl acetate | 46. Cyclohexanone | 58. <i>m</i> -Cresol |
| 11. Methyl ethyl ketone | 23. Benzene | 35. <i>N,N</i> -Dimethylformamide | 47. <i>o</i> -Xylene | |
| 12. Hexane | 24. <i>n</i> -Butanol | 36. Methyl <i>n</i> -butyl ketone | 48. Cellosolve acetate | |

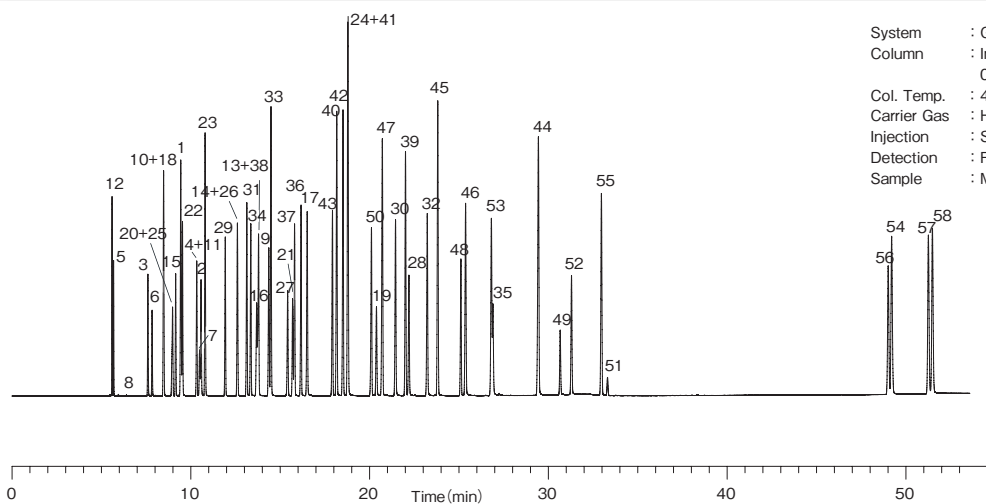
Organic solvents 58 compounds



System : GC/FID
 Column : InertCap 25
 0.25 mm I.D. × 60 m df = 0.25 μm
 Col. Temp. : 40 °C (5 min hold) – 4 °C/min – 230 °C
 Carrier Gas : He
 Injection : Split
 Detection : FID
 Sample : Mixed evenly

- | | | | | |
|--|--------------------------------------|-----------------------------------|-----------------------------|-------------------------------|
| 1. Methanol | 13. 2-Butanol | 25. Carbon Tetrachloride | 37. <i>n</i> -Butyl acetate | 49. Butyl cellosolve |
| 2. Ethanol | 14. <i>cis</i> -1,2-Dichloroethylene | 26. Trichloroethylene | 38. Tetrachloroethylene | 50. <i>n</i> -Amyl acetate |
| 3. Acetone | 15. Ethyl acetate | 27. 1,4-Dioxane | 39. Chlorobenzene | 51. 1,1,2,2-tetrachloroethane |
| 4. <i>i</i> -Propanol | 16. Chloroform | 28. Ethyl cellosolve | 40. Ethylbenzene | 52. Methylcyclohexanol |
| 5. Ethyl ether | 17. <i>i</i> -Butanol | 29. <i>n</i> -Propyl acetate | 41. <i>m</i> -Xylene | 53. Methylcyclohexanone |
| 6. Methyl acetate | 18. Tetrahydrofuran | 30. <i>i</i> -Amyl alcohol | 42. <i>p</i> -Xylene | 54. Phenol |
| 7. Dichloromethane | 19. Methyl cellosolve | 31. Methyl <i>i</i> -butyl ketone | 43. <i>i</i> -Amyl acetate | 55. <i>o</i> -Dichlorobenzene |
| 8. Carbon disulfide | 20. 1,1,1-Trichloroethane | 32. <i>n</i> -Amyl alcohol | 44. Cyclohexanol | 56. <i>o</i> -Cresol |
| 9. <i>n</i> -Propanol | 21. 1,2-Dichloroethane | 33. Toluene | 45. Styrene | 57. <i>p</i> -Cresol |
| 10. <i>trans</i> -1,2-Dichloroethylene | 22. <i>i</i> -Propyl acetate | 34. <i>i</i> -Butyl acetate | 46. Cyclohexanone | 58. <i>m</i> -Cresol |
| 11. Methyl ethyl ketone | 23. Benzene | 35. <i>N,N</i> -Dimethylformamide | 47. <i>o</i> -Xylene | |
| 12. Hexane | 24. <i>n</i> -Butanol | 36. Methyl <i>n</i> -butyl ketone | 48. Cellosolve acetate | |

Organic solvents 58 compounds



System : GC/FID
 Column : InertCap WAX
 0.25 mm I.D. × 60 m df = 0.25 μm
 Col. Temp. : 40 °C (5 min hold) – 4 °C/min – 230 °C
 Carrier Gas : He
 Injection : Split
 Detection : FID
 Sample : Mixed evenly

- | | | | | |
|--|--------------------------------------|-----------------------------------|-----------------------------|-------------------------------|
| 1. Methanol | 13. 2-Butanol | 25. Carbon Tetrachloride | 37. <i>n</i> -Butyl acetate | 49. Butyl cellosolve |
| 2. Ethanol | 14. <i>cis</i> -1,2-Dichloroethylene | 26. Trichloroethylene | 38. Tetrachloroethylene | 50. <i>n</i> -Amyl acetate |
| 3. Acetone | 15. Ethyl acetate | 27. 1,4-Dioxane | 39. Chlorobenzene | 51. 1,1,2,2-tetrachloroethane |
| 4. <i>i</i> -Propanol | 16. Chloroform | 28. Ethyl cellosolve | 40. Ethylbenzene | 52. Methylcyclohexanol |
| 5. Ethyl ether | 17. <i>i</i> -Butanol | 29. <i>n</i> -Propyl acetate | 41. <i>m</i> -Xylene | 53. Methylcyclohexanone |
| 6. Methyl acetate | 18. Tetrahydrofuran | 30. <i>i</i> -Amyl alcohol | 42. <i>p</i> -Xylene | 54. Phenol |
| 7. Dichloromethane | 19. Methyl cellosolve | 31. Methyl <i>i</i> -butyl ketone | 43. <i>i</i> -Amyl acetate | 55. <i>o</i> -Dichlorobenzene |
| 8. Carbon disulfide | 20. 1,1,1-Trichloroethane | 32. <i>n</i> -Amyl alcohol | 44. Cyclohexanol | 56. <i>o</i> -Cresol |
| 9. <i>n</i> -Propanol | 21. 1,2-Dichloroethane | 33. Toluene | 45. Styrene | 57. <i>p</i> -Cresol |
| 10. <i>trans</i> -1,2-Dichloroethylene | 22. <i>i</i> -Propyl acetate | 34. <i>i</i> -Butyl acetate | 46. Cyclohexanone | 58. <i>m</i> -Cresol |
| 11. Methyl ethyl ketone | 23. Benzene | 35. <i>N,N</i> -Dimethylformamide | 47. <i>o</i> -Xylene | |
| 12. Hexane | 24. <i>n</i> -Butanol | 36. Methyl <i>n</i> -butyl ketone | 48. Cellosolve acetate | |

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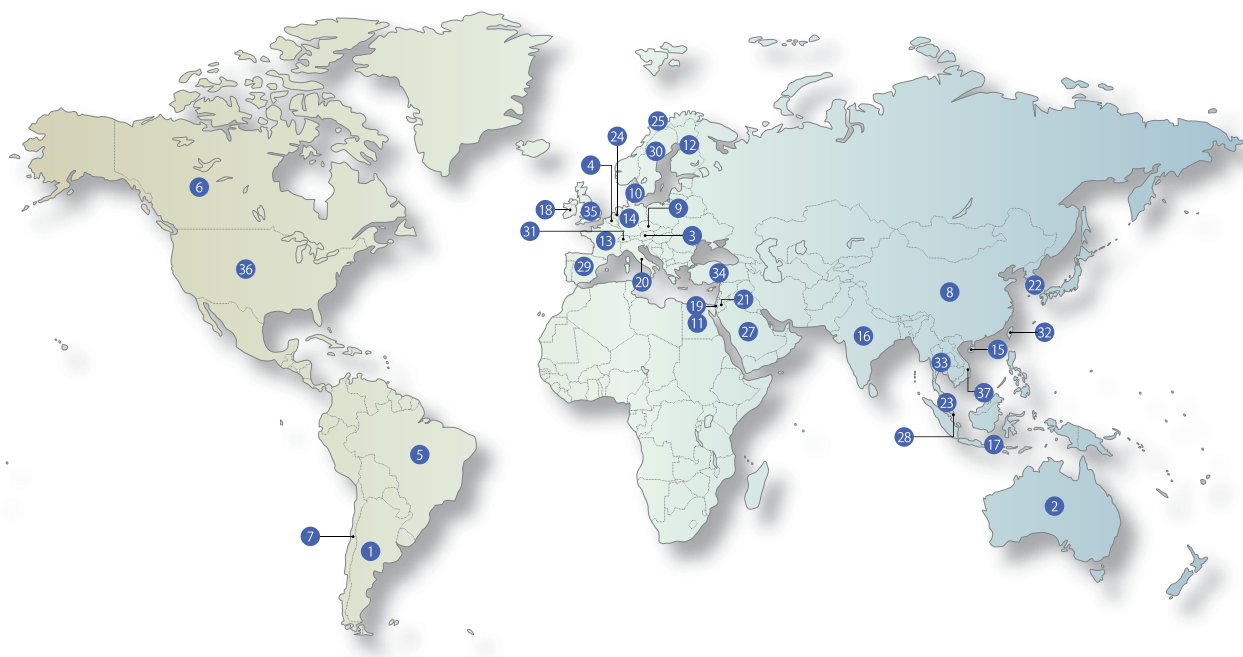
GC-O our PHASER, Olfactory Detection Port for GC or GC-MS (odour port)

The human nose is an incredible detector for aroma/mal-odor components. Gas Chromatography Olfactometry (GC/O) is a bioassay that measures human response to odorants separated by gas chromatography. The superior sensitivity and selectivity of human olfaction make GC/O a powerful and meaningful tool for flavor chemistry. Head-space sampling, distillation, solvent extraction, solid phase microextraction (SPME) and our DMI are typical procedures used to introduce samples in a GC/O. Besides providing data about the potency of odorants extracted and separated for samples, GC/O can also be used to study variation in human olfaction or provide testing and training of panelists used in sensory testing. At its best, GC-O, provides industry with a link between chemical data collected from ingredients or products and the sensory and consumer preference data collected from the market place. At the very least GC-O data derived from a product can be used for quality control or the development of value added products.



Worldwide Ordering Information

InertCap GC Capillary columns are available through our authorized distributors in the following countries.



1 ARGENTINA		10 DENMARK		19 ISRAEL		29 SPAIN	
2 AUSTRALIA		11 EGYPT		20 ITALY		30 SWEDEN	
3 AUSTRIA		12 FINLAND		21 JORDAN		31 SWITZERLAND	
4 BELGIUM		13 FRANCE		22 KOREA		32 TAIWAN	
5 BRAZIL		14 GERMANY		23 MALAYSIA		33 THAILAND	
6 CANADA		15 HONG-KONG		24 The NETHERLANDS		34 TURKEY	
7 CHILE		16 INDIA		25 NORWAY		35 UNITED KINGDOM	
8 CHINA		17 INDONESIA		27 SAUDI-ARABIA		36 UNITED STATES	
9 CZECH REPUBLIC		18 IRELAND		28 SINGAPORE		37 VIETNAM	

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info@glsciences.eu
www.glsciences.eu

Prices for 2016, we reserve the right to change specifications and prices without notice.