GL Sciences

GL SCIENCES HPLC COLUMN CATALOG
2014/2015

GL Sciences Inc.

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Reversed Phase Columns

- InertSustain® C18 002
- InertSustainSwift™ C18 006
- Inertsil® ODS-4 008
- Inertsil® ODS-3 010
- Inertsil® ODS-4V, ODS-3V 012
- Inertsil® ODS-SP 014
- Inertsil® ODS-P 016
- Inertsil® ODS-EP 018
- Inertsil® ODS-80A 020
- Inertsil® ODS-2 022
- Inertsil® ODS 023
- InertSustain® C8 024
- Inertsil® C8-4 026
- Inertsil® C8-3 028
- Inertsil® C8 030
- Inertsil® C4 031
- InertSustain® Phenyl 032
- InertSustain® Phenylhexyl 034
- Inertsil® Ph-3 036
- Inertsil® Ph 038
- Inertsil® CN-3 040
- Inertsil® WP300 C18 042
- Inertsil® WP300 C8 044
- Inertsil® WP300 C4 045

HILIC Columns

- Inertsil® Amide 048
- Inertsil® HILIC 050
- InertSustain® NH2 052
- Inertsil® NH2 054

Normal Phase Columns

- Inertsil® Diol 058
- Inertsil® SIL-100A 060
- InertSustain® NH2 062
- Inertsil® NH2 064
- Inertsil® CN-3 066
- Inertsil® SIL-150A 068
- Inertsil® WP300 SIL 069

SEC Columns

- Inertsil® Diol 072
- Inertsil® WP300 Diol 074

Ion Exchange Columns

- Inertsil® AX 078
- Inertsil® CX 080

Application Specific Columns

- Bioptic AV-1, AV-2 084
- Inertsil® Peptides C18 085
- Inertsil® Acrolein C18 085
- InertSphere™ Sugar-1 086
- Inertsil® Sulfa C18 087
- Inertsil® AS 087
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- Corresponding SFC 090

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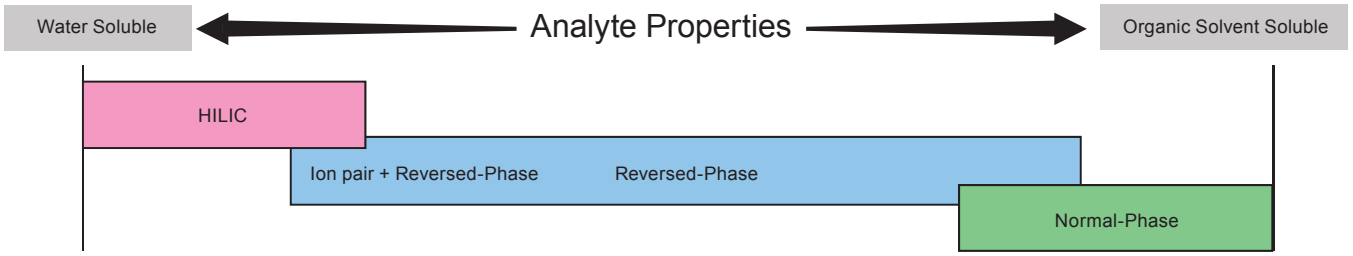
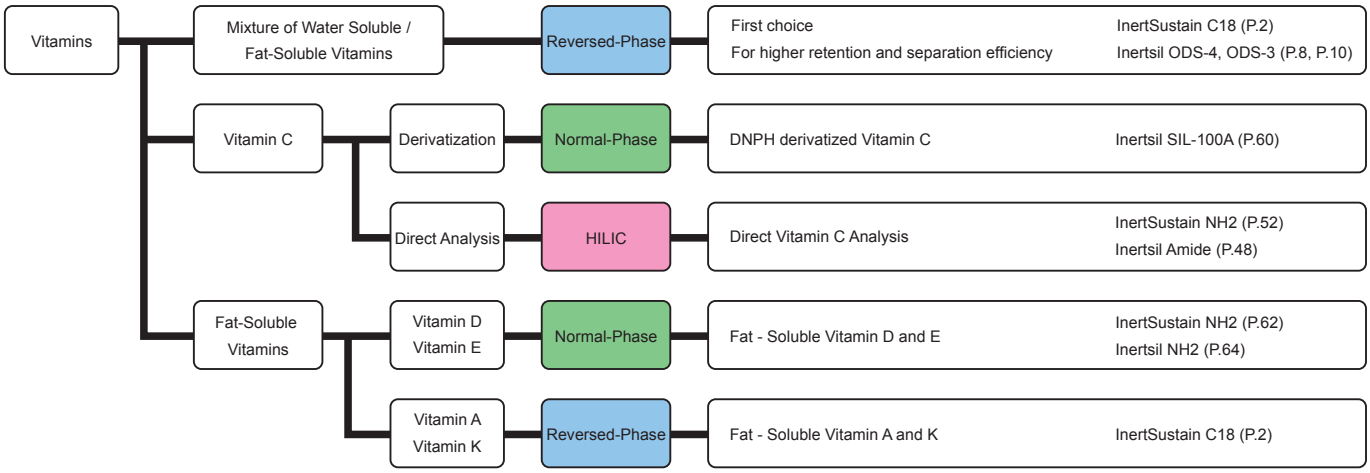
Column Selection Overview

Separation Mode Selection for Analyte Polarity



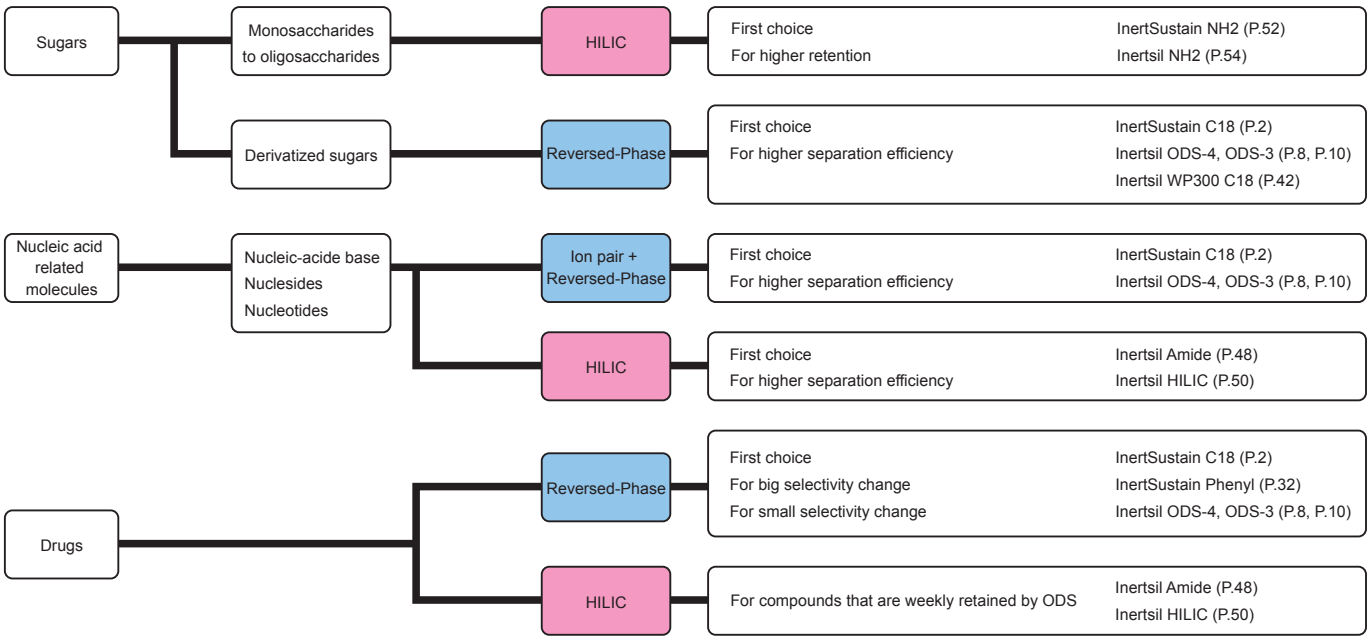
Column Selection for Analyte Properties

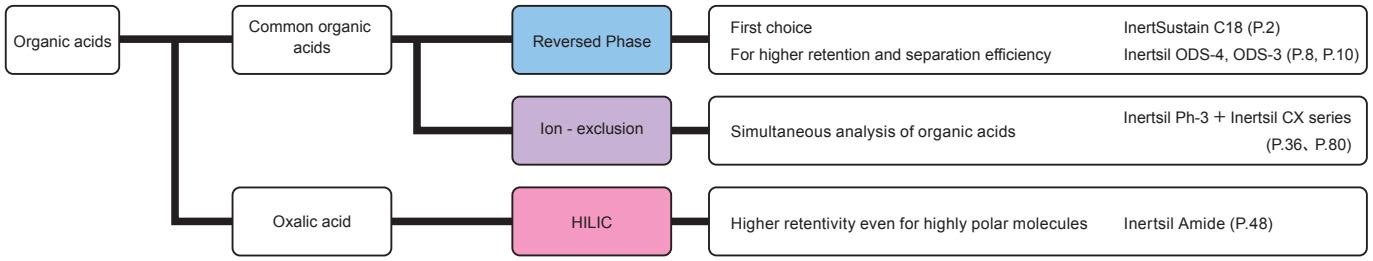


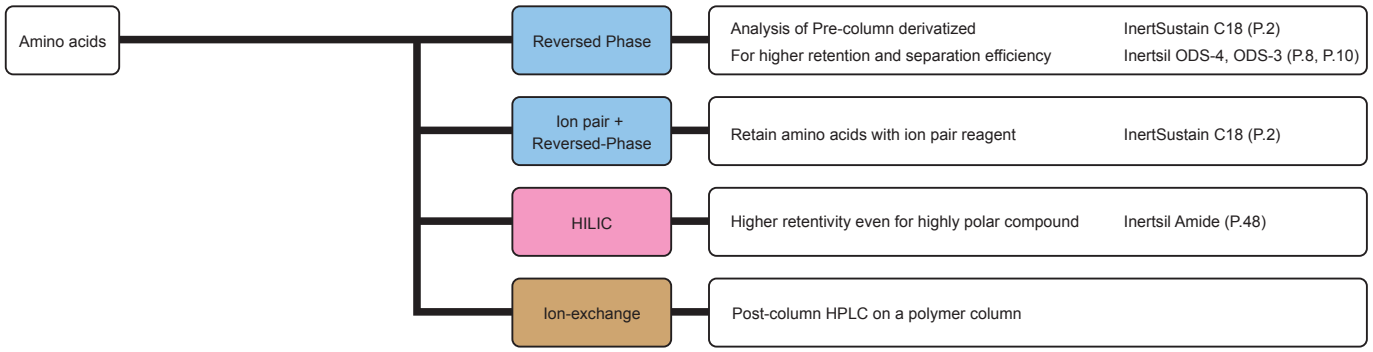
Water Soluble vitamins	Phase	Detector
Vitamin C	NH2, SIL, Amide	UV
Vitamin B_1	ODS	UV, (FL)
Vitamin B_2	ODS	UV, FL
Vitamin B_6	ODS	UV
Niacin	ODS	UV
Folic acid	ODS	UV
Pantothenic acid	ODS	UV

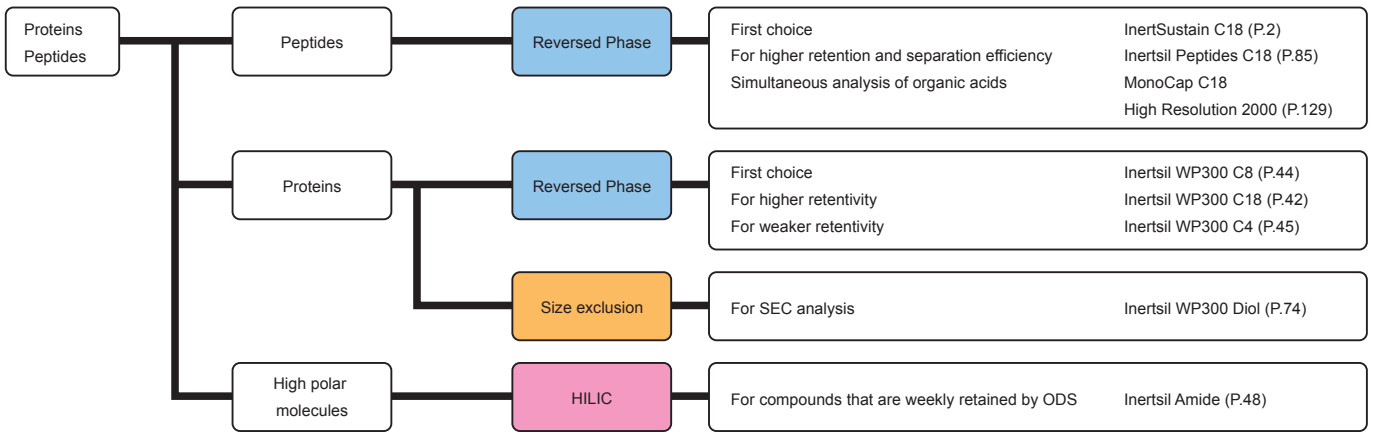
Fat-Soluble Vitamin	Phase	Detector
Vitamin A	ODS	UV, FL
Vitamin D	ODS, NH2	UV
Vitamin E	ODS	UV, FL
Vitamin K	ODS	UV, (FL)

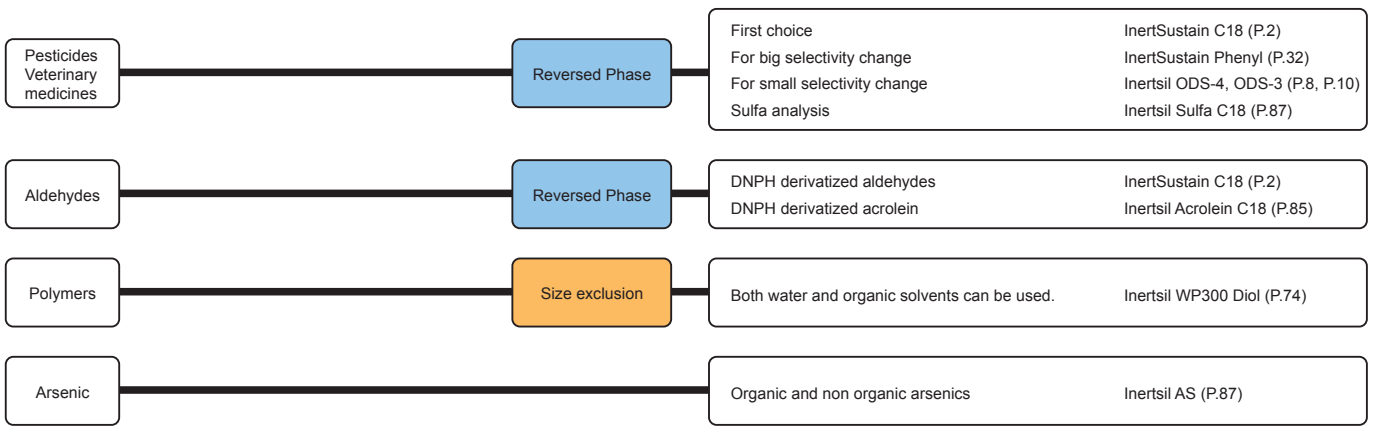
* (FL): Post-column derivatization




Organic acids
Common organic acids
Reversed Phase
First choice
For higher retention and separation efficiency
InertSustain C18 (P.2)
Inertsil ODS-4, ODS-3 (P.8, P.10)
Ion - exclusion
Simultaneous analysis of organic acids
Inertsil Ph-3 + Inertsil CX series (P.36、P.80)
Oxalic acid
HILIC
Higher retentivity even for highly polar molecules
Inertsil Amide (P.48)

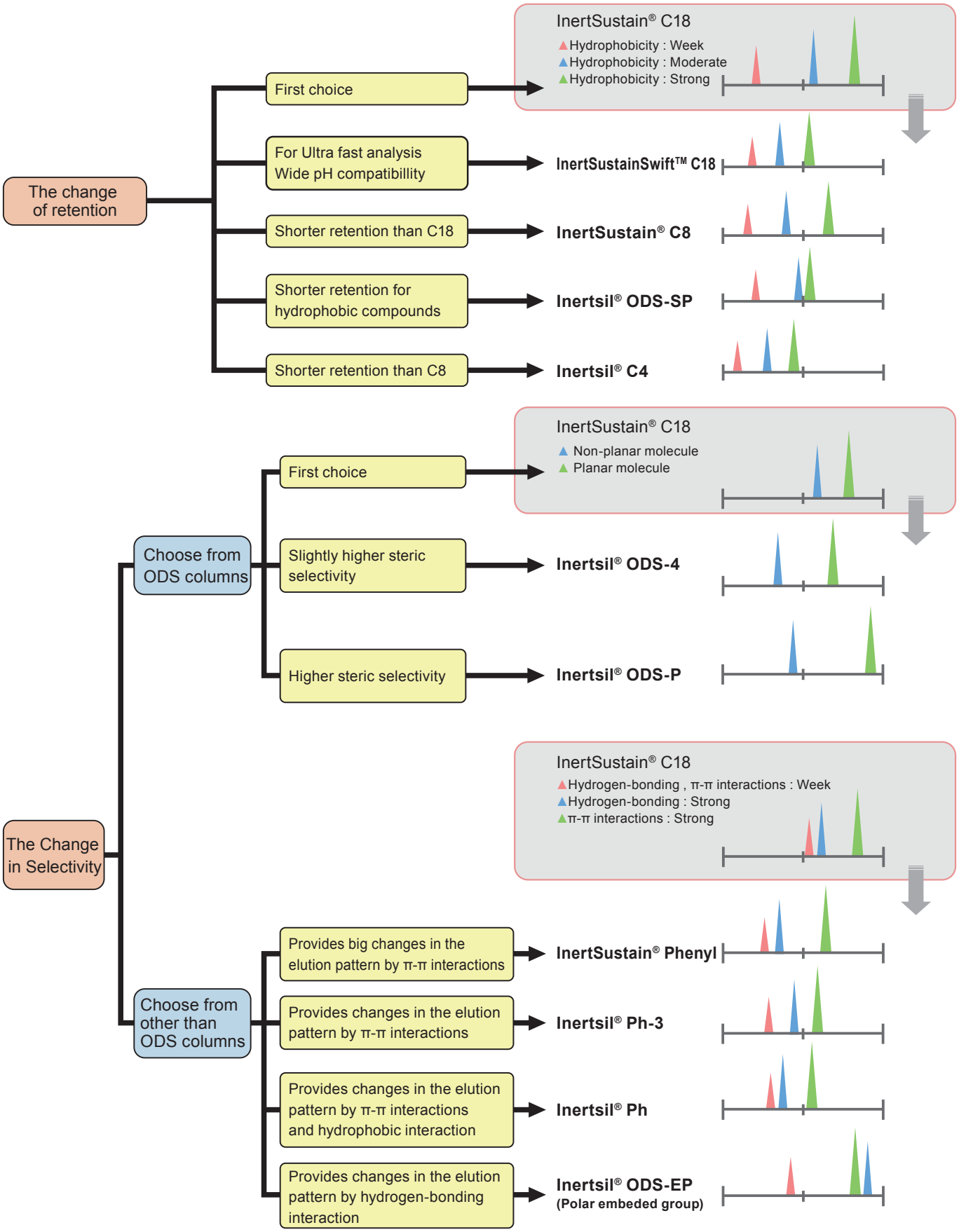

Amino acids
Reversed Phase
Analysis of Pre-column derivatized
For higher retention and separation efficiency
InertSustain C18 (P.2)
Inertsil ODS-4, ODS-3 (P.8, P.10)
Ion pair + Reversed-Phase
Retain amino acids with ion pair reagent
InertSustain C18 (P.2)
HILIC
Higher retentivity even for highly polar compound
Inertsil Amide (P.48)
Ion-exchange
Post-column HPLC on a polymer column


Proteins
Peptides
Peptides
Reversed Phase
First choice
For higher retention and separation efficiency
Simultaneous analysis of organic acids
InertSustain C18 (P.2)
Inertsil Peptides C18 (P.85)
MonoCap C18
High Resolution 2000 (P.129)
Proteins
Reversed Phase
First choice
For higher retentivity
For weaker retentivity
Inertsil WP300 C8 (P.44)
Inertsil WP300 C18 (P.42)
Inertsil WP300 C4 (P.45)
Size exclusion
For SEC analysis
Inertsil WP300 Diol (P.74)
High polar molecules
HILIC
For compounds that are weekly retained by ODS
Inertsil Amide (P.48)

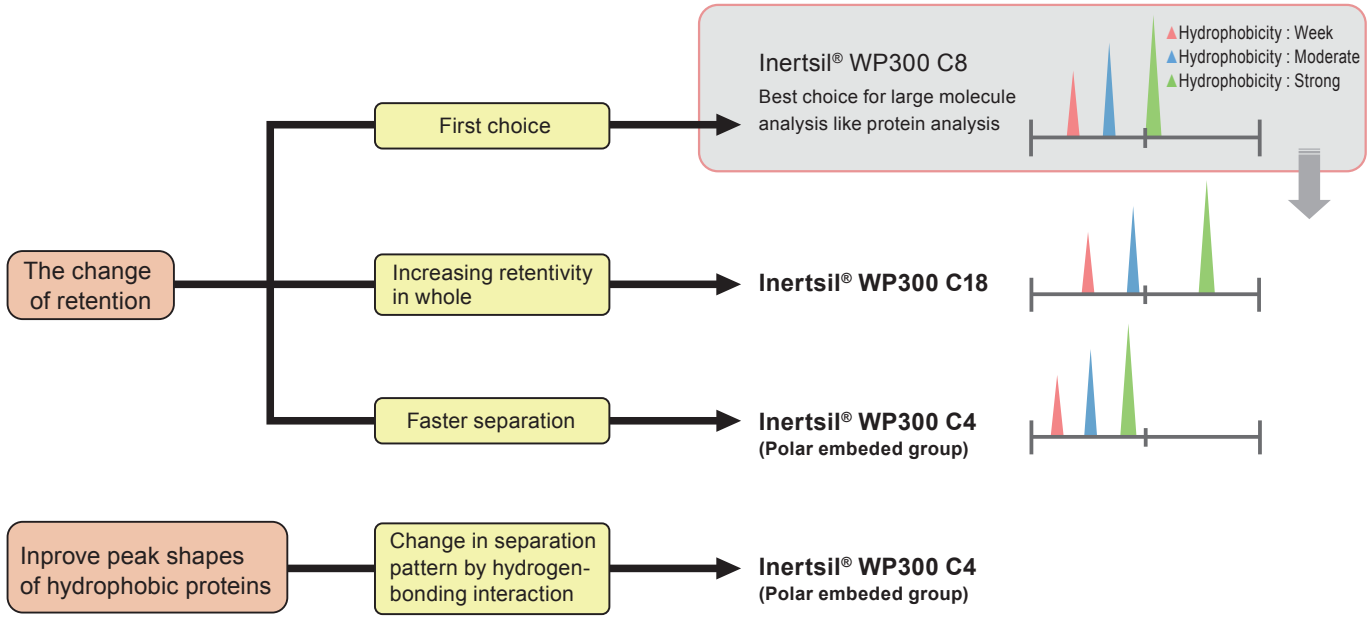

Pesticides
Veterinary medicines
Reversed Phase
First choice
For big selectivity change
For small selectivity change
Sulfa analysis
InertSustain C18 (P.2)
InertSustain Phenyl (P.32)
Inertsil ODS-4, ODS-3 (P.8, P.10)
Inertsil Sulfa C18 (P.87)
Aldehydes
Reversed Phase
DNPH derivatized aldehydes
DNPH derivatized acrolein
InertSustain C18 (P.2)
Inertsil Acrolein C18 (P.85)
Polymers
Size exclusion
Both water and organic solvents can be used.
Inertsil WP300 Diol (P.74)
Arsenic
Organic and non organic arsenics
Inertsil AS (P.87)

Reversed-Phase Column Selection Guide

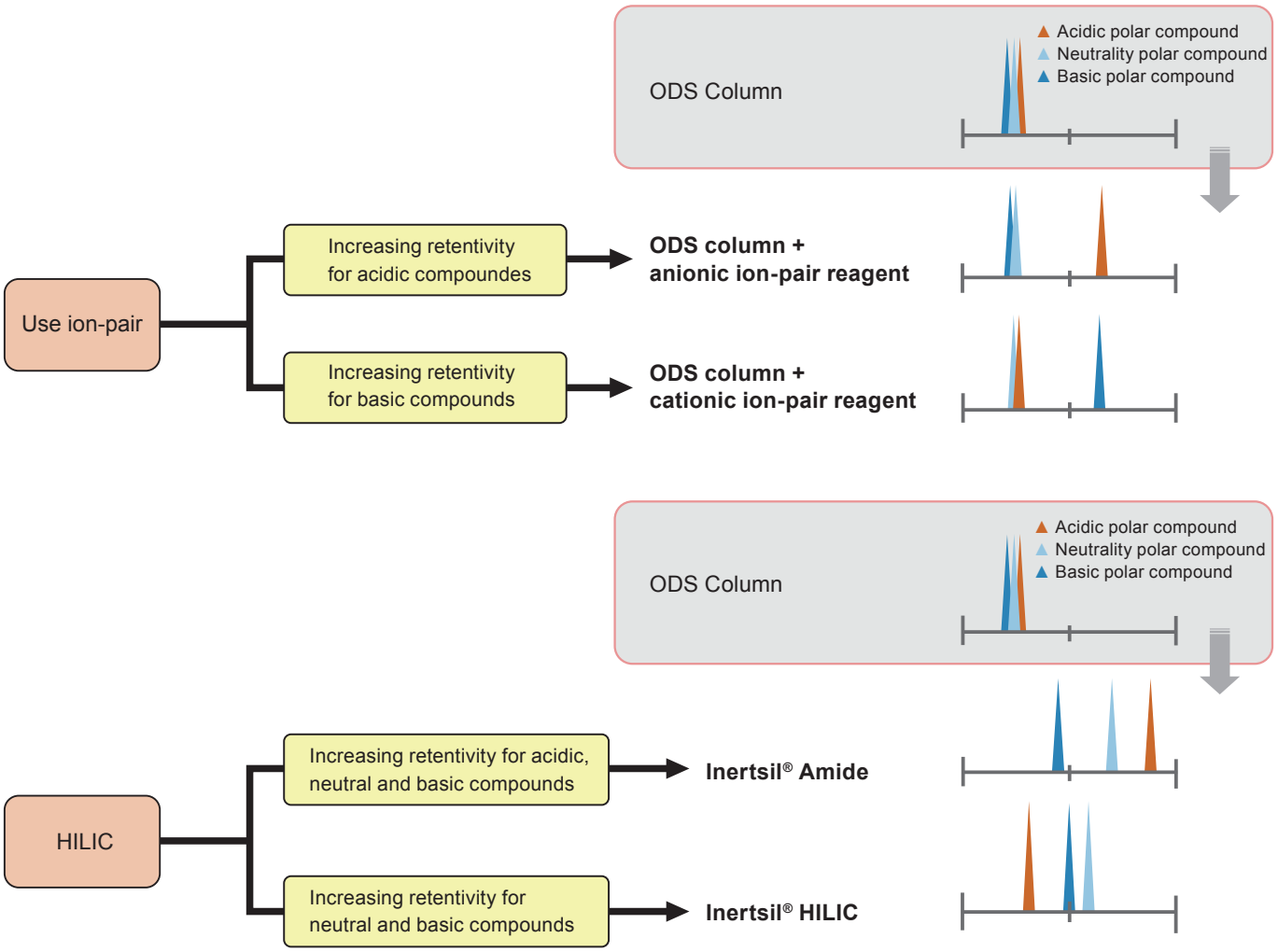
Small Molecule Analysis MW<5000



Large Molecule Analysis MW>5000



Small Molecule-Highly Polar Compound Analysis



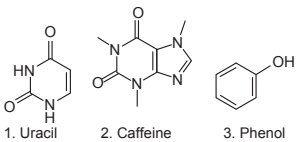
Selectivity Comparison of Reversed-Phase Columns

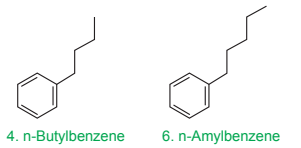
Selectivity of reversed-phase columns are compared under the same conditions, packing material size and column size. Chemical structural formulas used for the comparison are shown at right. Separation differences between basic compounds, acidic compounds, alkyl benzenes and polyaromatic compounds shows the differences of column selectivity. The more silanol groups on the packing material lead the later elution time of Caffeine compared with that of Phenol. The higher hydrophobicity of the column shows the later elution time of n-Amylbenzene compared with that of n-Butylbenzene. The higher steric selectivity of the column shows the later elution time of Triphenylene compared with that of o-Terphenyl

Conditions

Column	: Peversed-Phase columns (5 µm, 250 × 4.6 mm I.D.)*
Eluent	: A) CH_3OH B) H_2O
	: A/B = 80/20, v/v , (Inertsil Diol, CN-3) A/B = 70/30, v/v ,
Flow Rate	: 1.0 mL/min*
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Injection Vol.	: 5 µL*

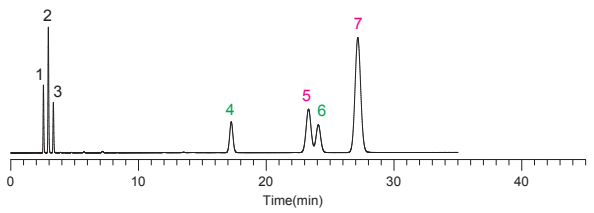
* : For Mono Clad C18-HS (3.0 mm I.D.), 0.4 mL/min of flow rate and 2 µL of injection volume are adopted according to the column internal diameter.





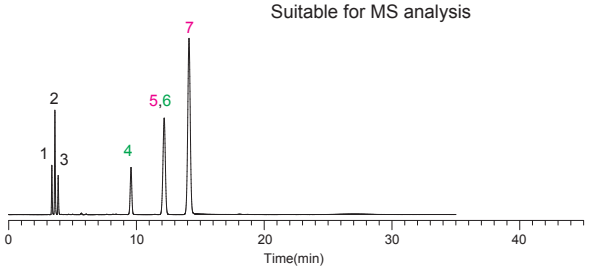
InertSustain® C18

Recommended ODS column as the first choice.



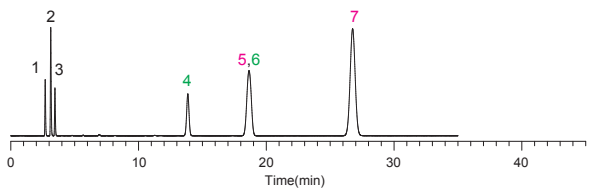
InertSustainSwift™ C18

For first elution with a sharp peak shape. Suitable for MS analysis



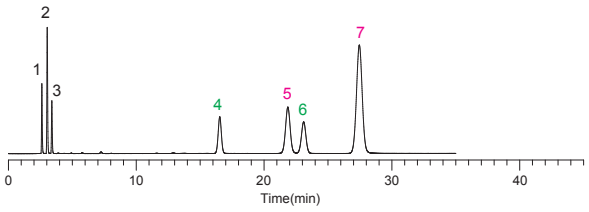
Inertsil® ODS-4

Slightly faster elution time than InertSustain C18 and slightly higher planar molecule recognition (steric selectivity).



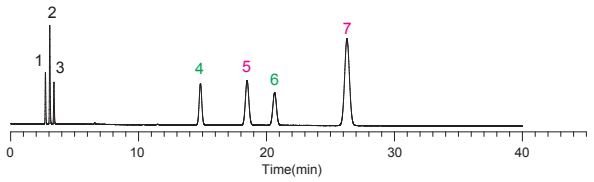
Inertsil® ODS-3

Shows similar elution pattern with InertSustain C18



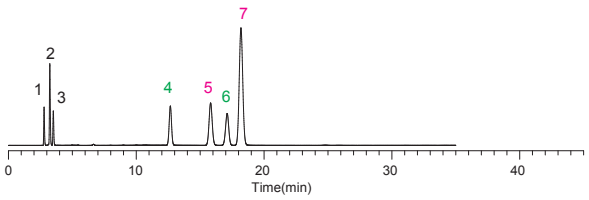
Inertsil® ODS-2

Adequate retention and steric selectivity



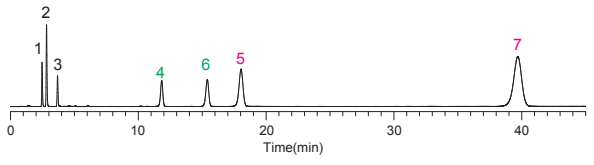
Inertsil® ODS

Original version of Inertsil column



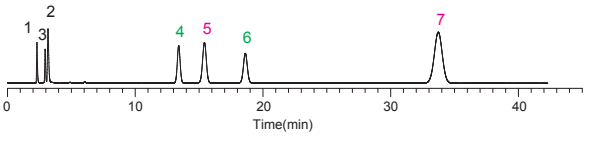
Inertsil® ODS-EP

Shows a different separation pattern from other ODS columns
Suitable for a ODS column being specified still in need of a separation changes



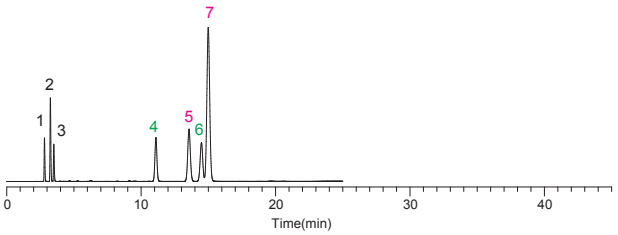
Inertsil® ODS-P

High steric selectivity shows highest resolution between peek 5 and 7



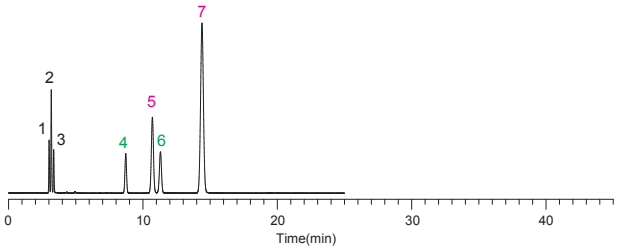
Inertsil® ODS-SP

With common retentivity for hydrophilic compounds (Peal 1,2,3,) and much less retentivity for hydrophobic compounds (Peak 4,5,6,7)



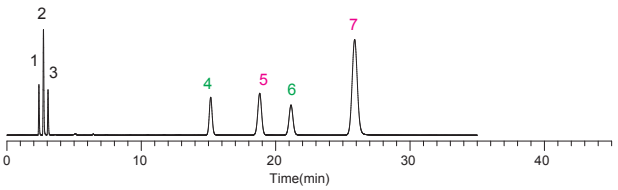
Inertsil® WP300 C18

Weakly retain both hydrophilic compounds and hydrophobic compounds by smaller surface area.



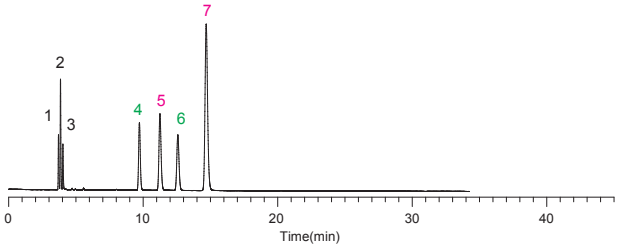
Inertsil® ODS-80A

Shows high plate count owing to narrow pore size



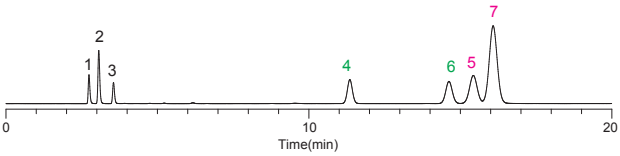
Mono Clad® C18-HS

Weakly retain compounds compared with packed columns.



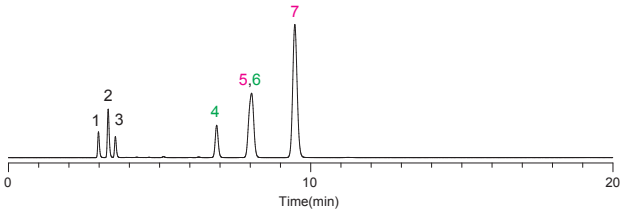
InertSustain® C8

Recommended C8 column as the first choice



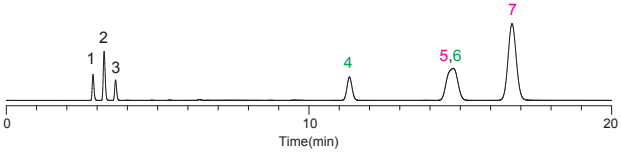
Inertsil® C8-4

Shows first elution of compounds and slightly higher steric selectivity



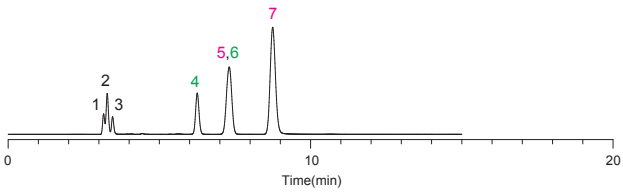
Inertsil® C8-3

Shows similar retentivity to InertSustain C8 but slightly different selectivity.



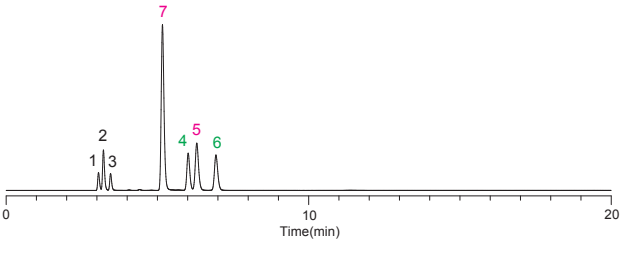
Inertsil® WP300 C8

Weakly retain both hydrophilic compounds and hydrophobic compounds by smaller surface area.



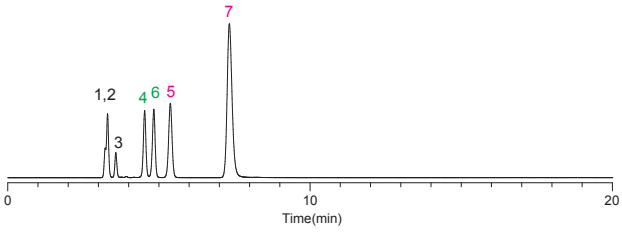
Inertsil® C4

To reduce retention time for hydrophobic compounds.



Inertsil® WP300 C4

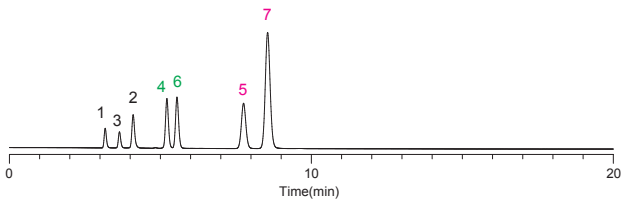
Suitable for hydrophobic protein analysis.



Selectivity Comparison of Reversed-Phase Columns

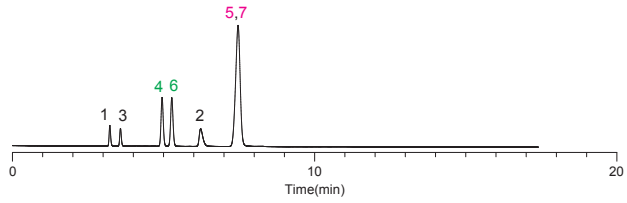
InertSustain® Phenyl

Provide with big changes in elution order of C18 and C4 and recommended for such perposes



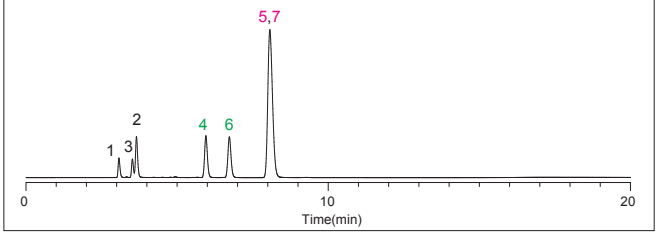
Inertsil® Ph-3

Compared to InertSustain Phenyl, different separation pattern can be obtained owning to steric selectivity difference.



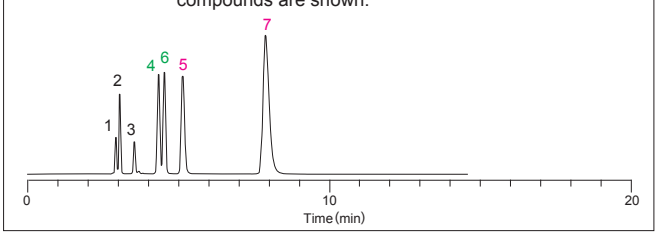
Inertsil® Ph

As the bonded phase includes an alkyl chain, the retentivity for hydrophobic compounds are higher.



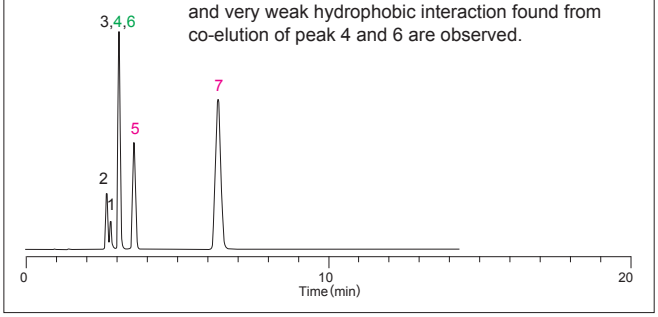
Inertsil® CN-3

Relatively strong π-π interactions and hydrogen-bonding capacity resulting in higher retention time of aromatic compounds are shown.



Inertsil® Diol

Strong hydrogen-bonding interaction with diol groups and very weak hydrophobic interaction found from co-elution of peak 4 and 6 are observed.

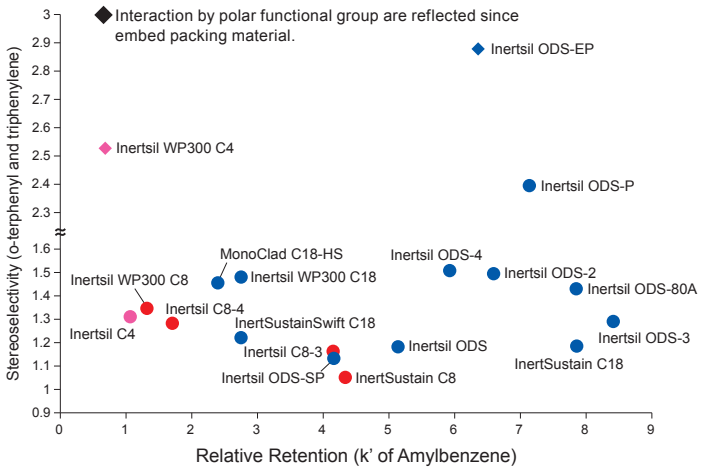


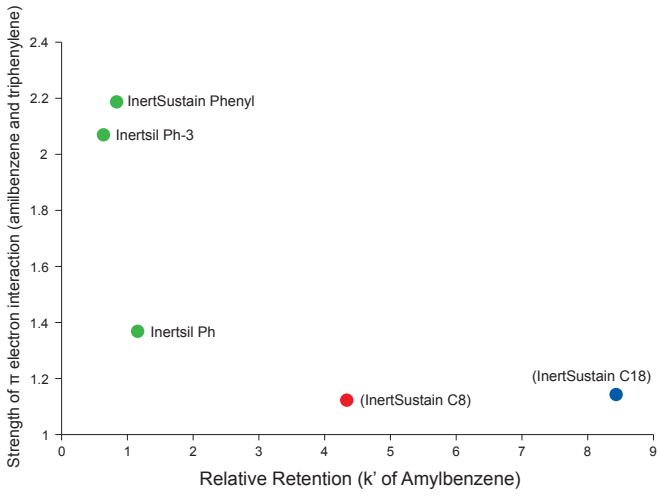
The strengths of stereo selectivity and π-π interaction against retention strengths of reversed phase columns are shown below. The following contents are pointed in the chart.

- Retentive factor of amil benzene as retentivity.
- Relative retention of o-terphenyl and triphenylene as stereo selectivity.
- Relative retention value of amilbenzene and triphenylene as strength of π-π interaction.

◊type was plotted to discriminate from the other columns since polar group endohedral (embedded type) columns

InertSustain & Inertsil Distribution Model

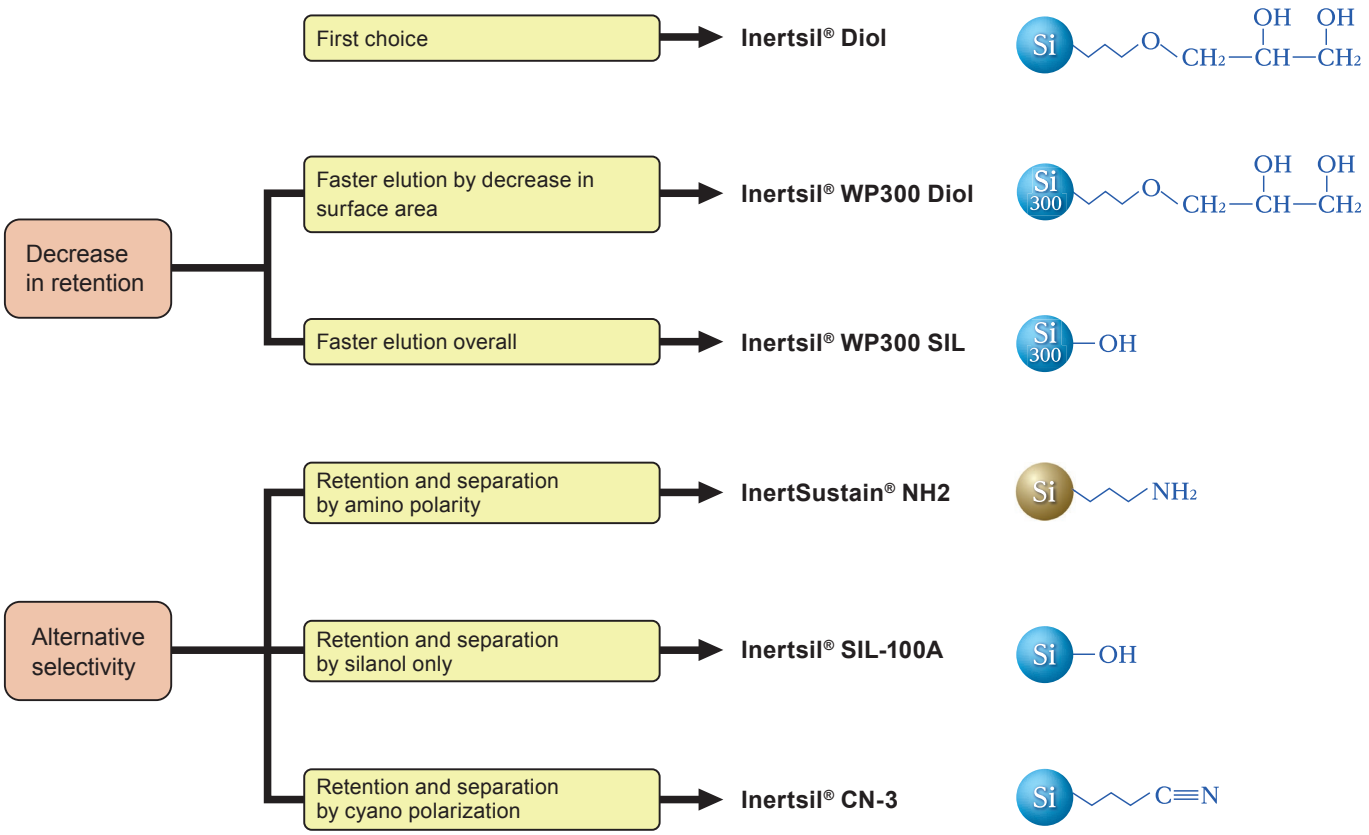




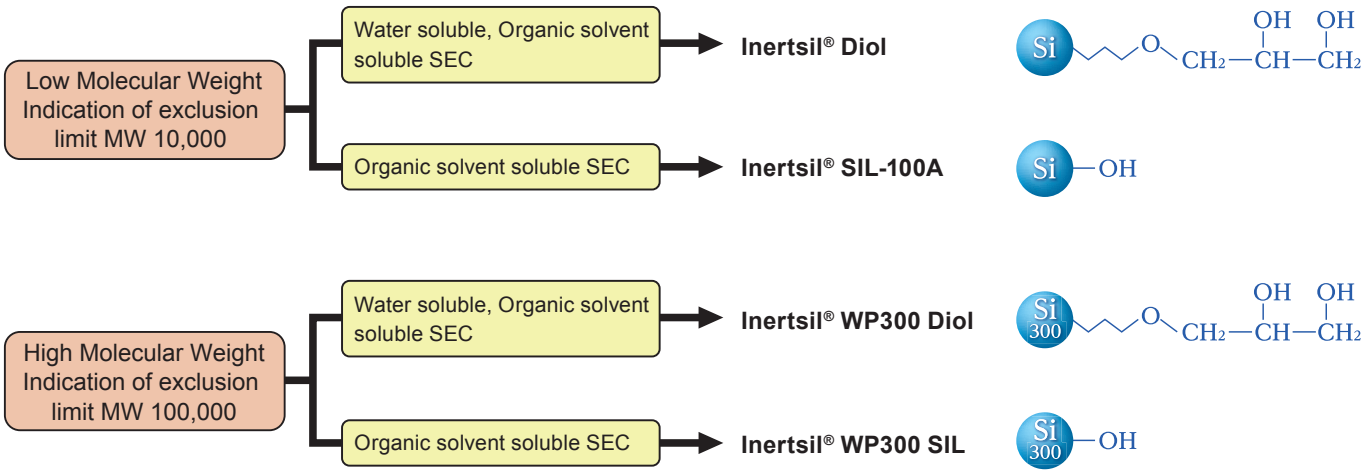
* Interaction may changes upon eluent conditions. This chart shows typical guidance.

Normal-Phase Column Selection Guide

Low Molecular Samples on Normal Distribution Mode



Size Exclusion Chromatography (SEC)



Column Specifications

	Phase	Features	USP Code	Particle Size (μm)	Pore Size (nm)	Area (m^2/g)
ODS Reversed-Phases	InertSustain C18	First choice with ultra high inertness and high durability	L1	2, 3, 5	10	350
	InertSustainSwift C18	First analysis with ultra high inertness and high durability	L1	1.9, 3, 5	20	200
	Inertsil ODS-4	Ultra high inertness, High plate count, ,Medium retentivity	L1	2, 3, 5	10	450
	Inertsil ODS-4V	Inertsil ODS-4 Validated column	L1	3, 5	10	450
	Inertsil ODS-3	Strong retentivity, Lower column backpressure, Very inert	L1	2, 3, 4, 5, 10	10	450
	Inertsil ODS-3V	Inertsil ODS-3 Validated column	L1	3, 5	10	450
	Inertsil ODS-SP	Weak retentivity, for hydrophobic compounds	L1	3, 5	10	450
	Inertsil ODS-P	High steric selectivity	L1	3, 5	10	450
	Inertsil ODS-EP	A polar functional group embedded	L1	5	10	450
	Inertsil WP300 C18	Analysis of high molecules	L1	5	30	150
	Inertsil ODS-80A	Elute low molecule with a sharp peak shape	L1	5	8	450
	Inertsil ODS-2	Ultra pure silica gel is used	L1	5	15	320
	Inertsil ODS	Inertness 1st generation	L1	5, 10	10	350
The other Reversed-Phases	InertSustain C8	First choice with ultra high inertness and high durability	L7	2, 3, 5	10	350
	Inertsil C8-4	Ultra high inertness, High plate count, , low retentivity	L7	2, 3, 5	10	450
	Inertsil C8-3	Strong retentivity, Lower column backpressure, Very inert	L7	2, 3, 5, 10	10	450
	Inertsil C8	Ultra pure silica gel is used	L7	5	15	320
	Inertsil C4	Low retentivity	L26	5	15	320
	Inertsil WP300 C8	Suitable for high molecules	L7	5	30	150
	Inertsil WP300 C4	Suitable for high molecules	L26	5	30	150
	InertSustain Phenyl	Extremely strong π-π interactions	L11	2, 3, 5	10	350
	Inertsil Ph-3	strong π-π interactions	L11	2, 3, 5	10	450
	Inertsil Ph	High inertness, weak π-π interactions	L11	5	15	320
HILIC	Inertsil HILIC	Separation of highly polar basic compounds	L20	3, 5	10	450
	Inertsil Amide	Separation of polar compounds	–	3, 5	10	450
	InertSustain NH2	Sugar analysis	L8	3, 5	10	350
	Inertsil NH2	Sugar analysis, High retentive in normal-phase mode	L8	3, 5	10	450
Normal-Phases	Inertsil Diol	First choice for normal-phase mode, For SEC	L20	3, 5	10	450
	Inertsil SIL-100A	Ultra pure silica gel with 100Å pore size	L3	3, 5	10	450
	Inertsil SIL-150A	Ultra pure silica gel with 150Å pore size	L3	5	15	320
	Inertsil WP300 SIL	Ultra pure silica gel with 300Å pore size	L3	5	30	150
	Inertsil CN-3	Can be also used in reversed-phase mode	L10	3, 5	10	450
SEC	Inertsil WP300 Diol	High molecule SEC, Can be also used in normal-phase mode	L20, L33	5	30	150
Ion-Exchanges	Inertsil AX	Anion-exchange column	–	5	10	450
	Inertsil CX	Cation - exchange column	L9	5	10	450
The others	Bioptic AV-1	Chiral separation in reversed-phase mode	–	5	10	–
	Bioptic AV-2	Inner reversed-phase separation	–	5	10	–
	Inertsil Peptides C18	Peptide analysis	L1	4	10	450
	Inertsil Acrolein C18	Acrolein analysis	L1	5	10	450
	InertSphere Sugar-1	Sugar analysis with ECD	–	5	–	–
	Inertsil Sulfa C18	Sulfa Analysis	L1	3, 5	10	450
	MonoCap Series	Monolithic silica capillary column				

	phase	Carbon loading (%)	End Cap	Inertness	Recommended pH range	Reference pages		
						Analytical columns	Preparative columns	Capillary columns
ODS Reversed-Phases	InertSustain C18	14	○	★★★★★	1~10	2	109	121
	InertSustainSwift C18	9	○	★★★★★	1~10	6	*1	*1
	Inertsil ODS-4	11	○	★★★★½	2~7.5	8	109	121
	Inertsil ODS-4V	11	○	★★★★½	2~7.5	12	*2	*2
	Inertsil ODS-3	15	○	★★★★	2~7.5	10	109	121
	Inertsil ODS-3V	15	○	★★★★	2~7.5	13	*2	*2
	Inertsil ODS-SP	8.5	○	★★★★	2~7.5	14	109	122
	Inertsil ODS-P	29	−	★★★	2~7.5	16	109	122
	Inertsil ODS-EP	9	−	★★★★	2~7.5	18	109	122
	Inertsil WP300 C18	9	○	★★★★	2~7.5	42	111	123
	Inertsil ODS-80A	17.5	○	★★★★	2~7.5	20	110	*2
	Inertsil ODS-2	18.5	○	★★★★	2~7.5	22	110	*2
	Inertsil ODS	14	○	★★	2~7.5	23	110	*2
The other Reversed-Phases	InertSustain C8	8	○	★★★★★	1~10	24	110	122
	Inertsil C8-4	5	○	★★★★½	2~7.5	26	110	122
	Inertsil C8-3	9	○	★★★★	2~7.5	28	110	123
	Inertsil C8	10.5	○	★★	2~7.5	30	*1	*2
	Inertsil C4	7.5	○	★★★★	2~7.5	31	*1	*2
	Inertsil WP300 C8	4	○	★★★★	2~7.5	44	111	123
	Inertsil WP300 C4	3	−	★★★★	2~7.5	45	111	123
	InertSustain Phenyl	10	−	★★★★	2~7.5	32	111	123
	Inertsil Ph-3	9.5	−	★★★	2~7.5	36	111	123
	Inertsil Ph	10	○	★★★	2~7.5	38	111	*2
HILIC	Inertsil HILIC	20	−		2~7.5	50	112	124
	Inertsil Amide	18	−		2~7.5	48	112	124
	InertSustain NH2	7	−		2~7.5	52, 62	112	124
	Inertsil NH2	8	−		2~7.5	54, 64	112	124
Normal-Phases	Inertsil Diol	20	−		2~7.5	58, 72	112	125
	Inertsil SIL-100A	−	−		2~7.5	60	112	125
	Inertsil SIL-150A	−	−		2~7.5	68	113	*2
	Inertsil WP300 SIL	−	−		2~7.5	69	113	*1
	Inertsil CN-3	14	−		2~7.5	40, 66	111	125
SEC	Inertsil WP300 Diol	9	−		2~7.5	74	113	*1
Ion-Exchanges	Inertsil AX	17	−		2~7.5	78	*1	125
	Inertsil CX	14	−		2~7.5	80	*1	125
The others	Bioptic AV-1	−	−		2~7.5	84		*2
	Bioptic AV-2	−	−		2~7.5	84		*2
	Inertsil Peptides C18	15	○	★★★★	2~7.5	85	113	*2
	Inertsil Acrolein C18	9	○	★★★★	2~7.5	85		*2
	InertSphere Sugar-1	−	−		2~14	86	−	−
	Inertsil Sulfa C18	15	○	★★★★	2~7.5	87	*2	*2
	MonoCap Series					−	−	−

* 1 : Please refer to GL Sciences website.
* 2 : Please contact us.

Conforming to USP

USP Code	PACKING	HPLC Column Name
L1	Octadecyl silane chemically bonded to porous or nonporous silica or ceramic microparticles, 1.5 to 10 µm in diameter, or a monolithic silica rod.	InertSustain C18 InertSustainSwift C18 Inertsil ODS-4 Inertsil ODS-3 Inertsil ODS-SP Inertsil ODS-P Inertsil ODS-2 Inertsil ODS-80A Inertsil ODS Inertsil WP300 C18 Unisil Q C18, NQ C18
L2	Octadecyl silane chemically bonded to silica gel of a controlled surface porosity that has been bonded to a solid spherical core, 30 to 50 µm in diameter.	ECONO PREP ODS
L3	Porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod.	Inertsil SIL-100A Inertsil SIL-150A Inertsil WP300 SIL Unisil Q 30, Q 60, Q 100
L4	Silica gel of controlled surface porosity bonded to a solid spherical core, 30 to 50 µm in diameter.	ECONO PREP SIL
L5	Alumina of controlled surface porosity bonded to a solid spherical core, 30 to 50 µm in diameter.	
L6	Strong cation-exchange packing-sulfonated fluorocarbon polymer coated on a solid spherical core, 30 to 50 µm in diameter.	
L7	Octylsilane chemically bonded to totally porous or superficially porous silica particles, 1.5 - 10 µm in diameter, or a monolithic silica rod.	InertSustain C8 Inertsil C8-4 Inertsil C8-3 Inertsil C8 Inertsil WP300 C8 Unisil Q C8
L8	An essentially monomolecular layer of aminopropylsilane chemically bonded to totally porous silica gel support, 1.5 to 10 µm in diameter.	InertSustain NH2 Inertsil NH2 Unisil Q NH2
L9	Irregular or spherical, totally porous silica gel having a chemically bonded, strongly acidic cation-exchange coating, 3 to10 µm in diameter.	Inertsil CX
L10	Nitrile groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter.	Inertsil CN-3 Unisil Q CN
L11	Phenyl groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter.	InertSustain Phenyl Inertsil Ph-3 Inertsil Ph
L12	A strong anion-exchange packing made by chemically bonding a quartenary amine to a solid silica spherical core, 30 to 50 µm in diameter.	
L13	Trimethylsilane chemically bonded to porous silica particles, 3 to 10 µm in diameter.	Spherisorb Methyl
L14	Silica gel having a chemicallly bonded, strongly basic quaternary ammonium anion-exchange coating, 5 to 10 µm in diameter.	Nucleosil 100-SB Partisil SAX Spherisorb SAX
L15	Hexylsilane chemically bonded to totally porous silica particles, 3 to 10 µm in diameter.	Spherisorb C6
L16	Dimethylsilane chemically bonded to porous silica particles, 5 to 10 µm in diameter.	
L17	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the hydrogen form, 6 to 12 µm in diameter.	PRP-X200, PRP-X300 HC-75(H^+) SUGAR SH1011, SH1821 RSpak KC-811 IC Y-521
L18	Amino and cyano groups chemically bonded to porous silica particles, 3 to 10 µm in diameter.	Partisil 5 PAC Partisil 10 PAC
L19	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the calcium form, about 9 µm in diameter.	HC-75(Ca^{2+}) SUGAR SC1011, SC1821 SUGAR SC1211
L20	Dihydroxypropane groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter.	Inertsil Diol Inertsil WP300 Diol PROTEIN KW-800 series

USP Code	PACKING	HPLC Column Name
L21	A rigid, spherical styrene-divinylbenzene copolymer, 3 to 30 µm in diameter.	PRP-1, PRP-3 GPC KF-801 RSpak DS-413, DS-613 RSpak RP18-415
L22	A cation-exchange resin made of porous polystyrene gel with sulfonic acid groups, about 10 µm in size.	PRP-X200, PRP-X300 SUGAR SH1011, SH1821 RSpak KC-811 SUGAR SP0810 SUGAR SC1011, SC1821 SUGAR SZ5532 SUGAR KS800 series IC Y-521
L23	An anion-exchange resin made of porous polymethacrylate or polyacrylate gel with quaternary ammonium groups, about 7 - 12 µm in size.	PRP-X500 IEC QA-825
L24	A semi-rigid hydrophilic gel consisting of vinyl polymers with numerous hydroxyl groups on the matrix surface, 32 to 63 µm in diameter.	
L25	Packing having the capacity to separate compounds with a molecular weight range from 100-5000 (as determined by polyethylene oxide), applied to neutral, anionic, and cationic water-soluble polymers. A polymethacrylate resin base, cross-linked with polyhydroxylated ether (surface contained some residual carboxyl functional groups) was found suitable.	OHpak SB-802 HQ OHpak SB-802.5 HQ
L26	Butyl silane chemically bonded to totally porous silica particles, 1.5 to 10 µm in diameter.	Inertsil C4 Inertsil WP300 C4
L27	Porous silica particles, 30 to 50 µm in diameter.	
L28	A multifunctional support, which consists of a high purity, 100 Å, spherical silica substrate that has been bonded with anionic exchanger, amine functionality in addition to a conventional reversed phase C8 functionality.	
L29	Gamma alumina, reverse-phase, low carbon percentage by weight, alumina-based polybutadiene spherical particles, 5 µm in diameter with a pore volume of 80 Å.	
L30	Ethyl silane chemically bonded to totally porous silica particles, 3 to 10 µm in diameter.	
L31	A hydroxide-selective, strong anion-exchange resin-quaternary amine bonded on latex particles attached to a core of 8.5 µm macroporous particles having a pore size of 2000 Å and consisting of ethylvinylbenzene cross-linked with 55 % divinylbenzene.	
L32	A chiral ligand-exchange packing-L-proline copper complex covalently bonded to irregularly shaped silica particles, 5 to 10 µm in diameter.	CHIRALPAK WH
L33	Packing having the capacity to separate dextrans by molecular size over a range of 4,000 to 500,000 Da. It is spherical, silica-based, and processed to provide pH stability.	Inertsil WP300 Diol PROTEIN KW-800 series
L34	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the lead form, 7 to 9 µm in diameter.	HC-75(Pb^{2+}) SUGAR SP0810
L35	A zirconium-stabilized spherical silica packing with a hydrophilic (diol-type) molecular monolayer bonded phase having a pore size of 150 Å.	
L36	A 3, 5-dinitrobenzoyl derivative of L-phenylglycine covalently bonded to 5-µm aminopropyl silica.	SUMICHIRAL OA-2000
L37	Packing having the capacity to separate proteins by molecular size over a range of 2,000 to 40,000 Da. It is a polymethacrylate gel.	OHpak SB-803 HQ
L38	A methacrylate-based size-exclusion packing for water-soluble samples.	OHpak SB-800 HQ series
L39	A hydrophilic polyhydroxymethacrylate gel of totally porous spherical resin.	OHpak SB-800 HQ series RSpak DM-614
L40	Cellulose tris-3,5-dimethylphenylcarbamate coated porous silica particles, 5 to 20 µm in diameter.	CHIRALCEL OD series
L39	A hydrophilic polyhydroxymethacrylate gel of totally porous spherical resin.	OHpak SB-800 HQ series RSpak DM-614
L40	Cellulose tris-3,5-dimethylphenylcarbamate coated porous silica particles, 5 to 20 µm in diameter.	CHIRALCEL OD series

Conforming to USP

USP Code	PACKING	HPLC Column Name
L41	Immobilized α 1-acid glycoprotein on spherical silica particles, 5 µm in diameter.	CHIRALPAK AGP
L42	Octylsilane and octadecylsilane groups chemically bonded to porous silica particles, 5 µm in diameter.	
L43	Pentafluorophenyl groups chemically bonded to silica particles by a propyl spacer, 1.5 to 10 µm in diameter.	
L44	A multifunctional support, which consists of a high purity, 60 Å, spherical silica substrate that has been bonded with a cationic exchanger, sulfonic acid functionality in addition to a conventional reversed phase C8 functionality.	
L45	Beta cyclodextrin bonded to porous silica particles, 5 to 10 µm in diameter.	ORpak CDBS-453 SUMICHIRAL OA7000 SUMICHIRAL OA7100
L46	Polystyrene/divinylbenzene substrate agglomerated with quaternary amine functionalized latex beads, about 9 to 11 µm in diameter.	
L47	High-capacity anion-exchange microporous substrate, fully functionalized with trimethylamine groups, 8 µm in diameter.	PRP-X100, PRP-X110 RCX-10, RCX-30
L48	Sulfonated, cross-linked polystyrene with an outer layer of submicron, porous, anion-exchange microbeads, 15 µm in diameter.	
L49	A reversed-phase packing made by coating a thin layer of polybutadiene onto spherical porous zirconia particles, 3 to 10 µm in diameter.	
L50	Multifunction resin with reversed-phase retention and strong anion-exchange functionalities. The resin consists of ethylvinylbenzene, 55 % cross-linked with divinylbenzene copolymer, 3 to 15 µm in diameter, and a surface area not less than 350 m² per g. Substrate is coated with quaternary ammonium functionalized latex particles consisting of styrene cross-linked with divinylbenzene.	
L51	Amylose tris-3,5-dimethylphenylcarbamate-coated, porous, spherical, silica particles, 5 to 10 µm in diameter.	CHIRALPAK AD series
L52	A strong cation-exchange resin made of porous silica with sulfopropyl groups, 5 to 10 µm in diameter.	
L53	Weak cation-exchange resin consisting of ethylvinylbenzene, 55 % cross-linked with divinylbenzene copolymer, 3 to 15 µm diameter. Substrate is surface grafted with carboxylic acid and/or phosphoric acid functionalized monomers. Capacity not less than 500 µEq/column.	
L54	A size exclusion medium made of covalent bonding of dextran to highly cross-linked porous agarose beads, about 13 µm in diameter.	
L55	A strong cation-exchange resin made of porous silica coated with polybutadiene-maleic acid copolymer, about 5 µm in diameter.	Spherisorb SCX
L56	Propyl silane chemically bonded to totally porous silica particles, 3 to 10 µm in diameter.	
L57	A chiral-recognition protein, ovomucoid, chemically bonded to silica particles, about 5 µm in diameter, with a pore size of 120 Å.	
L58	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the sodium form, about 6 to 30 µm diameter.	SUGAR KS 800 series CXpak P-421S
L59	Packing for the size-exclusion separation of proteins (separation by molecular weight) over the range of 5 to 7,000 kDa. The packing is a spherical 1.5 - to 10-µm silica of hybrid packing with a hydrophilic coating.	PROTEIN KW-803
L60	Spherical, porous silica gel, 10 µm or less in diameter, the surface of which has been covalently modified with alkyl amide groups and endcapped.	
L61	A hydroxide selective strong anion-exchange resin consisting of a highly cross-linked core of 13-µm microporous particles having a pore size less than 10 Å units and consisting of ethylvinylbenzene cross-linked with 55 % divinylbenzene with a latex coating composed of 85 nm diameter microbeads bonded with alkanol quaternary ammonium ions (6 %).	

USP Code	PACKING	HPLC Column Name
L62	C30 silane bonded phase on a fully porous spherical silica, 3 to 15 µm in diameter.	
L63	Glycopeptide teicoplanin linked through multiple covalent bonds to a 100-Å units spherical silica.	SUGAR KS 800 series
L64	Strongly basic anion-exchange resin consisting of 8 % cross-linked styrene-divinylbenzene copolymer with a quaternary ammonium group in the chloride form, 45 to 180 µm in diameter.	
L65	Strongly acidic cation-exchange resin consisting of 8 % sulfonated cross-linked styrene-divinylbenzene copolymer with a sulfonic acid group in the hydrogen form, 45 to 250 µm in diameter.	
L66	A crown ether coated on a 5-µm particle size silica gel substrate. The active site is (S)-18-crown-6-ether.	Crownpak CR (+)
L67	Porous vinyl alcohol copolymer with a C18 alkyl group attached to the hydroxyl group of the polymer, 2 to 10 µm in diameter.	Asahipak ODP-40 Asahipak ODP-50 Shodex ET-RP1
L68	Spherical, porous silica, 10 µm or less in diameter, the surface of which has been covalently modified with alkyl amide groups and not endcapped.	
L69	Ethylvinylbenzene/divinylbenzene substrate agglomerated with quaternary amine functionalized 130-nm latex beads, about 6.5 µm in diameter.	
L70	Cellulose tris(phenyl carbamate) coated on 5-µm silica.	CHIRALCEL OC-H SUMICHIRAL OA-3300
L71	A rigid, spherical polymetacrylate, 4 to 6 µm in diameter.	RSpak DE-213, DE-413 RSpak DE-613
L72	(S)-phenylglycine and 3,5-dinitroanaline urea linkage covalently bonded to silica.	SUMICHIRAL OA-3300
L73	A rigid spherical polydivinylbenzene particle, 5 to 10 µm in diameter.	
L74	a strong anion-exchange resin consisting of a highly cross-linked core of 7- µm macroporous particles having a 100-Å average pore size and consisting of ethylvinylbenzene cross-linked with 55 % divinylbenzene and an anion-exchange layer grafted to the surface, which is functionalized with alkyl quaternary ammonium ions.	
L75	A chiral-recognition protein, bovine serum albumine (BSA), chemically bonded to silica particles, about 7 µm in diameter, with a pore size of 300 Å.	
L76	Silica based weak cation-exchange material, 5 µm in diameter. Substrate is surface polymerized polybutadiene-maleic acid to provide carboxylic acid functionalities. Capacity not less than 29 µEq/column.	
L77	Weak cation-exchange resin consisting of ethylvinylbenzene, 55 % cross-linked with divinylbenzene copolymer, 6 to 9 µm diameter. Substrate is surface grafted with carboxylic acid funcionalized groups. Capacity not less than 500 µEq/column (4 mm × 25 cm)	
L78	A silane ligand that consists of both reversed-phase (an alkyl chain longer than C8) and anion-exchange (primary, secondary, tertiary, or quartenary amino groups) functional groups chemically bonded to porous or non-porous silica or ceramic micro-particles, 1.0 to 50 µm in diameter, or a monolithic rod.	
L79	A chiral-recognition protein, human serum albumin (HSA), chemically bonded to silica particles, about 5 µm in diameter.	CHIRALPAK HSA
L80	Cellulose tris(4-methylbenzoate)-coated, porous, spherical, silica particles, 5 µm in diameter.	CHIRALCEL OJ CHIRALCEL OJ-H
L81	A hydroxide-selective, strong anion-exchange resin consisting of a highly cross-linked core of 9 µm porous particles having a pore size of 2000 Angstroms units and consisting of ethylvinylbenzene cross-linked with 55 % divinylbenzene with a latex coating composed of 70 nm diameter microbeads (6 % crosslinked) bonded with alkanol quartenary ammonium ions.	

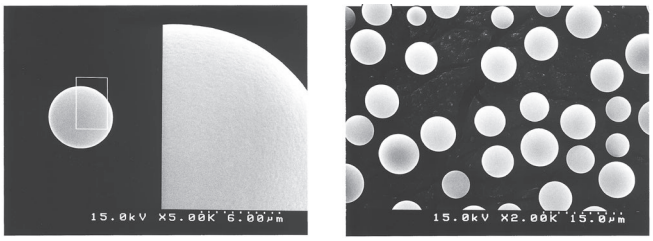
GL Sciences' greatest strength

GL Sciences supports from the use of SPE to analysis. Among them all, HPLC columns which play a major role in separation analysis are manufactured by synthesizing base silica-gels, bonging phases and being packed into columns and through demanding tests for a stable supply with the same excellent quality all over the world. Based on accumulated know-how GL Sciences' manufacturing technology keeps on evolving to supply better columns for customers

Sophisticated self-manufacturing technology for the base silica

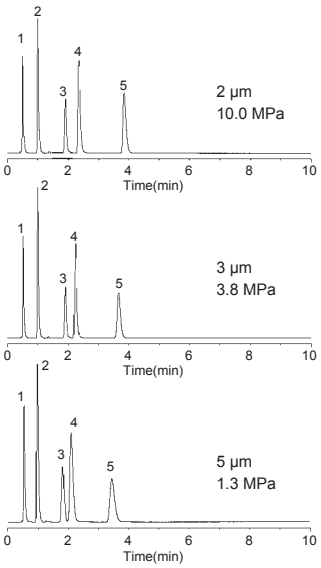
GL Sciences has been synthesizing base silica-gels, bonding phases and endcapping for column packing which enable us stable supply with exceptionally-high quality. Consequently those HPLC columns have been chosen for the method used for many years as reliable products.

Ultra pure base silica



Reliable column performance

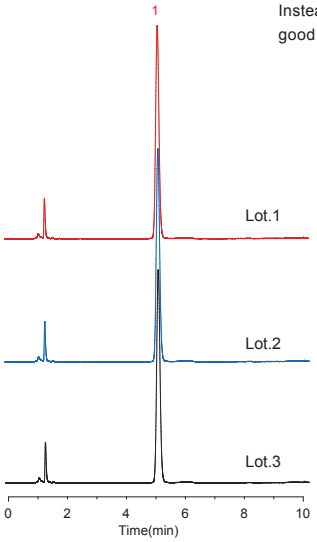
Provide the same separation patterns with the changes of particle size



Conditions

Column : InertSustain C18 (50 × 2.1 mm I.D.)
Eluent : A) CH_3OH
B) 25 mM phosphate buffer (pH 7.0)
A/B = 30/70, v/v
Flow Rate : 0.2 mL/min
Col. Temp. : 40 °C
Detection : UV 230 nm
Sample : 1. Uracil
2. Pyridine
3. Phenol
4. Berberine chloride
5. Dextromethorphan

Test by a strong basic compound



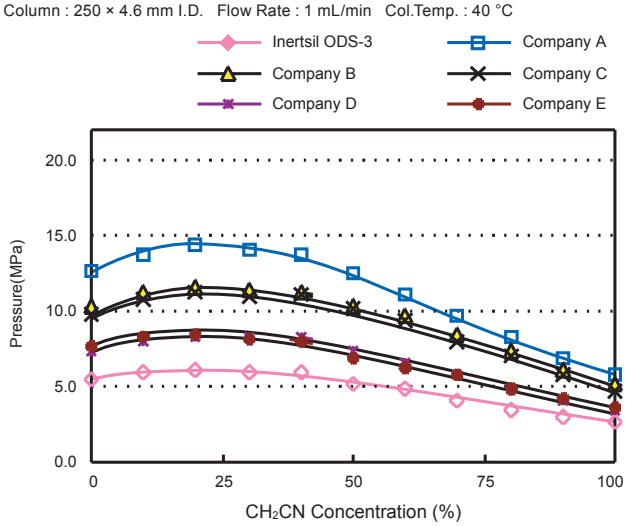
Instead of a difficult compound symmetry peak and good reproducibility are obtained

Conditions

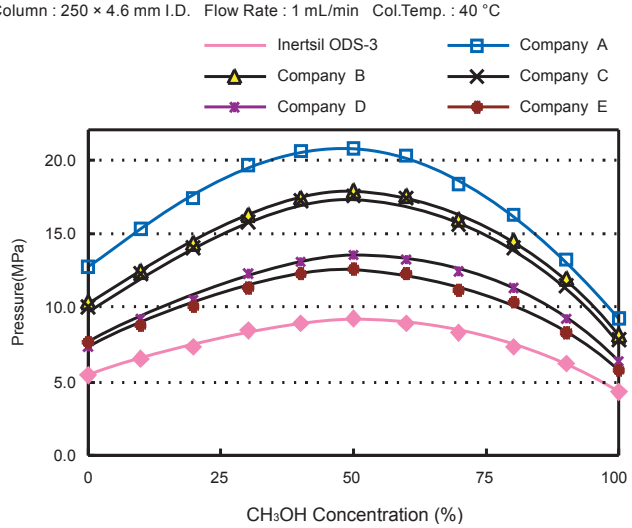
Column : InertSustain C18 (5 µm, 250 × 4.6 mm I.D.)
Eluent : A) CH_3CN
B) 25 mM phosphate buffer (pH 7.0)
A/B = 40/60, v/v
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 220 nm
Sample : 1. Dextromethorphan

Base silica is designed for low column back pressure to reduce the load on the system

Column : 250 × 4.6 mm I.D. Flow Rate : 1 mL/min Col.Temp. : 40 °C

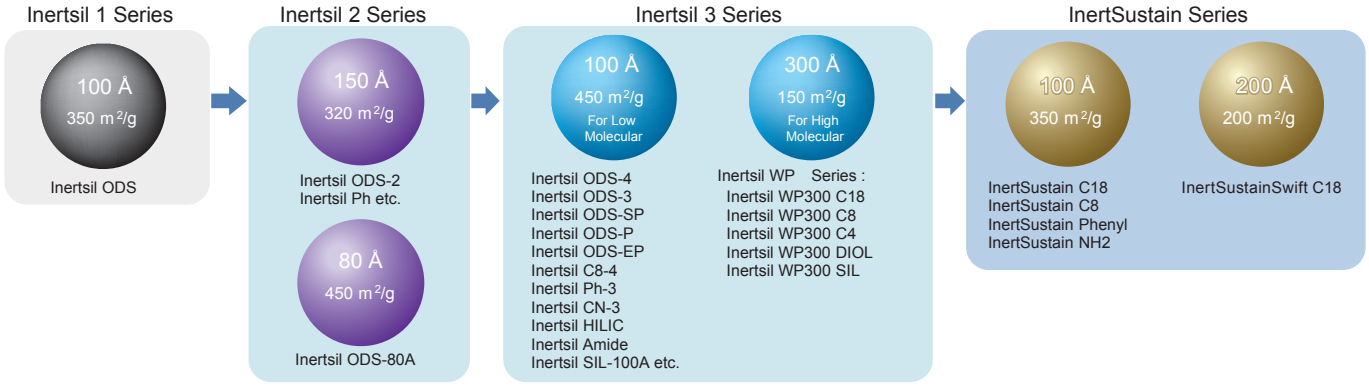


Column : 250 × 4.6 mm I.D. Flow Rate : 1 mL/min Col.Temp. : 40 °C



The Evolving HPLC Column Packings

GL Sciences has been steadily supplying with columns from Inertsil ODS, first-generation to InertSustain series, integration of state-of-the-art technologies, and has established a very good reputation around the world. They are available with the same quality and the same performance anywhere in the world.



Base on Evolutionally Surfaced Silica (ES Silica) evolved from Inertsil, InertSustain has developed

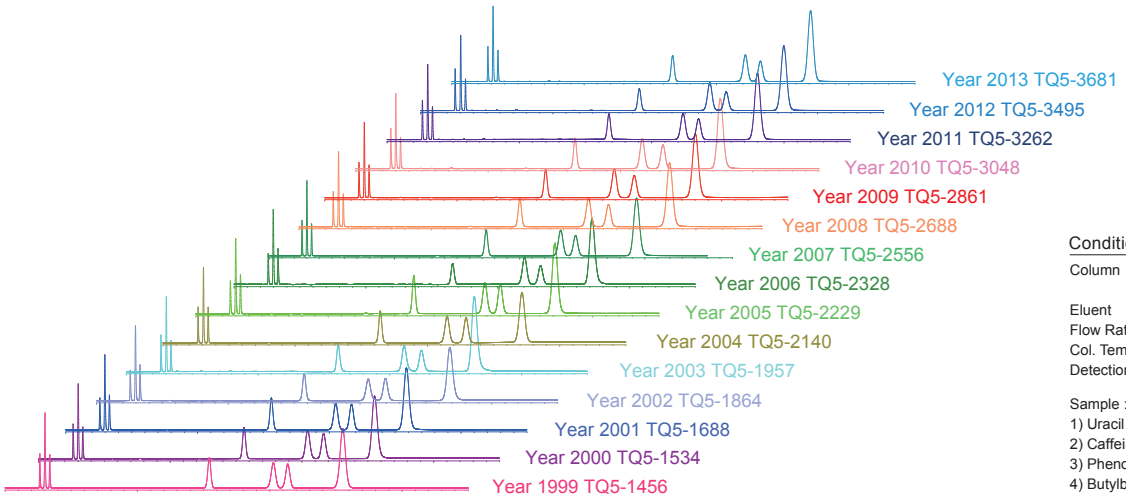
InertSustain employs a radically new type of silica , in which the surface of the silica is uniquely modified, the amount of silanols are controlled. Owing to this state-of-the-art technology ES silica allows easy surface modification including endcapping, which grants the following three favors.

1. Exceptionally improved inertness
2. Robust bonded phase
3. High reproducibility batch to batch

Owing to above benefits InertSustain is recommended as the first choice column for almost all compounds analyzed.

Batch to batch reproducibility

Keeping on stable supplies with high quality and performance, GL Sciences continues to evolve.



Conditions

Column	: Inertsil ODS-3 (5 µm, 250 × 4.6 mm I.D.)
Eluent	: CH_3OH/H_2O=80/20,v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm

Sample :

1) Uracil
2) Caffeine
3) Phenol
4) Butylbenzene
5) o-Terphenyl
6) Amylbenzene
7) Triphenylene

QC, ISO

Quality Inspections

♦Sphericity and surface smoothness of Silica-gel with Scanning Electron Microscopy.
♦Particle size, Surface area, Pore diameter, Pore volume of Base Silica-Gel.
♦Trace metals impurity on Base Silica-Gel
♦Chemical bonding amount
♦Residual Silanol Groups by 29Si-NMR
♦Chromatographic Test for each lot (4 Standard Samples)
♦Column Performance Tests for Individual Columns

ISO Certification

GL Sciences is ISO14001 Compliant Company

Product Ranges: Development, manufacture and sale of instruments, parts, accessories, columns, packing materials, reagents relating to gas chromatography, liquid chromatography and cells for spectrometry

GL Sciences Fukushima Factory is ISO9001 Compliant Facility

Product Ranges: Design, manufacture and supply of instruments, parts, accessories, columns, packings, reagents relating to gas chromatography, liquid chromatography and cells for spectrometry

General Technical Division

Fukushima Factory

Reversed Phase Columns

- InertSustain® C18 002
- InertSustainSwift™ C18 006
- Inertsil® ODS-4 008
- Inertsil® ODS-3 010
- Inertsil® ODS-4V, ODS-3V 012
- Inertsil® ODS-SP 014
- Inertsil® ODS-P 016
- Inertsil® ODS-EP 018
- Inertsil® ODS-80A 020
- Inertsil® ODS-2 022
- Inertsil® ODS 023
- InertSustain® C8 024
- Inertsil® C8-4 026
- Inertsil® C8-3 028
- Inertsil® C8 030
- Inertsil® C4 031
- InertSustain® Phenyl 032
- InertSustain® Phenylhexyl 034
- Inertsil® Ph-3 036
- Inertsil® Ph 038
- Inertsil® CN-3 040
- Inertsil® WP300 C18 042
- Inertsil® WP300 C8 044
- Inertsil® WP300 C4 045

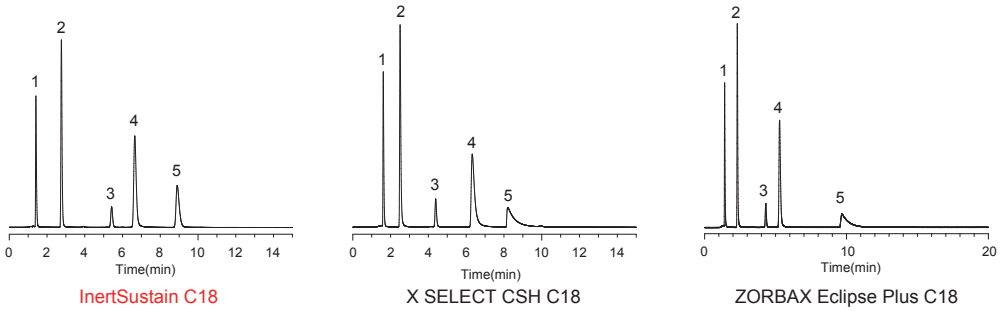
InertSustain® C18

Physical Properties

- **Silica** : **Newly Developed ES Silica Gel**
- **Particle Size** : **2 µm, 3 µm, 5 µm**
- **Surface Area** : **350 m^2/g**
- **Pore Size** : **100 Å (10 nm)**
- **Pore Volume** : **0.85 mL/g**
- **Bonded Phase** : **Octadecyl Groups**
- **End-capping** : **Complete**
- **Carbon Loading** : **14 %**
- **USP Code** : **L1**
- **pH Range** : **1~10**

Generally, silica based columns are mechanically stable and provide high efficiencies, however, they cannot be used under alkaline conditions and their residual silanol groups tend to adsorb organic bases. InertSustain C18 employs a radically new type of silica, in which the surface of the silica is uniquely modified, enabling precise control of the silica properties.
InertSustain C18 inherits the advantages of all the current Inertsil HPLC columns (e.g., extremely low operating back pressure, superior inertness to typically any analytes, high efficiency and compatibility with a wide range of solvents), but now can be used for wide pH analysis with consistent performance from column to column and lot to lot.

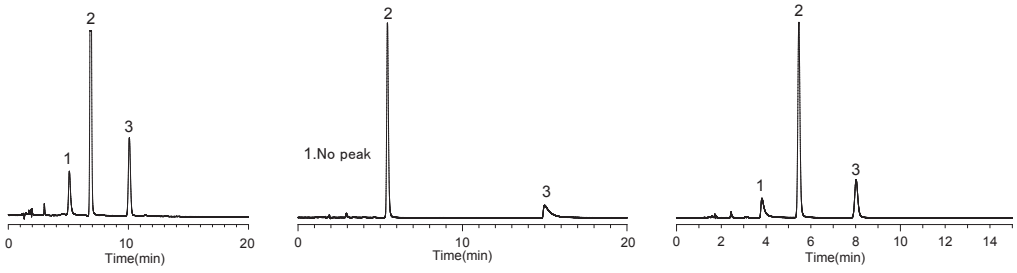
Figure 1 : Basic Compounds



Conditions

Column Size	: 3 µm, 150 × 2.1 mm I.D.
Eluent	: A) CH_3CN
	B) 25 mM K_2HPO_4
	(pH 7.0, KH_2PO_4)
	A/B = 30/70, v/v
Flow Rate	: 0.2 mL/min
Col. Temp.	: 40 °C
Detection	: UV 230 nm
Sample	: 1. Uracil
	2. Pyridine
	3. Phenol
	4. Berberine chloride
	5. Dextromethorphan

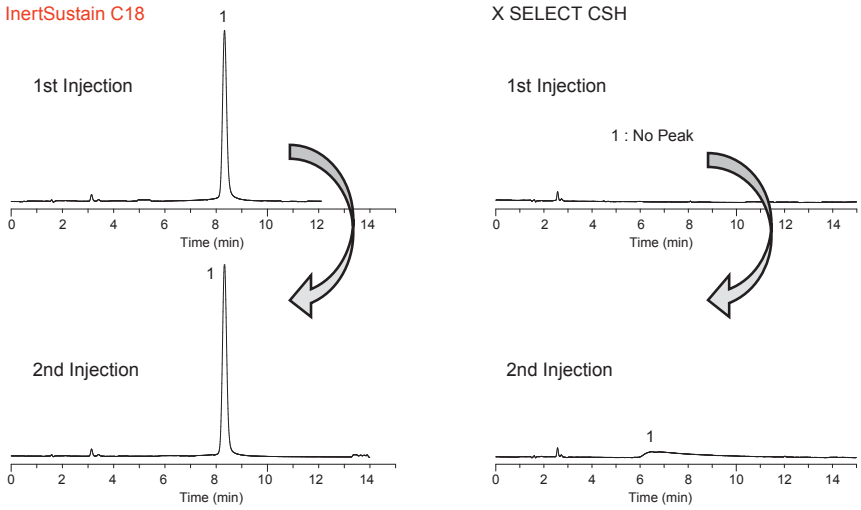
Figure 2 : Acidic Compounds



Conditions

Column Size	: 3 µm, 150 × 2.1 mm I.D.
Eluent	: A) CH_3CN
	B) 0.1 % H_3PO_4
	A/B = 25/75, v/v
Flow Rate	: 0.2 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Sample	: 1. Brilliant Blue FCF
	2. Phenol
	3. Salicylic acid

Figure 3 : Chelating Compound



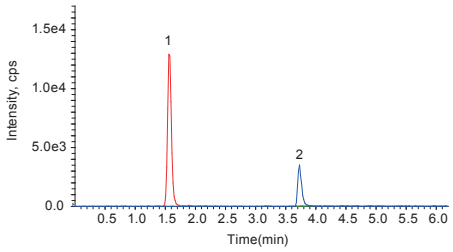
Conditions

Column Size	: 5 µm, 150 × 4.6 mm I. D.
Eluent	: A) CH3CN
	B) 0.1 % H_3PO_4
	A / B = 40 / 60, v / v
Flow Rate	: 1.0 mL / min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Sample	: 1. Hinokitiol

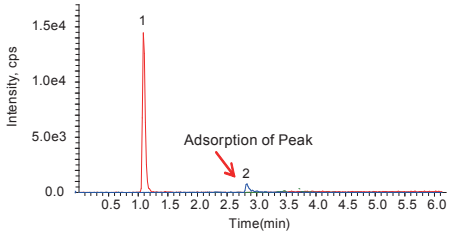
Comparison of Performance to Core-Shell Columns

As shown below, core-shell columns show peak tailing due to the presence of trace metals or silanol groups in their silica gel. Quantitative and qualitative analysis will be a source of concern since the adsorption of compounds can be expected.

InertSustain C18 3 µm



Kinetex C18 (1.7 µm)

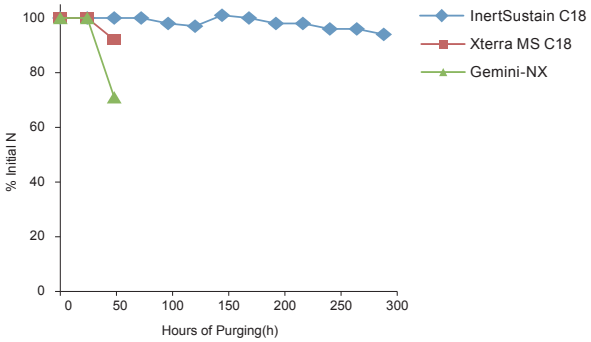


Conditions

Column	:	ODS Column(100 × 2.1 mm I.D.)
Eluent	:	A) 2 mM CH_3COONH_4 in 95 % CH_3CN B) 2 mM CH_3COONH_4 in 10 % CH_3CN A / B = 20 / 80 - 2 min – 100 / 0 - 2.5 min – 100 / 0 - 0.01 min - 20 / 80, v / v (Mixed by a gradient mixer)
Flow Rate	:	0.3 mL / min
Col. Temp.	:	40 °C
Detection	:	LC / MS / MS (4000 QTRAP® : ESI, Positive, MRM)
Injection Vol.	:	10 µL
Sample	:	1. Nitrofurazone (100 µg / L) 2. Lasalocid A (100 µg / L)

Wide pH compatibility with Long Column Lifetime

As shown in the experiment below, due to the introduction of Evolved Surface Silica, InertSustain C18 maintained high efficiency and peak shape for 300 hours while other “wide pH” column brands failed.



Purging Conditions

Column Size	:	5 µm, 150 × 4.6 mm I.D.
Eluent	:	A)CH_3OH B)50 mM Triethylamine (pH 10.0) A/B = 30/70, v/v
Flow Rate	:	1.0 mL/min
Col. Temp.	:	50 °C

Analytical Conditions

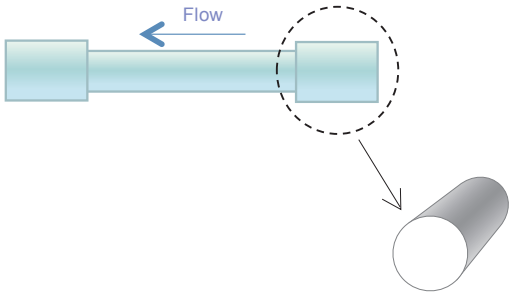
Eluent	:	A) CH_3CN B) H_2O A/B = 65/35, v/v
Flow Rate	:	1.0 mL/min
Col. Temp.	:	40 °C
Detection	:	UV 254 nm
Sample	:	Naphthalene

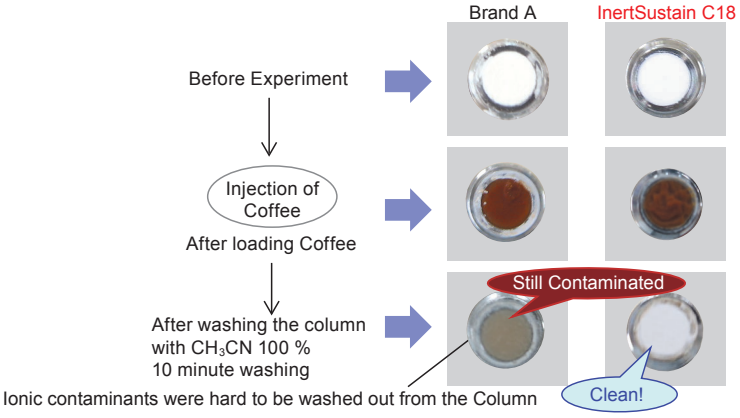
Experience the InertSustain! (Inertness and Sustainability)

Highly end-capped ODS column such as InertSustain C18 offers an opportunity to flush out contaminants from the column surface easily using an organic solvent. Coffee melanoidins are brown heterogeneous polymers contained in coffee. Its components are not clarified yet, but it is considered to contain several ionic compounds, which a poorly end-capped column will adsorb those ionic compounds leading to short column lifetime.

As for ODS column, which is commonly used for HPLC and LC/MS/MS, its inertness has an influence not only on peak shape but also detection sensitivity and durability. It is highly recommended to use highly end-capped column which provides good peak shape for both basic and acidic compounds such as InertSustain C18.

The packing material was visually confirmed by removing the column



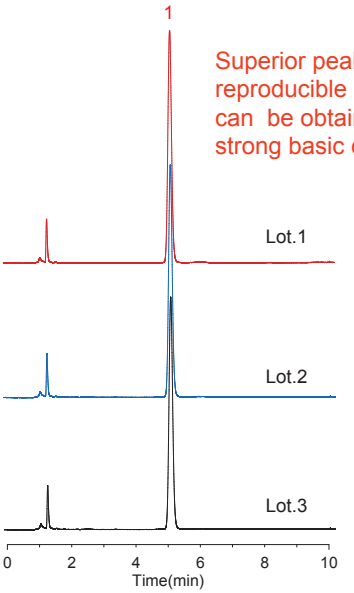


InertSustain® C18

Reliable Reproducibility, Performance and Quality

Rigorous quality control of physical properties and strict chromatographic tests for inertness and selectivity, contribute to the production of InertSustain C18 with an outstanding reproducibility and long column lifetime.

Strong Basic Compound Test

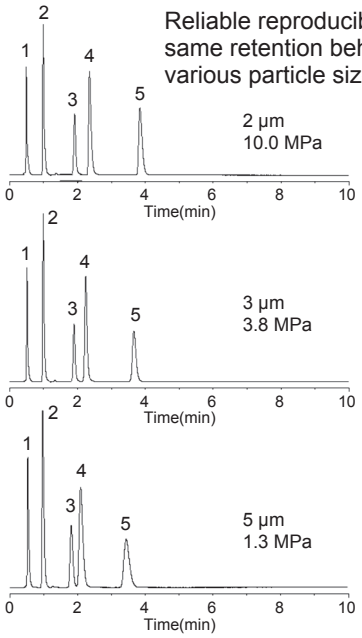


Superior peak shape with highly reproducible chromatograms can be obtained even for those strong basic compounds.

Conditions

Column Size : 5 µm, 250 × 4.6 mm I.D.
Eluent : A) CH_3CN
B) 25 mM phosphate buffer (pH 7.0)
A / B = 40 / 60, v / v
Flow Rate : 1.0 mL / min
Col. Temp. : 40 °C
Detection : UV 220 nm
Sample : 1. Dextromethorphan

Same Retention Behavior between Various Particle Sizes



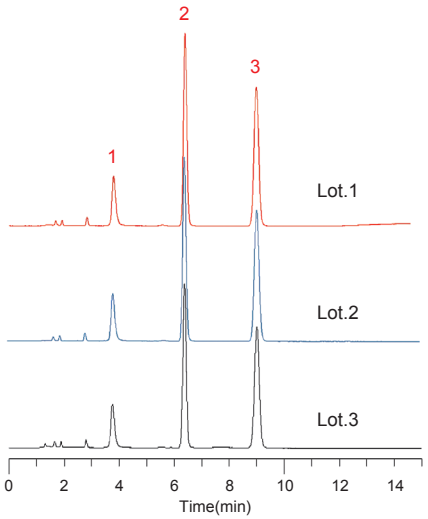
Reliable reproducibility and same retention behavior between various particle size columns

Conditions

Column Size : 50 × 2.1 mm I.D.
Eluent : A) CH_3OH
B) 25 mM phosphate buffer (pH 7.0)
A / B = 30 / 70, v / v
Flow Rate : 0.2 mL / min
Col. Temp. : 40 °C
Detection : UV 230 nm

Sample : 1. Uracil
2. Pyridine
3. Phenol
4. Berberine chloride
5. Dextromethorphan

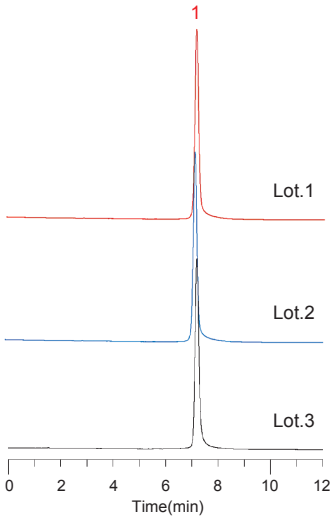
Strong Acidic Compound Test



Conditions

Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) CH_3CN B) 0.1 % H_3PO_4
A / B = 25 / 75, v / v
Flow Rate : 1.0 mL / min
Col. Temp. : 40 °C
Detection : UV 254 nm
Sample : 1. Brilliant Blue FCF
2. Phenol
3. Salicylic acid

Strong Chelating Compound Test



Conditions

Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) CH_3CN B) 0.1 % H_3PO_4
A / B = 40 / 60, v / v
Flow Rate : 1.0 mL / min
Col. Temp. : 40 °C
Detection : UV 254 nm
Sample : 1. Hinokitiol

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0
Particle Size: 2 µm	30	5020-14351	5020-14361
	50	5020-14352	5020-14362
	75	5020-14353	5020-14363
	100	5020-14354	5020-14364
	150	5020-14355	5020-14365

	Length \ I.D. (mm)	2.1	3.0	4.6
HPSeries Particle Size: 3 µm 50 MPa (500 Bar)	30	5020-14411	5020-14421	5020-14441
	50	5020-14412	5020-14422	5020-14442
	75	5020-14413	5020-14423	5020-14443
	100	5020-14414	5020-14424	5020-14444
	150	5020-14415	5020-14425	5020-14445
	250	5020-14416	5020-14426	5020-14446

* End-fittings are 1/16" Waters-compatible.
* UHPLC compatible end-fittings are also available upon request for UHPLC systems (Ex: UPLC) to avoid dead volume.
* Indicate "UP Type end-fittings" when ordering. (Please note that UP type is not available for a 4.6 mm I.D. column)
* For maximum operating pressure information, please refer to page 46.

	Length \ I.D. (mm)	1.0	1.5
Particle Size: 3 µm	30	5020-14301	5020-14311
	50	5020-14302	5020-14312
	75	5020-14303	5020-14313
	100	5020-14304	5020-14314
	150	5020-14305	5020-14315
	250	5020-14306	5020-14316

	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-07411	5020-07421	5020-07431	5020-07441
	50	5020-07412	5020-07422	5020-07432	5020-07442
	75	5020-07413	5020-07423	5020-07433	5020-07443
	100	5020-07414	5020-07424	5020-07434	5020-07444
	125	5020-07417	5020-07427	5020-07437	5020-07447
	150	5020-07415	5020-07425	5020-07435	5020-07445
	250	5020-07416	5020-07426	5020-07436	5020-07446

	Length \ I.D. (mm)	1.0	1.5
	30	5020-14201	5020-14211
	50	5020-14202	5020-14212
	75	5020-14203	5020-14213
	100	5020-14204	5020-14214
	150	5020-14205	5020-14215
	250	5020-14206	5020-14216

	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
Particle Size: 5 µm	30	5020-07311	5020-07321	5020-07331	5020-07341
	50	5020-07312	5020-07322	5020-07332	5020-07342
	75	5020-07313	5020-07323	5020-07333	5020-07343
	100	5020-07314	5020-07324	5020-07334	5020-07344
	125	5020-07317	5020-07327	5020-07337	5020-07348
	150	5020-07315	5020-07325	5020-07335	5020-07345
	250	5020-07316	5020-07326	5020-07336	5020-07346

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19250	5020-19249	5020-19300	5020-19299
1.5, 2.1		1.5	5020-19350	5020-19349	5020-19400	5020-19399
2.1, 3.0		3.0	5020-19150	5020-19149	5020-19200	5020-19199
4.0, 4.6		4.0	5020-19050	5020-19049	5020-19100	5020-19099
2.1, 3.0	20	3.0	5020-19550	5020-19549	5020-19600	5020-19599
4.0, 4.6		4.0	5020-19450	5020-19449	5020-19500	5020-19499
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

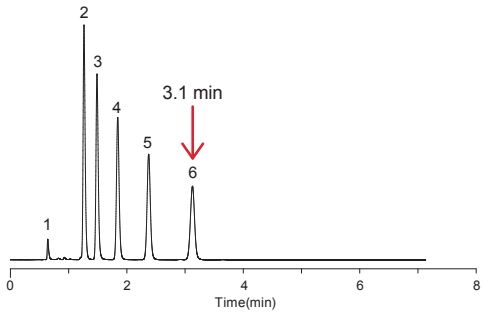
InertSustainSwift™ C18

Physical Properties

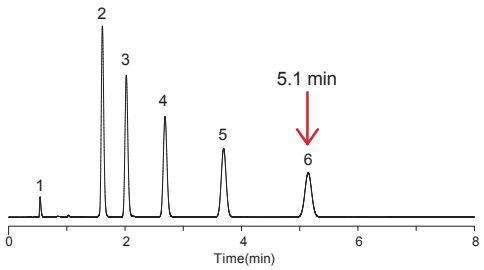
- **Silica** : **Newly Developed ES Silica Gel**
- **Particle Size** : **1.9 µm, 3 µm, 5 µm**
- **Surface Area** : **200 m^2/g**
- **Pore Size** : **200 Å (20 nm)**
- **Pore Volume** : **1.00 mL/g**
- **Bonded Phase** : **Octadecyl Groups**
- **End-capping** : **Complete**
- **Carbon Loading** : **9.0 %**
- **USP Code** : **L1**
- **pH Range** : **1.0~10.0**

As shown in figure 1, InertSustainSwift C18 maintains the same extreme inertness , wide pH range and provide rapid separations with symmetric peaks. The optimization of surface area, pore size and chemical bonding delivers superior peak shapes (Figure 2). Figure 3 proves InertSustainSwift C18 is also ideal for LC/MS/MS applications which offer highly sensitive results and enables MS compatible buffers to be used due to the extremely inert silica gel.

Figure 1 : Comparison of Retentivity



InertSustainSwift C18 (1.9 µm)

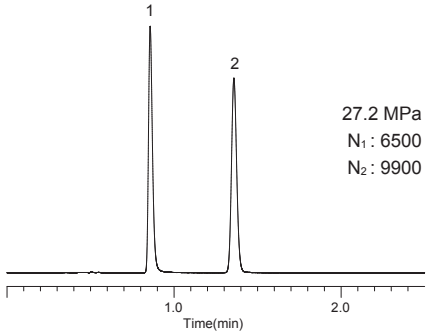


InertSustain C18 (2 µm)

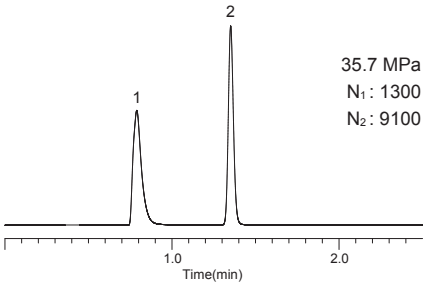
Conditions

Column Size	:	50 × 2.1 mm I.D.
Eluent	:	A) CH_3OH
		B) H_2O
		A/B = 80/20, v/v
Flow Rate	:	0.2 mL/min
Col. Temp.	:	40 °C
Detection	:	UV 254 nm
Sample	:	1. Uracil
		2. Toluene
		3. Ethylbenzene
		4. Propylbenzene
		5. n-Butylbenzene
		6. n-Amylbenzene

Figure 2 : Comparison of Efficiency



InertSustainSwift C18 (1.9 µm)

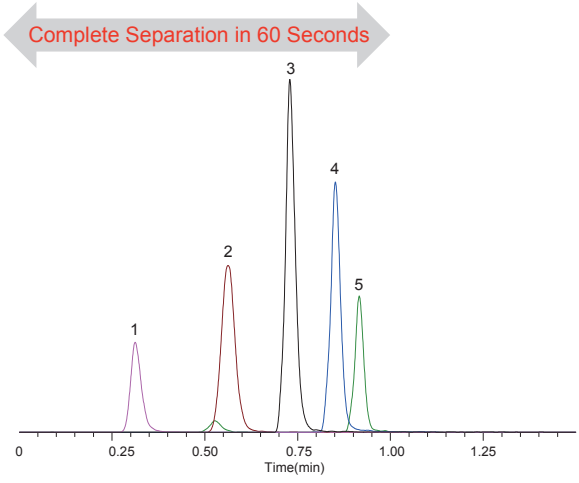


Acguity BEH C18 (1.7 µm)

Conditions

Column Size	:	50 × 2.1 mm I.D.
Eluent	:	A) CH_3OH
		B) H_2O
		A/B = 30/70, v/v
Flow Rate	:	0.4 mL/min
Col. Temp.	:	40 °C
Detection	:	UV 254 nm
Sample	:	1. Pyridine
		2. Phenol

Figure 3 : Rapid LC/MS/MS Analysis of Basic Drugs



Conditions

Column	:	InertSustainSwift C18(1.9 µm, 50 × 2.1 mm I.D.)
Eluent	:	A) 10 mM Ammonium Formate in H_2O
		B) 10 mM Ammonium Formate in CH_3OH
		A/B = 70/30 – 0.3 min - 40/60 – 0.5 min
		- 0/100 – 0.1 min – 0/100 – 0.01 min -70/30- 0.5 min - 70/30 ,v/v
Flow Rate	:	0.6 mL/min
Col. Temp.	:	40 °C
Detection	:	LC/MS/MS (ESI, Positive, MRM)
Sample	:	1. Acebutolol
		2. Atenolol
		3. Labetalol
		4. Nadolol
		5. Pindolol

Analytical Columns

	Length / I.D. (mm)	2.1	3.0	
Particle Size: 1.9 µm	50	5020-88228	5020-88233	
	100	5020-88230	5020-88235	
	150	5020-88231	5020-88236	
HP Series Particle Size: 3 µm Max. Operating Pressure : 50 MPa (500 Bar)	Length / I.D. (mm)	2.1	3.0	4.6
	50	5020-88210	5020-88216	5020-88222
	100	5020-88212	5020-88218	5020-88224
	150	5020-88213	5020-88219	5020-88225
	250	5020-88214	5020-88220	5020-88226

* End-fittings are 1/16" Parker style.
* For maximum operating pressure information, please refer to page 46.

	Length / I.D. (mm)	1.0	1.5		
	30	5020-88160	5020-88166		
	50	5020-88161	5020-88167		
	75	5020-88162	5020-88168		
	100	5020-88163	5020-88169		
	150	5020-88164	5020-88170		
	250	5020-88165	5020-88171		
Particle Size: 3 µm	Length / I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-88124	5020-88131	5020-88138	5020-88145
	50	5020-88125	5020-88132	5020-88139	5020-88146
	75	5020-88126	5020-88133	5020-88140	5020-88147
	100	5020-88127	5020-88134	5020-88141	5020-88148
	125	5020-88253	5020-88254	5020-88255	5020-88256
	150	5020-88128	5020-88135	5020-88142	5020-88149
	250	5020-88129	5020-88136	5020-88143	5020-88150
	Length / I.D. (mm)	1.0	1.5		
	30	5020-88038	5020-88044		
	50	5020-88039	5020-88045		
	75	5020-88040	5020-88046		
	100	5020-88041	5020-88047		
	150	5020-88042	5020-88048		
	250	5020-88043	5020-88049		
Particle Size: 5 µm	Length / I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-88001	5020-88008	5020-88015	5020-88022
	50	5020-88002	5020-88009	5020-88016	5020-88023
	75	5020-88003	5020-88010	5020-88017	5020-88024
	100	5020-88004	5020-88011	5020-88018	5020-88025
	125	5020-88249	5020-88250	5020-88251	5020-88252
	150	5020-88005	5020-88012	5020-88019	5020-88026
	250	5020-88006	5020-88013	5020-88020	5020-88027

* End-fittings are 1/16" Parker style.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-88199	5020-88105	5020-88200	5020-88106
1.5, 2.1		1.5	5020-88201	5020-88107	5020-88202	5020-88108
2.1, 3.0		3.0	5020-88197	5020-88103	5020-88198	5020-88104
4.0, 4.6		4.0	5020-88195	5020-88101	5020-88196	5020-88102
2.1, 3.0	20	3.0	5020-88205	5020-88111	5020-88206	5020-88112
4.0, 4.6		4.0	5020-88203	5020-88109	5020-88204	5020-88110
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

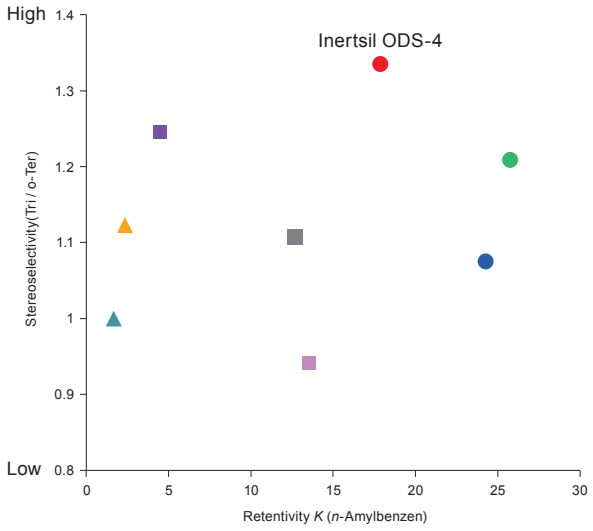
Inertsil® ODS-4

Physical Properties

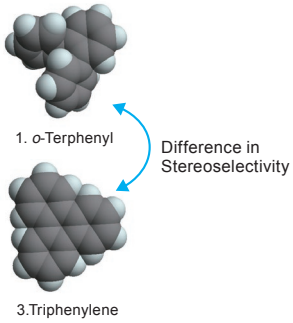
- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 2 µm, 3 µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Octadecyl Groups
- **End-capping** : Yes
- **Carbon Loading** : 11 %
- **USP Code** : L1
- **pH Range** : 2 ~ 7.5

Inertsil ODS-4 delivers the same extreme inertness to any type of compounds just like InertSustain C18 along with unprecedented stability under 100 % aqueous mobile phases for qualitative and quantitative analysis.
However, as the base silica gel and carbon loading are different on Inertsil ODS-4, differences in selectivity can be observed for certain analytes.

Figure 1 : Comparison of Selectivity between various GL Sciences' Columns



- InertSustain C18
- Inertsil ODS-4
- Inertsil ODS-3
- InertSustain C8
- Inertsil C8-3
- Inertsil C8-4
- InertSustain Phenyl
- Inertsil Ph-3

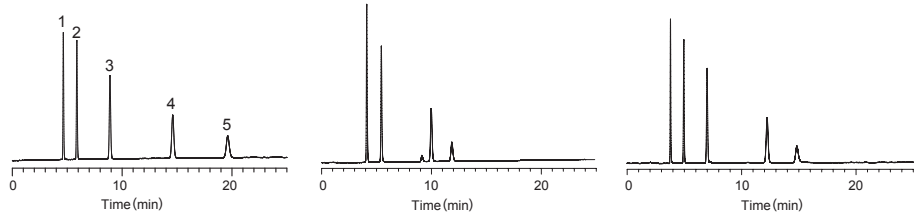


Conditions

Column Size	: 5 µm, 150 × 4.6 mm I.D.
Eluent	: A) CH_3OH
	B) H_2O
	A/B = 70/30, v/v
Flow Rate	: 0.8 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm

Sample :
1. *o*-Terphenyl
2. *n*-Amylbenzene
3. Triphenylene

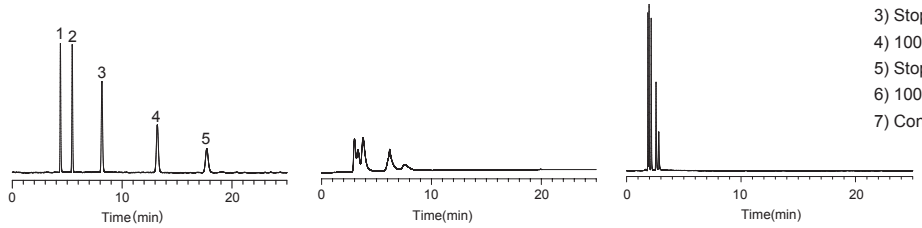
Figure 2 : Dewetting Test



Reduction rate of retention time
9.8 %

Reduction rate of retention time
64.0 %

Reduction rate of retention time
81.0 %



Inertsil ODS-4 | XBridge C18 | Luna C18(2)

Conditions

Column Size	: ODS Column (5 µm, 250 × 4.6 mm I.D.)
Eluent	: H_2O
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Sample	: 1. Cytosine
	2. Uracil
	3. Guanine
	4. Thymine
	5. Adenine

Testing Procedure:

1) 100 % water is introduced into column over 20 minutes.
2) Conduct Analysis (Upper chromatogram)
3) Stop flow for 15 minutes.
4) 100 % water is introduced again into column over 30 minutes.
5) Stop flow for 15 minutes again.
6) 100 % water is introduced again into column over 15 minutes.
7) Conduct Analysis (Lower chromatogram)

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	
Particle Size: 2 µm	30	5020-81200	5020-81210	
	50	5020-81202	5020-81212	
	75	5020-81203	5020-81213	
	100	5020-81204	5020-81214	
	150	5020-81205	5020-81215	
	Length \ I.D. (mm)	2.1	3.0	4.6
HPSeries Particle Size: 3 µm 50 MPa (500 Bar)	30	5020-14061	5020-14064	5020-14067
	50	5020-14062	5020-14065	5020-14068
	75	5020-14063	5020-14066	5020-14069
	100	5020-14001	5020-14004	5020-14007
	150	5020-14002	5020-14005	5020-14008
	250	5020-14003	5020-14006	5020-14009

* End-fittings are 1/16" Waters-compatible.
* UHPLC compatible end-fittings are also available upon request for UHPLC systems (Ex: UPLC) to avoid dead volume.
* Indicate "UP Type end-fittings" when ordering. (Please note that UP type is not available for a 4.6 mm I.D. column)
* For maximum operating pressure information, please refer to page 46.

	Length \ I.D. (mm)	1.0	1.5		
	30	5020-81111	5020-81121		
	50	5020-81112	5020-81122		
	75	5020-81113	5020-81123		
	100	5020-81114	5020-81124		
	150	5020-81115	5020-81125		
	250	5020-81116	5020-81126		
Particle Size: 3 µm	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-04011	5020-04021	5020-04031	5020-04041
	50	5020-04012	5020-04022	5020-04032	5020-04042
	75	5020-04013	5020-04023	5020-04033	5020-04043
	100	5020-04014	5020-04024	5020-04034	5020-04044
	125	5020-04017	5020-04027	5020-04037	5020-04047
	150	5020-04015	5020-04025	5020-04035	5020-04045
	250	5020-04016	5020-04026	5020-04036	5020-04046
	Length \ I.D. (mm)	1.0	1.5		
	30	5020-81011	5020-81021		
	50	5020-81012	5020-81022		
	75	5020-81013	5020-81023		
	100	5020-81014	5020-81024		
	150	5020-81015	5020-81025		
	250	5020-81016	5020-81026		
Particle Size: 5 µm	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-03911	5020-03921	5020-03931	5020-03941
	50	5020-03912	5020-03922	5020-03932	5020-03942
	75	5020-03913	5020-03923	5020-03933	5020-03943
	100	5020-03914	5020-03924	5020-03934	5020-03944
	125	5020-03917	5020-03927	5020-03937	5020-03947
	150	5020-03915	5020-03925	5020-03935	5020-03945
	250	5020-03916	5020-03926	5020-03936	5020-03946

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19202	5020-19201	5020-19252	5020-19251
1.5, 2.1		1.5	5020-19302	5020-19301	5020-19352	5020-19351
2.1, 3.0		3.0	5020-19102	5020-19101	5020-19152	5020-19151
4.0, 4.6		4.0	5020-19002	5020-19001	5020-19052	5020-19051
2.1, 3.0	20	3.0	5020-19502	5020-19501	5020-19552	5020-19551
4.0, 4.6		4.0	5020-19402	5020-19401	5020-19452	5020-19451
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

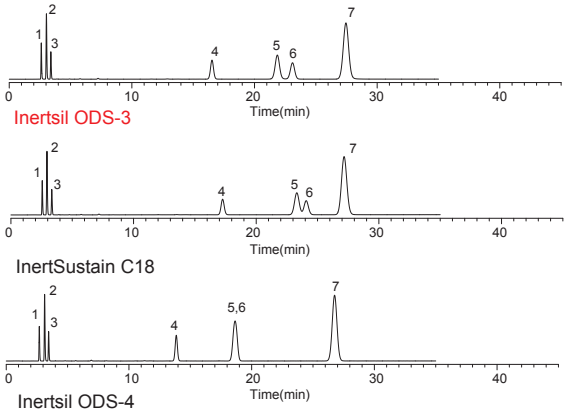
Inertsil® ODS-3

Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 2 µm, 3 µm, 4 µm , 5 µm, 7 µm, 10 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Octadecyl Groups
- **End-capping** : Yes
- **Carbon Loading** : 15 %
- **USP Code** : L1
- **pH Range** : 2 ~ 7.5

Inertsil ODS-3 is still GL Sciences' most popular phase and continues to be used widely and reliably for long established methods in pharmaceutical, and contract research labs. As shown in figure 1, Inertsil ODS-3 has a relatively strong retentivity compared to commercially available ODS columns. In addition, the introduction of higher surface area silica provide high preparative loading capacity without sacrificing peak shape which is illustrated in figure 2.

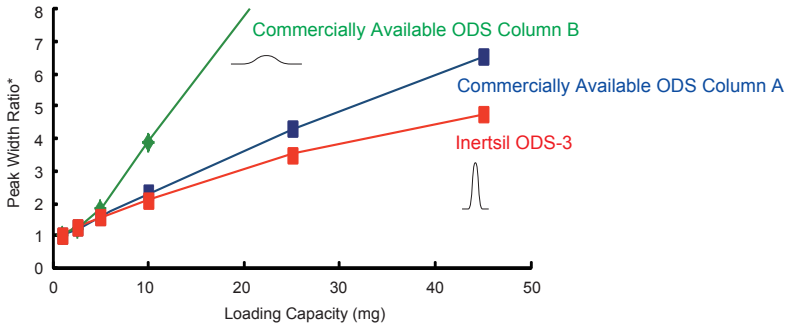
Figure 1 : Comparison of Retentivity



Conditions

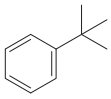
Column Size	: 5 µm, 250 × 4.6 mm I.D.	Sample :
Eluent	: A) CH_3OH	1. Uracil
	B) H_2O	2. Caffeine
	A/B= 80/20, v/v	3. Phenol
Flow Rate	: 1.0 mL/min	4. Butylbenzene
Col.Temp.	: 40 °C	5. *o*-Terphenyl
Detection	: UV 254 nm	6. Amylbenzene
		7. Triphenylene

Figure 2 : Comparison of Loading Capacity



Conditions

Column Size	: 5 µm, 250 × 4.6 mm I.D.
Eluent	: A) CH_3OH
	B) H_2O
	A/B = 90/10, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 270 nm
Sample	: *tert*-Buthylbenzene (100 mg/mL)



* The loading capacity varies depending on the column I.D. size and length.

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	
Particle Size: 2 µm	30	5020-84650	5020-84660	
	50	5020-84652	5020-84662	
	75	5020-84653	5020-84663	
	100	5020-84654	5020-84664	
	150	5020-84655	5020-84665	
	Length \ I.D. (mm)	2.1	3.0	4.6
HPSeries Particle Size: 3 µm 50 MPa (500 Bar)	30	5020-14081	5020-14084	5020-14087
	50	5020-14082	5020-14085	5020-14088
	75	5020-14083	5020-14086	5020-14089
	100	5020-14011	5020-14014	5020-14017
	150	5020-14012	5020-14015	5020-14018
	250	5020-14013	5020-14016	5020-14019

* End-fittings are 1/16" Waters-compatible.
* UHPLC compatible end-fittings are also available upon request for UHPLC systems (Ex: UPLC) to avoid dead volume.
* Indicate "UP Type end-fittings" when ordering. (Please note that UP type is not available for a 4.6 mm I.D. column)
* For maximum operating pressure information, please refer to page 46.

Analytical Columns

Particle Size: 3 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-84411	5020-84421		
	50	5020-84412	5020-84422		
	75	5020-84413	5020-84423		
	100	5020-84414	5020-84424		
	150	5020-13360	5020-13350		
	250	5020-	5020-		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-04411	5020-04421	5020-04431	5020-04441
	50	5020-04412	5020-04422	5020-04432	5020-01774
	75	5020-04413	5020-04423	5020-04433	5020-01770
	100	5020-04414	5020-04424	5020-01790	5020-01775
	125	5020-04417	5020-04427	5020-01791	5020-01776
	150	5020-04415	5020-04425	5020-04435	5020-01771
	250	5020-04416	5020-04426	5020-04436	5020-01772
Particle Size: 4 µm	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-04611	5020-04621	5020-04631	5020-04641
	50	5020-04612	5020-04622	5020-04632	5020-04642
	75	5020-04613	5020-04623	5020-04633	5020-04643
	100	5020-04614	5020-04624	5020-04634	5020-04644
	125	5020-04617	5020-04627	5020-04637	5020-04647
	150	5020-04615	5020-04625	5020-04635	5020-04645
	250	5020-04616	5020-04626	5020-04636	5020-04646
Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-84511	5020-84521		
	50	5020-84512	5020-84522		
	75	5020-84513	5020-84523		
	100	5020-84514	5020-84524		
	150	5020-13251	5020-13241		
	250	5020-13252	5020-13242		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-04511	5020-04521	5020-04531	5020-04541
	50	5020-04512	5020-04522	5020-04532	5020-01763
	75	5020-04513	5020-04523	5020-04533	5020-01764
	100	5020-04514	5020-04524	5020-01766	5020-01765
	125	5020-04515	5020-04525	5020-01767	5020-01768
	150	5020-01741	5020-01751	5020-01761	5020-01731
	250	5020-01742	5020-01752	5020-01762	5020-01732
Particle Size: 10 µm	Length \ I.D. (mm)	4.6			
	150	5020-01631			
	250	5020-01632			

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.) Particle Size			Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder) Particle Size		
			3 µm	4 µm	5 µm	3 µm	4 µm	5 µm
1.0	10	1.0	5020-19205	5020-19204	5020-19203	5020-19255	5020-19254	5020-19253
1.5, 2.1		1.5	5020-19305	5020-19304	5020-19303	5020-19355	5020-19354	5020-19353
2.1, 3.0		3.0	5020-19105	5020-19104	5020-19103	5020-19155	5020-19154	5020-19153
4.0, 4.6		4.0	5020-19005	5020-19004	5020-19003	5020-19055	5020-19054	5020-19053
2.1, 3.0	20	3.0	5020-19505	5020-19504	5020-19503	5020-19555	5020-19554	5020-19553
4.0, 4.6		4.0	5020-19405	5020-19404	5020-19403	5020-19455	5020-19454	5020-19453
Holder for Cartridge Guard Column E				For 10 mm Length				5020-08500
				For 20 mm Length				5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® ODS-4V

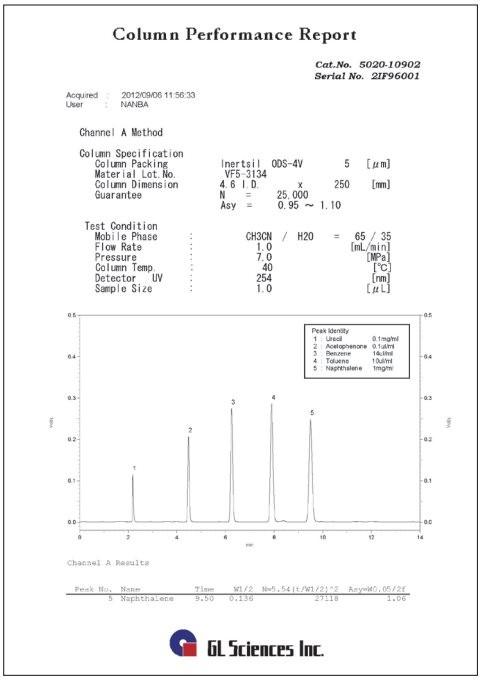
(Specifically Qualified HPLC columns for GLP/GMP Compliance Validation)

Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Octadecyl Groups
- **End-capping** : Yes
- **Carbon Loading** : 11 %
- **USP Code** : L1
- **pH Range** : 2 ~ 7.5

Inertsil ODS-4 columns have proven superior worldwide for analysis of strong pharmaceutical bases, acids, chelating compounds, and zwitterions. The long-awaited validated Inertsil ODS-4V has now been added to our product lineup.
Each Inertsil ODS-4V is delivered with a Manufacturer's Validation Certificate showing the detailed results of every QA and QC step in manufacturing.
By choosing Inertsil ODS-4V, you can be assured that you are using one of the most trusted and enduring HPLC columns for validation.

Details of Column Performance Report (Front Page)



Column Performance Report

Cat.No. 5020-10902
Serial No. 2IF96001

Acquired : 2012/09/06 11:56:33
User : NANBA

Channel A Method

Column Specification
Column Packing: Inertsil ODS-4V 5 [µm]
Material Lot.No.: VF5-3134
Column Dimension: 4.6 I.D. x 250 [mm]
Guarantee: N = 25,000
Asy = 0.95 ~ 1.10

Test Condition
Mobile Phase : CH3CN / H2O = 65 / 35
Flow Rate : 1.0 [mL/min]
Pressure : 7.0 [MPa]
Column Temp. : 40 [°C]
Detector UV : 254 [nm]
Sample Size : 1.0 [µL]

Peak Identity
1 : Uracil 0.1mg/ml
2 : Acetophenone 0.1µl/ml
3 : Benzene 1µl/ml
4 : Toluene 10µl/ml
5 : Naphthalene 1mg/ml

Channel A Results

Peak No.	Name	Time	W1/2	N=5.54(t/W1/2)^2	Asy=W0.05/2f
5	Naphthalene	9.50	0.136	27118	1.06

GL Sciences Inc.

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
Particle Size: 3 µm	50	5020-30212	5020-30222	5020-30232	5020-30242
	75	5020-30213	5020-30223	5020-30233	5020-30243
	100	5020-30214	5020-30224	5020-30234	5020-30244
	150	5020-30215	5020-30225	5020-30235	5020-30245
	250	5020-30216	5020-30226	5020-30236	5020-30246
	Length \ I.D. (mm)	3.0	4.0	4.6	
Particle Size: 5 µm	150	5020-10921	5020-10911	5020-10901	
	250	5020-10922	5020-10912	5020-10902	

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

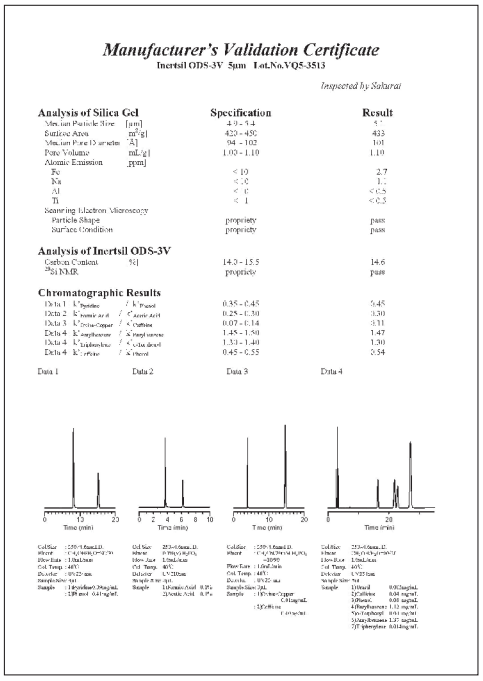
Inertsil® ODS-3V
(Specifically Qualified HPLC columns for GLP/GMP Compliance Validation)

Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Octadecyl Groups
- **End-capping** : Yes
- **Carbon Loading** : 15 %
- **USP Code** : L1
- **pH Range** : 2 ~ 7.5

Inertsil ODS-3V offers all of the outstanding chromatographic benefits of Inertsil ODS-3 with the added benefit of a more thoroughly documented, validated QC procedure consistent with the demands of GLP/GMP compliance. Each Inertsil ODS-3V is delivered with a Manufacturer's Validation Certificate showing the detailed results of every QA and QC step in manufacturing. The use of Inertsil ODS-3V columns provides an extra measure of assurance of consistent performance from column to column and batch to batch. Inertsil ODS-3V columns are also available in 3-column-sets packed with your choice of 3 different silica batches or a single silica batch to assist in reproducibility studies.

Details of Manufacturer's Validation Certificate (Back Page)



Manufacturer's Validation Certificate

Inertsil ODS-3V 5µm Lot.No.VQ5-3513

Inspected by Sakurai

Analysis of Silica Gel

	Specification	Result
Mean Particle Size [µm]	4.9 ~ 5.4	5.1
Surface Area [m^2/g]	420 ~ 450	433
Mean Pore Diameter [Å]	94 ~ 102	101
Pore Volume [mL/g]	1.03 ~ 1.10	1.10
Atomic Emission [ppm]		
Fe	< 10	2.7
Na	< 5	1.1
Al	< 10	< 0.5
Ti	< 1	< 0.5
Scanning Electron Microscopy		
Particle Shape	properiety	pass
Surface Condition	properiety	pass

Analysis of Inertsil ODS-3V

Carbon Content [%]	14.0 ~ 15.5	14.6
^{29}Si NMR	properiety	pass

Chromatographic Results

Data 1 k' Pyridine / k' Phenol	0.35 ~ 0.45	0.45
Data 2 k' Aniline / k' Acetic Acid	0.25 ~ 0.30	0.30
Data 3 k' Pyridine-Copper / k' Caffeine	0.07 ~ 0.14	0.11
Data 4 k' Amphetamine / k' Ethyl Benzene	1.45 ~ 1.50	1.47
Data 5 k' Diphenylamine / k' Quinizarin	1.33 ~ 1.40	1.30
Data 6 k' Caffeine / k' Phenol	0.45 ~ 0.55	0.54

Data 1 Data 2 Data 3 Data 4

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
Particle Size: 3 µm	50	5020-30112	5020-30122	5020-30132	5020-30142
	75	5020-30113	5020-30123	5020-30133	5020-30143
	100	5020-30114	5020-30124	5020-30134	5020-30144
	150	5020-30115	5020-30125	5020-30135	5020-30145
	250	5020-30116	5020-30126	5020-30136	5020-30146

	Length \ I.D. (mm)	3.0	4.0	4.6
Particle Size: 5 µm	150	5020-01821	5020-01811	5020-01801
	250	5020-01822	5020-01812	5020-01802

Validation Packs (3-Column-Sets)

Inertsil ODS-3V columns are also available in 3-column-sets packed with your choice of 3 different silica batches or a single silica batch to assist in reproducibility studies. Choose the column dimension and one of the following batch requirements.All three columns with single batch 2. Two columns with single batch and other a different batch 3. All three columns with different batches

	Length \ I.D. (mm)	3.0	4.0	4.6
Particle Size: 5 µm	150	5020-	5020-	5020-
	250	5020-	5020-	5020-

* *End-fittings are 1/16" Waters-compatible.
* *For maximum operating pressure information, please refer to page 46.

Inertsil® ODS-SP

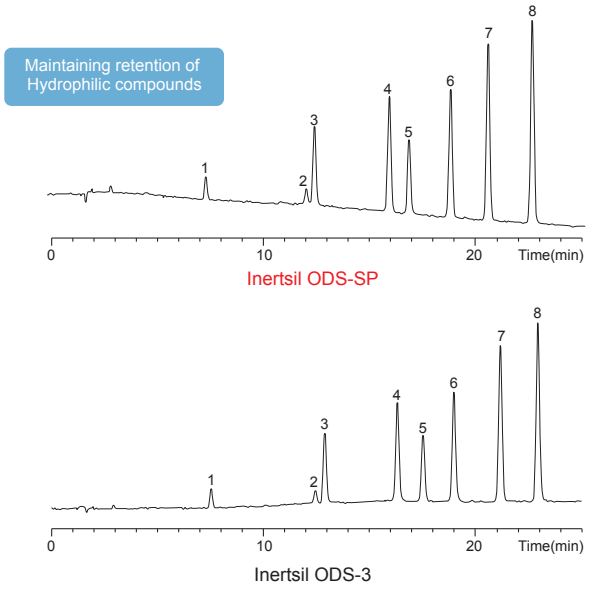
Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Octadecyl Groups
- **End-capping** : Yes
- **Carbon Loading** : 8.5 %
- **USP Code** : L1
- **pH Range** : 2 ~ 7.5

As shown in figure 1, Inertsil ODS-SP is super base deactivated and optimally bonded to retain hydrophilic compounds without excessive retention of hydrophobic compounds achieving better separations faster than before.
As the carbon load of Inertsil ODS-SP is relatively low, it is compatible with 100 % aqueous eluents and offer faster equilibration of column for gradient analysis.

Figure 1 : Comparison of Retention Behavior between Inertsil® ODS-3 and Inertsil ® ODS-SP

Conditions
Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) CH_3OH
B) 10 mM NaH_2PO_4
A/B = 10/90 – 30 min – 50/50, v/v
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 280 nm
Sample : 1. Gallocatechin (GC)
2. Epigallocatechin (EGC)
3. Catechin (C)
4. Epigallocatechin gallate (EGCg)
5. Epicatechin (EC)
6. Gallocatechin gallate (GCg)
7. Epicatechin gallate (ECg)
8. Catechin gallate (Cg)



Conditions
Column Size : 5 µm, 250 × 4.6 mm I.D.
Eluent : A) CH_3CN
B) 20 mM KH_2PO_4 (pH 3.0, H_3PO_4)
A/B = 70/30, v/v
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 280 nm
Sample : 1. Phenol
2. Bisphenol A
3. 4-Octylphenol
4. 4-Nonylphenol

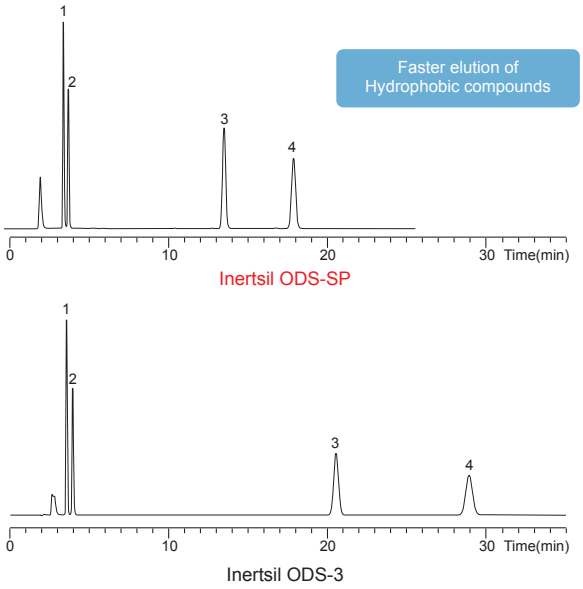
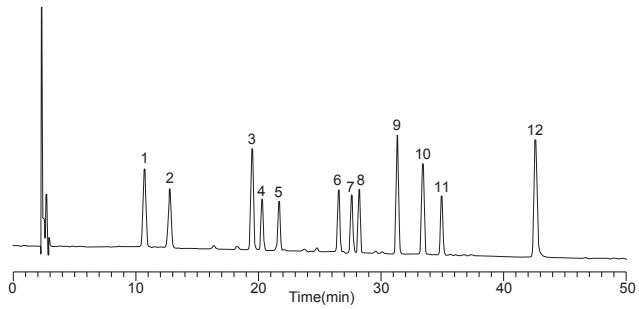


Figure 2 : Simultaneous Analysis of Soybean Isoflavone



Conditions
Column : Inertsil ODS-SP
(5 µm, 250 × 4.6 mm I.D.)
Eluent : A) 0.1 % CH_3COOH in CH_3CN
B) 0.1 % CH_3COOH in H_2O
A/B = 15/85 – 8 min – 15/85 – 42 min – 35/65 – 10 min hold, v/v
Flow Rate : 1.5 mL/min
Col. Temp. : 35 °C
Detection : UV 254 nm
Sample : 1. Daidzin (D)
2. Glycitin (Gly)
3. Genistin (GI)
4. 6"-O-malonyldaidzin (MD)
5. 6"-O-malonylglycitin (MGI)
6. 6"-O-acetyldaidzin (AD)
7. 6"-O-acetylglycitin (AGI)
8. 6"-O-malonylgenistin (MG)
9. Daizein (De)
10. Glycitein (Gle)
11. 6"-O-acetylgenistin (AG)
12. Genistein (Ge)

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	4.6
HPSeries Particle Size: 3 µm 50 MPa (500 Bar)	30	5020-14091	5020-14094	5020-14097
	50	5020-14092	5020-14095	5020-14098
	75	5020-14093	5020-14096	5020-14099
	100	5020-14021	5020-14024	5020-14027
	150	5020-14022	5020-14025	5020-14028
	250	5020-14023	5020-14026	5020-14029

* End-fittings are 1/16" Waters-compatible.
* UHPLC compatible end-fittings are also available upon request for UHPLC systems (Ex: UPLC) to avoid dead volume.
* Indicate "UP Type end-fittings" when ordering. (Please note that UP type is not available for a 4.6 mm I.D. column)
* For maximum operating pressure information, please refer to page 46.

	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
Particle Size: 3 µm	20	5020-02811	5020-02821	5020-02831	5020-02841
	50	5020-02812	5020-02822	5020-02832	5020-02842
	75	5020-02813	5020-02823	5020-02833	5020-02843
	100	5020-02814	5020-02824	5020-02834	5020-02844
	150	5020-02815	5020-02825	5020-02835	5020-02845
	250	5020-02816	5020-02826	5020-02836	5020-02846
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
Particle Size: 5 µm	20	5020-02711	5020-02721	5020-02731	5020-02741
	50	5020-02712	5020-02722	5020-02732	5020-02742
	75	5020-02713	5020-02723	5020-02733	5020-02743
	100	5020-02714	5020-02724	5020-02734	5020-02744
	150	5020-02715	5020-02725	5020-02735	5020-02745
	250	5020-02716	5020-02726	5020-02736	5020-02746

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19207	5020-19206	5020-19257	5020-19256
1.5, 2.1		1.5	5020-19307	5020-19306	5020-19357	5020-19356
2.1, 3.0		3.0	5020-19107	5020-19106	5020-19157	5020-19156
4.0, 4.6		4.0	5020-19007	5020-19006	5020-19057	5020-19056
2.1, 3.0	20	3.0	5020-19507	5020-19506	5020-19557	5020-19556
4.0, 4.6		4.0	5020-19407	5020-19406	5020-19457	5020-19456
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

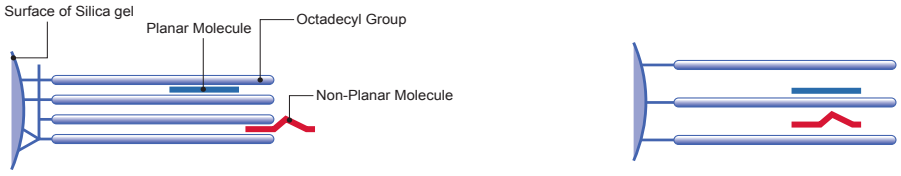
Inertsil® ODS-P

Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Octadecyl Groups
- **End-capping** : None
- **Carbon Loading** : 29 %
- **USP Code** : L1
- **pH Range** : 2 ~ 7.5

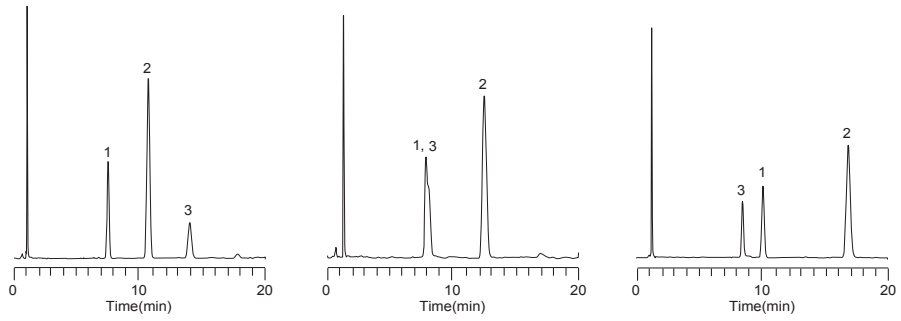
GL Sciences offers a polymerically bonded ODS-P phase which provide high steric selectivity for separation of planar and non-planar compounds as shown in figure 1. This polymeric type C18 column delivers complete baseline separation of structurally similar compounds such as vitamins D2 and D3 which is illustrated in figure 2. Inertsil ODS-P columns are also ideal for the HPLC analysis of 16 PAH compounds, listed as target pollutants by the U.S. EPA.

Figure 1 : Classification of Inertsil® ODS phases by Standard Reference Material 869

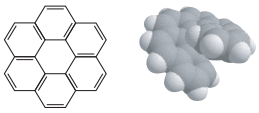


Conditions
Column Size : 5 µm, 250 × 4.6 mm I.D.
Eluent : A) CH_3CN
B) H_2O
A/B = 85/15, v/v
Flow Rate : 2.0 mL/min
Col. Temp. : 30 °C
Detection : UV 254 nm

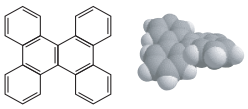
Polymeric	Intermediate	Monomeric
$\alpha = k'_{TBN}/k'_{BaP} = 0.7$	$\alpha = 1.7$	$\alpha = 2.2$
$\alpha \geq 1$: Polymeric-like	$1 < \alpha < 1.7$: Intermediate	$\alpha \geq 1.7$: Monomeric-like



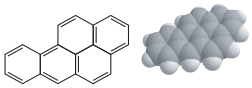
Inertsil ODS-P | Inertsil ODS-2 | Inertsil ODS-3



1. Phenanthro[3,4-c]phenanthrene (PhPh)

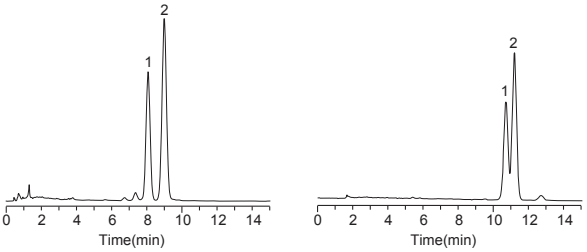


2. Tetrabenzonaphthalene (TBN)



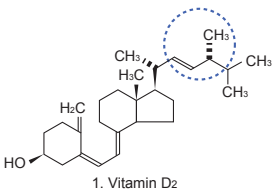
3. Benzo[a]pyrene (BaP)

Figure 2 : Comparison of Selectivity between a Polymeric and Monomeric type C18 phase

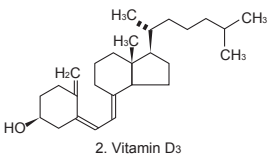


Inertsil ODS-P | Inertsil ODS-3

Conditions
Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) CH_3CN
B) CH_3OH
A/B = 75/25, v/v
Flow Rate : 1.0 mL/min
Col. Temp. : 30 °C
Detection : UV 280 nm



1. Vitamin D_2



2. Vitamin D_3

Analytical Columns

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	33	5020-84731	5020-84741		
	50	5020-84732	5020-84742		
	75	5020-84733	5020-84743		
	100	5020-84734	5020-84744		
	150	5020-84735	5020-84745		
	250	5020-84736	5020-84746		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-04661	5020-04671	5020-04681	5020-04691
	50	5020-04662	5020-04672	5020-04682	5020-04692
	75	5020-04663	5020-04673	5020-04683	5020-04693
	100	5020-04664	5020-04674	5020-04684	5020-04694
	150	5020-04665	5020-04675	5020-04685	5020-04695
	250	5020-04666	5020-04676	5020-04686	5020-04696
	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 5 µm	33	5020-84711	5020-84721		
	50	5020-84712	5020-84722		
	75	5020-84713	5020-84723		
	100	5020-84714	5020-84724		
	150	5020-84715	5020-84725		
	250	5020-84716	5020-84726		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-04711	5020-04721	5020-04731	5020-04741
	50	5020-04712	5020-04722	5020-04732	5020-04742
	75	5020-04713	5020-04723	5020-04733	5020-04743
	100	5020-04714	5020-04724	5020-04734	5020-04744
	150	5020-04715	5020-04725	5020-04735	5020-02001
	250	5020-04716	5020-04726	5020-04736	5020-02002

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19209	5020-19208	5020-19259	5020-19258
1.5, 2.1		1.5	5020-19309	5020-19308	5020-19359	5020-19358
2.1, 3.0		3.0	5020-19109	5020-19108	5020-19159	5020-19158
4.0, 4.6		4.0	5020-19009	5020-19008	5020-19059	5020-19058
2.1, 3.0	20	3.0	5020-19509	5020-19508	5020-19559	5020-19558
4.0, 4.6		4.0	5020-19409	5020-19408	5020-19459	5020-19458
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® ODS-EP

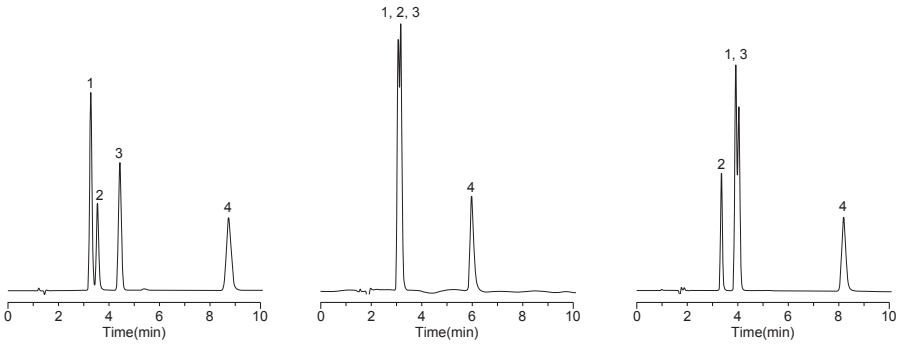
Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Octadecyl Groups
- **End-capping** : None
- **Carbon Loading** : 9 %
- **USP Code** : L1
- **pH Range** : 2 ~ 7.5

PG : Polar Group

Inertsil ODS-EP contains a polar functional group embedded between the silica surface and the C18 group.
The embedded polar group makes the C18 phase stable in 100 % aqueous eluents without "phase collapse."
This phase is also extremely "base deactivated" and provides superior peak shape for acids and bases in organic eluents as well as acidified eluents typically used in LC/MS.

Figure 1 : Comparison of Selectivity between various reversed phased columns



Inertsil ODS-EP　　Inertsil Ph-3　　Inertsil C8-3

Conditions

Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) CH_3OH
B) 10 mM KH_2PO_4(pH 7.0, K_2HPO_4)
A/B = 50/50, v/v
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 210 nm

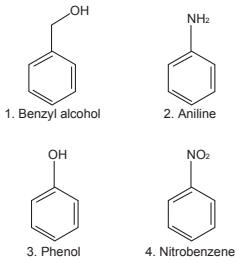
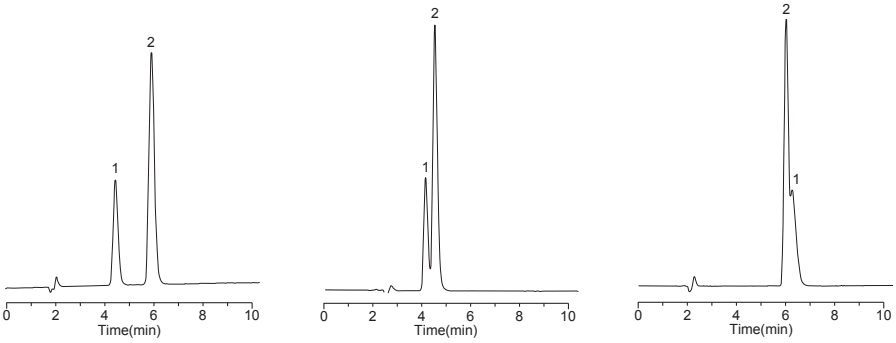


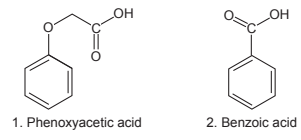
Figure 2 : Unique Selectivity of an Embedded Polar C18 Phase



Inertsil ODS-EP　　Inertsil Ph-3　　Inertsil ODS-3

Conditions

Column Size : 5 µm, 150 × 3.0 mm I.D.
Eluent : A) CH_3OH
B) 0.1 % HCOOH in H_2O
A/B = 50/50, v/v
Flow Rate : 0.4 mL/min
Col. Temp. : 40 °C
Detection : UV 254 nm



Analytical Columns

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 5 µm	33	5020-18211	5020-18221		
	50	5020-18212	5020-18222		
	75	5020-18213	5020-18223		
	100	5020-18214	5020-18224		
	150	5020-18215	5020-18225		
	250	5020-18216	5020-18226		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-02611	5020-02621	5020-02631	5020-02641
	50	5020-02612	5020-02622	5020-02632	5020-02642
	75	5020-02613	5020-02623	5020-02633	5020-02643
	100	5020-02614	5020-02624	5020-02634	5020-02644
	150	5020-02615	5020-02625	5020-02635	5020-02645
	250	5020-02616	5020-02626	5020-02636	5020-02646

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
1.0	10	1.0	5020-19210	5020-19260
1.5, 2.1		1.5	5020-19310	5020-19360
2.1, 3.0		3.0	5020-19110	5020-19160
4.0, 4.6		4.0	5020-19010	5020-19060
2.1, 3.0	20	3.0	5020-19510	5020-19560
4.0, 4.6		4.0	5020-19410	5020-19460
Holder for Cartridge Guard Column E		For 10 mm Length		5020-08500
		For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

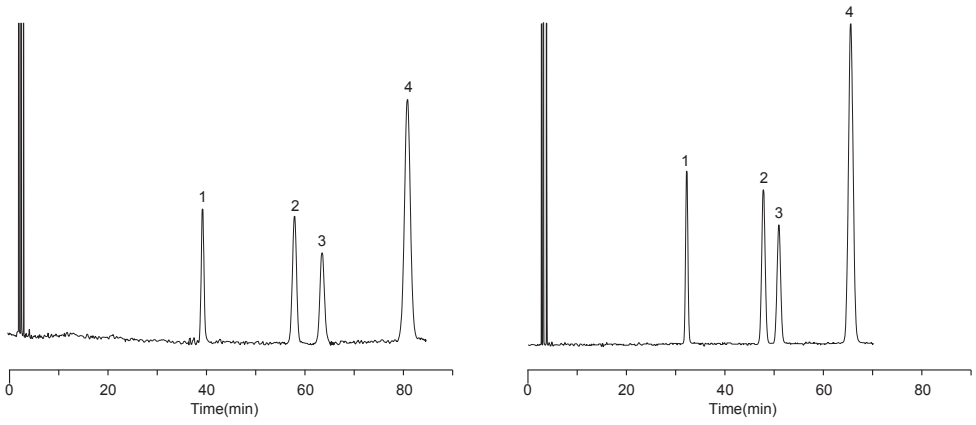
Inertsil® ODS-80A

Physical Properties

- **Silica** : **2 Series High Purity Silica Gel**
- **Particle Size** : **5 µm**
- **Surface Area** : **450 m^2/g**
- **Pore Size** : **80 Å (8 nm)**
- **Pore Volume** : **0.80 mL/g**
- **Bonded Phase** : **Octadecyl Groups**
- **End-capping** : **Yes**
- **Carbon Loading** : **17.5 %**
- **USP Code** : **L1**
- **pH Range** : **2 ~ 7.5**

A relatively small pore size of 80 Å with high surface area silica delivers high number of theoretical plates for small molecule samples.
GL Sciences' InertSustain C18 and Inertsil ODS-4 were a major advancement on the Inertsil ODS-80A columns, and generally provide superior chromatography and alternative selectivity to the Inertsil ODS-80A.
We recommend InertSustain C18 or Inertsil ODS-4 columns for all new method development.

Figure 1 : Comparison With Inertsil® ODS-2

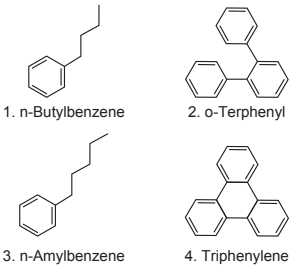


Guaranteed Number of Theoretical Plates Above 25,000
Inertsil ODS-80A[Pore Size 80 Å(8 nm)]

Guaranteed Number of Theoretical Plates Above 22,000
Inertsil ODS-2[Pore Size 150 Å(15 nm)]

Conditions

Column Size	: 5 µm, 250 × 4.6 mm I.D.
Eluent	: A) CH_3OH
	B) H_2O
	A/B = 70/30, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm



1. n-Butylbenzene
2. o-Terphenyl
3. n-Amylbenzene
4. Triphenylene

Analytical Columns

Particle Size: 5 µm	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	150	5020-01621	5020-01622	5020-01623	5020-01624
	250	5020-01625	5020-01626	5020-01627	5020-01628

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
2.1, 3.0	10	3.0	5020-19140	5020-19190
4.0, 4.6		4.0	5020-19040	5020-19090
2.1, 3.0	20	3.0	5020-19540	5020-19590
4.0, 4.6		4.0	5020-19440	5020-19490
Holder for Cartridge Guard Column E		For 10 mm Length		5020-08500
		For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

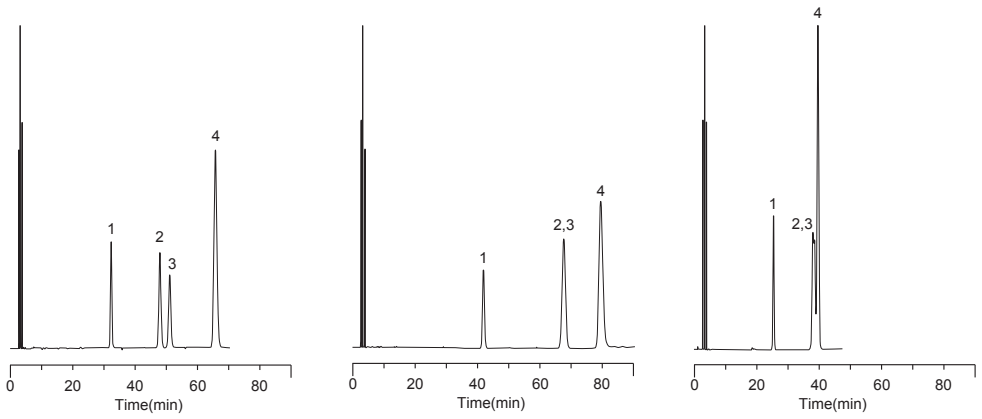
Inertsil® ODS-2

Physical Properties

- **Silica** : 2 Series High Purity Silica Gel
- **Particle Size** : 5 µm
- **Surface Area** : 320 m^2/g
- **Pore Size** : 150 Å (15 nm)
- **Pore Volume** : 1.20 mL/g
- **Bonded Phase** : Octadecyl Groups
- **End-capping** : Yes
- **Carbon Loading** : 18.5 %
- **USP Code** : L1
- **pH Range** : 2 ~ 7.5

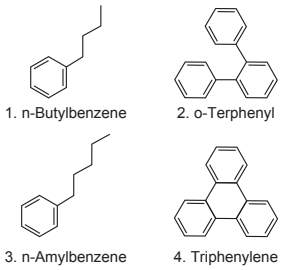
Inertsil ODS-2 columns have a pore size of 150 Å offering symmetric peaks for bases, acids with low pressure. When Inertsil ODS-2 was introduced in 1987s, this HPLC transformed the entire industry. Inertsil ODS-2 was the first HPLC phase created using ultra high purity silica, which produced superior base deactivation. Until this phase was eclipsed by the performance of it's sibling Inertsil ODS-4, it was GL Sciences' most popular phase and continues to be used widely and reliably for long established methods in pharmaceutical and environmental labs. We recommend Inertsil ODS-4 columns for all new method development.

Figure 1 : Comparison of Retentivity with various Inertsil® ODS Bonded Phases



Conditions

Column Size	: 5 µm, 250 × 4.6 mm I.D.
Eluent	: A) CH_3OH B) H_2O A/B = 70/30, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm



Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
Particle Size: 5 µm	150	5020-01121	5020-01122	5020-01123	5020-01124
	250	5020-01125	5020-01126	5020-01127	5020-01128

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

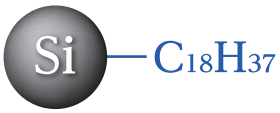
I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
2.1, 3.0	10	3.0	5020-19135	5020-19185
4.0, 4.6		4.0	5020-19035	5020-19085
2.1, 3.0	20	3.0	5020-19535	5020-19585
4.0, 4.6		4.0	5020-19435	5020-19485
Holder for Cartridge Guard Column E		For 10 mm Length		5020-08500
		For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® ODS

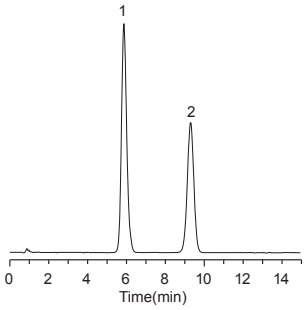
Physical Properties

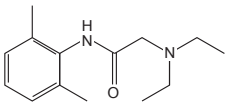
- **Silica** : **Spherical Silica Gel**
- **Particle Size** : **5 µm, 10 µm**
- **Surface Area** : **350 m^2/g**
- **Pore Size** : **100 Å (10 nm)**
- **Pore Volume** : **1.00 mL/g**
- **Bonded Phase** : **Octadecyl Groups**
- **End-capping** : **Yes**
- **Carbon Loading** : **14 %**
- **USP Code** : **L1**
- **pH Range** : **2 ~ 7.5**



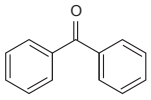
Inertsil ODS columns are general purpose, reversed phase C18 columns available in 5 µm and 10 µm particle sizes.
It was the first ODS bonded phase introduced from GL Sciences back in 1986.
We recommend InertSustain C18 or Inertsil ODS-4 columns for all new method development.

Figure 1 : Analysis of Lidocain under a condition based on the 16th Edition Japanese Pharmacopeia





1. Lidocain



2. Benzophenone

Conditions

Column : Inertsil ODS
(10 µm, 150 × 4.0 mm I.D.)
Eluent : A) 2.88 g Sodium laulyl salfate in CH_3CN
B) 0.02 M NaH_2PO_4 (pH 3.0, H_3PO_4)
A/B = 9/11, v/v
Flow Rate : 1.4 mL/min
Col. Temp. : 25 °C
Detection : UV 254 nm

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
Particle Size: 5 µm	150	5020-02121	5020-02122	5020-02123	5020-02124
	250	5020-02125	5020-02126	5020-02127	5020-02128
Particle Size: 10 µm	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	150	5020-02221	5020-02222	5020-02223	5020-02224
	250	5020-02225	5020-02226	5020-02227	5020-02228

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			5 µm	10 µm	5 µm	10 µm
2.1, 3.0	10	3.0	5020-19141	5020-19142	5020-19191	5020-19192
4.0, 4.6		4.0	5020-19041	5020-19042	5020-19091	5020-19092
2.1, 3.0	20	3.0	5020-19541	5020-19542	5020-19591	5020-19592
4.0, 4.6		4.0	5020-19441	5020-19442	5020-19491	5020-19492
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

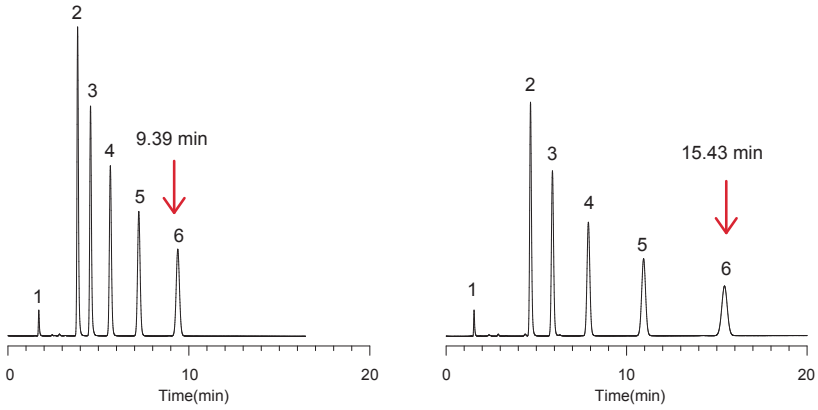
InertSustain® C8

Physical Properties

- **Silica** : **Newly Developed ES Silica Gel**
- **Particle Size** : **3 µm, 5 µm**
- **Surface Area** : **350 m^2/g**
- **Pore Size** : **100 Å (10 nm)**
- **Pore Volume** : **0.85 mL/g**
- **Bonded Phase** : **Octyl Groups**
- **End-capping** : **Complete**
- **Carbon Loading** : **8 %**
- **USP Code** : **L7**
- **pH Range** : **1 ~ 10**

IInertSustain C8 is an octyl group (C8) bonded column delivering the same extreme inertness to any type of compounds just like InertSustain C18, which enables rapid analysis of highly hydrophobic compounds delivering symmetric peaks at a wide range of pH.

Figure 1 : Comparison of Retentivity between InertSustain® C18 and InertSustain® C8

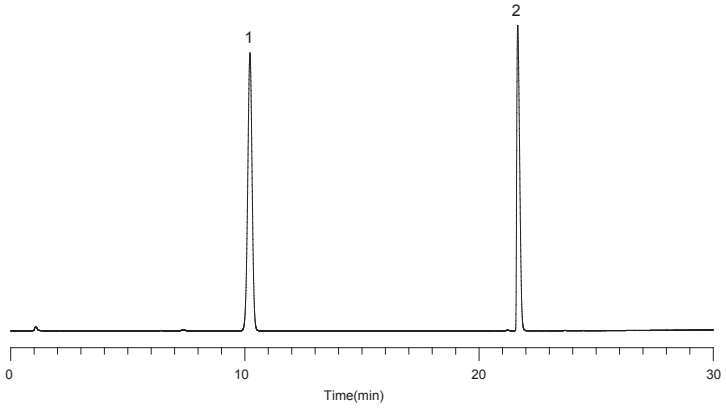


Conditions

Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A)CH_3OH
B)H_2O
A/B = 80/20, v/v
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 254 nm

Sample : 1. Uracil
2. Toluene
3. Ethylbenzene
4. Propylbenzene
5. *n*-Butylbenzene
6. *n*-Amylbenzene

Figure 2 : Analysis of Losartan Potassium and Hydrochlorothiazide Tablets, Assay Test (Based on the Condition of United States Pharmacopeia 36-NF31)



Conditions

Column : InertSustainC8(5 µm,150 × 4.0 mm I.D.)
Eluent : A)CH_3CN/Buffer* = 7/93,v/v(Premix)
B)CH_3CN
A/B=100/0 – 12min – 92/8 – 16min – 38/62 – 2min – 100/0 – 5min – 100/0,v/v
Flow Rate : 1.0mL/min
Col.Temp. : 35 °C
Detection : UV280 nm(GL-7450 UV Detector)
InjectionVol. : 20 µL
Sample : 1. Hydrochlorothiazide 0.1 mg/mL
2. Losartan Potassium 0.4 mg/mL
Tailing factor of 2 : 1.79 (< 2.5)

* Buffer : 1.25 g/L of monobasic potassium phosphate and 1.5 g/L of dibasic sodium phosphate n water.

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	
Particle Size: 2 µm	30	5020-16235	5020-16240	
	50	5020-16236	5020-16241	
	75	5020-16237	5020-16242	
	100	5020-16238	5020-16243	
	150	5020-16239	5020-16244	
	Length \ I.D. (mm)	2.1	3.0	4.6
HPSeries Particle Size: 3 µm 50 MPa (500 Bar)	30	5020-16217	5020-16223	5020-16229
	50	5020-16218	5020-16224	5020-16230
	75	5020-16219	5020-16225	5020-16231
	100	5020-16220	5020-16226	5020-16232
	150	5020-16221	5020-16227	5020-16233
	250	5020-16222	5020-16228	5020-16234

* End-fittings are 1/16" Waters-compatible.
* UHPLC compatible end-fittings are also available upon request for UHPLC systems (Ex: UPLC) to avoid dead volume.
* Indicate "UP Type end-fittings" when ordering. (Please note that UP type is not available for a 4.6 mm I.D. column)
* For maximum operating pressure information, please refer to page 46.

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	30	5020-16168	5020-16174		
	50	5020-16169	5020-16175		
	75	5020-16170	5020-16176		
	100	5020-16171	5020-16177		
	150	5020-16172	5020-16178		
	250	5020-16173	5020-16179		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-16132	5020-16139	5020-16146	5020-16153
	50	5020-16133	5020-16140	5020-16147	5020-16154
	75	5020-16134	5020-16141	5020-16148	5020-16155
	100	5020-16135	5020-16142	5020-16149	5020-16156
	125	5020-16855	5020-16856	5020-16857	5020-16858
	150	5020-16136	5020-16143	5020-16150	5020-16157
	250	5020-16137	5020-16144	5020-16151	5020-16158
	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 5 µm	30	5020-16039	5020-16045		
	50	5020-16040	5020-16046		
	75	5020-16041	5020-16047		
	100	5020-16042	5020-16048		
	150	5020-16043	5020-16049		
	250	5020-16044	5020-16050		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-16002	5020-16009	5020-16016	5020-16023
	50	5020-16003	5020-16010	5020-16017	5020-16024
	75	5020-16004	5020-16011	5020-16018	5020-16025
	100	5020-16005	5020-16012	5020-16019	5020-16026
	125	5020-16851	5020-16852	5020-16853	5020-16854
	150	5020-16006	5020-16013	5020-16020	5020-16027
	250	5020-16007	5020-16014	5020-16021	5020-16028

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-16207	5020-16106	5020-16208	5020-16107
1.5, 2.1		1.5	5020-16209	5020-16108	5020-16210	5020-16109
2.1, 3.0		3.0	5020-16205	5020-16104	5020-16206	5020-16105
4.0, 4.6		4.0	5020-16203	5020-16102	5020-16204	5020-16103
2.1, 3.0	20	3.0	5020-16213	5020-16112	5020-16214	5020-16113
4.0, 4.6		4.0	5020-16211	5020-16110	5020-16212	5020-16111
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

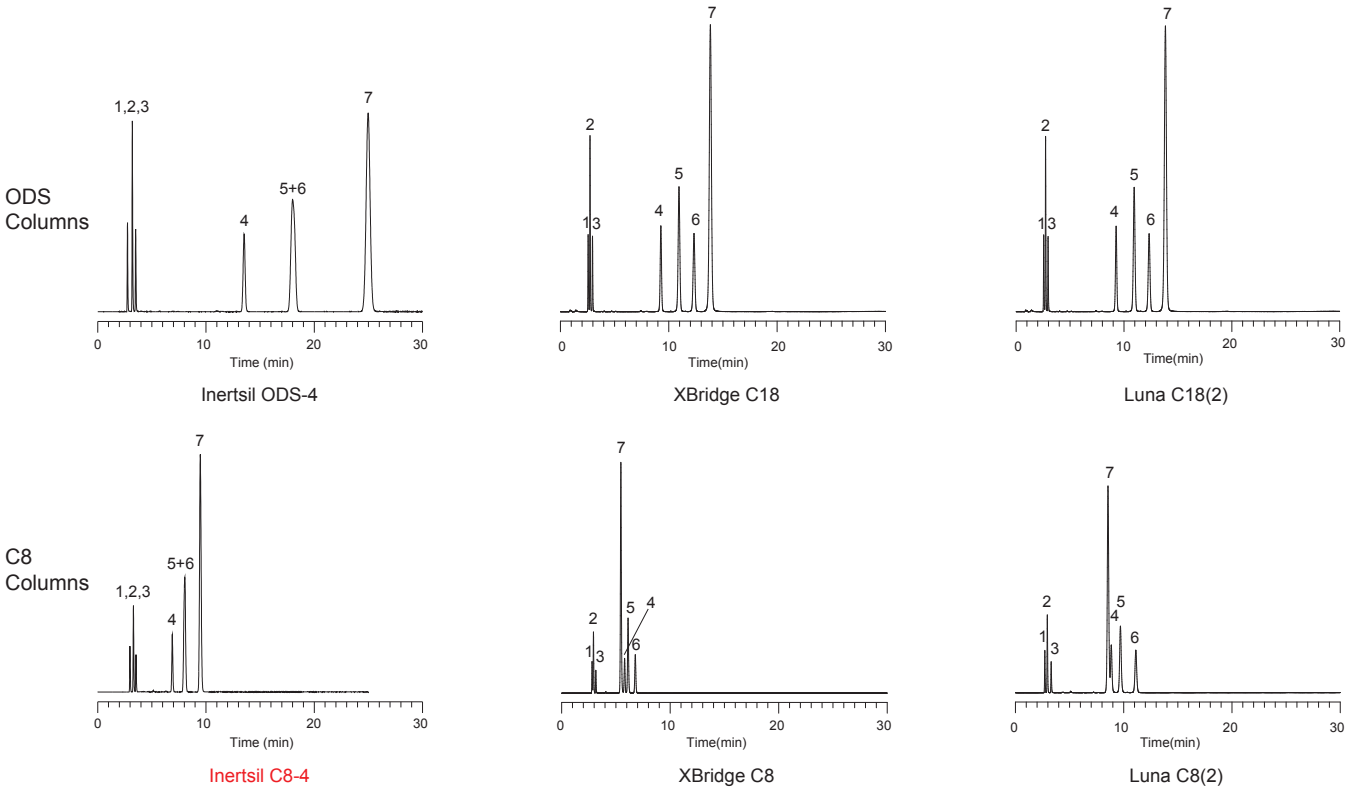
Inertsil® C8-4

Physical Properties

- **Silica** : **3 Series High Purity Silica Gel**
- **Particle Size** : **2 µm, 3 µm, 5 µm**
- **Surface Area** : **450 m^2/g**
- **Pore Size** : **100 Å (10 nm)**
- **Pore Volume** : **1.05 mL/g**
- **Bonded Phase** : **Octyl Groups**
- **End-capping** : **Yes**
- **Carbon Loading** : **5 %**
- **USP Code** : **L7**
- **pH Range** : **2 ~ 7.5**

Many chromatographers prefer a C8 column when an ODS phase shows excessive retention values. Inertsil C8-4 provides the same separation pattern (selectivity) and extreme inertness to any type of compounds just like Inertsil ODS-4, which enables easy method transfer from ODS-4 to C8-4 while other commercially available ODS and C8 columns can show dramatically different selectivity even though they are part of the same brand/series.

Figure 1 : Comparison of Separation Pattern between ODS and C8 Columns



Conditions

Column Size	: 5 µm, 250 × 4.6 mm I.D.	1. Uracil	(0.005 mg/mL)
Eluent	: A) CH_3OH	2. Caffeine	(0.04 mg/mL)
	B) H_2O	3. Phenol	(0.08 mg/mL)
	A / B = 80/20, v/v	4. *n*-Butylbenzene	(1.12 mg/mL)
Flow Rate	: 1.0 mL/min	5. *o*-Terphenyl	(0.04 mg/mL)
Col. Temp.	: 40 °C	6. *n*-Amylbenzene	(1.37 mg/mL)
Detection	: UV 254 nm	7. Triphenylene	(0.014 mg/mL)
Injection Vol.	: 5 µL		

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	
Particle Size: 2 µm	30	5020-81280	5020-81290	
	50	5020-81282	5020-81292	
	75	5020-81283	5020-81293	
	100	5020-81284	5020-81294	
	150	5020-81285	5020-81295	
	Length \ I.D. (mm)	2.1	3.0	4.6
HPSeries Particle Size: 3 µm 50 MPa (500 Bar)	30	5020-14071	5020-14074	5020-14077
	50	5020-14072	5020-14075	5020-14078
	75	5020-14073	5020-14076	5020-14079
	100	5020-14051	5020-14054	5020-14057
	150	5020-14052	5020-14055	5020-14058
	250	5020-14053	5020-14056	5020-14059

* End-fittings are 1/16" Waters-compatible.
* UHPLC compatible end-fittings are also available upon request for UHPLC systems (Ex: UPLC) to avoid dead volume.
* Indicate "UP Type end-fittings" when ordering. (Please note that UP type is not available for a 4.6 mm I.D. column)
* For maximum operating pressure information, please refer to page 46.

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	30	5020-81261	5020-81271		
	50	5020-81262	5020-81272		
	75	5020-81263	5020-81273		
	100	5020-81264	5020-81274		
	150	5020-81265	5020-81275		
	250	5020-81266	5020-81276		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-03971	5020-03978	5020-03985	5020-03992
	50	5020-03972	5020-03979	5020-03986	5020-03993
	75	5020-03973	5020-03980	5020-03987	5020-03994
	100	5020-03974	5020-03981	5020-03988	5020-03995
	125	5020-03977	5020-03984	5020-03991	5020-03998
	150	5020-03975	5020-03982	5020-03989	5020-03996
	250	5020-03976	5020-03983	5020-03990	5020-03997
	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 5 µm	30	5020-81221	5020-81231		
	50	5020-81222	5020-81232		
	75	5020-81223	5020-81233		
	100	5020-81224	5020-81234		
	150	5020-81225	5020-81235		
	250	5020-81226	5020-81236		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-04051	5020-04061	5020-04071	5020-04081
	50	5020-04052	5020-04062	5020-04072	5020-04082
	75	5020-04053	5020-04063	5020-04073	5020-04083
	100	5020-04054	5020-04064	5020-04074	5020-04084
	125	5020-04057	5020-04067	5020-04077	5020-04080
	150	5020-04055	5020-04065	5020-04075	5020-04085
	250	5020-04056	5020-04066	5020-04076	5020-04086

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19247	5020-19246	5020-19297	5020-19296
1.5, 2.1		1.5	5020-19347	5020-19346	5020-19397	5020-19396
2.1, 3.0		3.0	5020-19147	5020-19146	5020-19197	5020-19196
4.0, 4.6		4.0	5020-19047	5020-19046	5020-19097	5020-19096
2.1, 3.0	20	3.0	5020-19547	5020-19546	5020-19597	5020-19596
4.0, 4.6		4.0	5020-19447	5020-19446	5020-19497	5020-19496
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

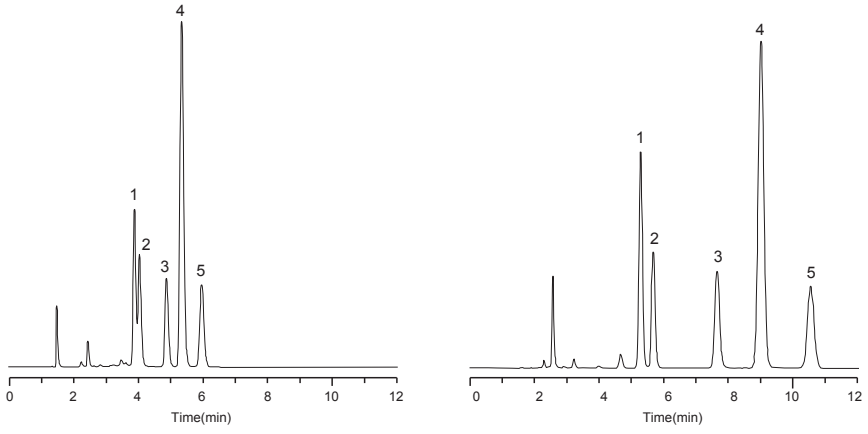
Inertsil® C8-3

Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 2 µm, 3 µm, 5 µm, 10 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Octyl Groups
- **End-capping** : Yes
- **Carbon Loading** : 9 %
- **USP Code** : L7
- **pH Range** : 2 ~ 7.5

The same base silica gel and bonding technology that is used for Inertsil ODS-3 is also employed for Inertsil C8-3.
The difference between the two phases is just the length of the hydrocarbon ligands. As shown in figure 2, 10 µm particle size columns are also available to meet the requirement of various pharmacopeia methods.
We recommend InertSustain C8 columns for all new method development.

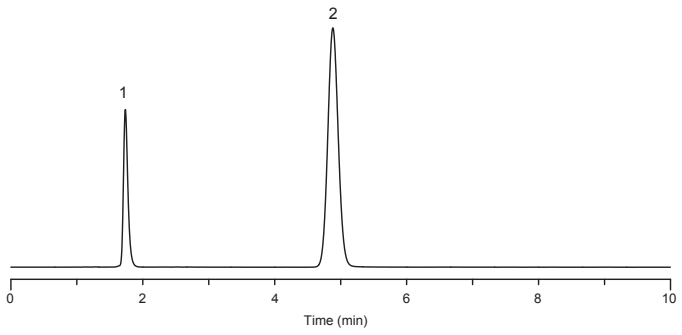
Figure 1 : Comparison of Retentivity between Inertsil® ODS-3 and Inertsil® C8-3



Conditions

Column Size: 5 µm, 150 × 4.6 mm I.D.
Eluent : A) CH_3CN
B) H_2O
A/B = 70/30, v/v
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 254 nm
Sample : 1. Naphthalene
2. Ethylbenzene
3. n-Propylbenzene
4. Anthracene
5. n-Butylbenzene

Figure 2 : Analysis of Losartan Potassium and Hydrochlorothiazide Tablets, Dissolution Test (Based on the Condition of United States Pharmacopeia 36-NF31)



Conditions

Column : Inertsil C8-3 (10 µm, 250 × 4.6 mm I.D.)
Eluent : A) CH_3CN
B) 10 mM KH_2PO_4 (pH 2.5, H_3PO_4)
A/B = 40/60, v/v
Flow Rate : 2.3 mL/min
Col. Temp. : 35 °C
Detection : UV 230 nm
Injection Vol. : 20 µL
Sample : 1. Hydrochlorothiazide (14 mg/L)
2. Losartan potassium (60 mg/L)

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	
Particle Size: 2 µm	30	5020-84930	5020-84935	
	50	5020-84931	5020-84936	
	75	5020-84932	5020-84937	
	100	5020-84933	5020-84938	
	150	5020-84934	5020-84939	
	Length \ I.D. (mm)	2.1	3.0	4.6
HPSeries Particle Size: 3 µm 50 MPa (500 Bar)	30	5020-14101	5020-14104	5020-14107
	50	5020-14102	5020-14105	5020-14108
	75	5020-14103	5020-14106	5020-14109
	100	5020-14031	5020-14034	5020-14037
	150	5020-14032	5020-14035	5020-14038
	250	5020-14033	5020-14036	5020-14039

* End-fittings are 1/16" Waters-compatible.
* UHPLC compatible end-fittings are also available upon request for UHPLC systems (Ex: UPLC) to avoid dead volume.
* Indicate "UP Type end-fittings" when ordering. (Please note that UP type is not available for a 4.6 mm I.D. column)
* For maximum operating pressure information, please refer to page 46.

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	33	5020-84811	5020-84821		
	50	5020-84812	5020-84822		
	75	5020-84813	5020-84823		
	100	5020-84814	5020-84824		
	150	5020-13522	5020-13520		
	250	5020-	5020-		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-04811	5020-04821	5020-04831	5020-04841
	50	5020-04812	5020-04822	5020-04832	5020-04842
	75	5020-04813	5020-04823	5020-04833	5020-01910
	100	5020-04814	5020-04824	5020-01913	5020-04844
	125	5020-04817	5020-04827	5020-04837	5020-04845
	150	5020-04815	5020-04825	5020-04835	5020-01911
	250	5020-04816	5020-04826	5020-04836	5020-01912
	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 5 µm	33	5020-84911	5020-84921		
	50	5020-84912	5020-84922		
	75	5020-84913	5020-84923		
	100	5020-84914	5020-84924		
	150	5020-13512	5020-13510		
	250	5020-84916	5020-84926		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-04911	5020-04921	5020-04931	5020-04941
	50	5020-04912	5020-04922	5020-04932	5020-04942
	75	5020-04913	5020-04923	5020-04933	5020-04943
	100	5020-04914	5020-04924	5020-04934	5020-04944
	125	5020-04917	5020-04927	5020-04935	5020-04945
	150	5020-04915	5020-04925	5020-01902	5020-01900
	250	5020-04916	5020-04926	5020-01903	5020-01901
	Length \ I.D. (mm)	4.6			
Particle Size: 10 µm	150	5020-01641			
	250	5020-01642			

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

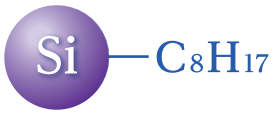
I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19215	5020-19214	5020-19265	5020-19264
1.5, 2.1		1.5	5020-19315	5020-19314	5020-19365	5020-19364
2.1, 3.0		3.0	5020-19115	5020-19114	5020-19165	5020-19164
4.0, 4.6		4.0	5020-19015	5020-19014	5020-19065	5020-19064
2.1, 3.0	20	3.0	5020-19515	5020-19514	5020-19565	5020-19564
4.0, 4.6		4.0	5020-19415	5020-19414	5020-19465	5020-19464
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® C8

Physical Properties

- **Silica : 2 Series High Purity Silica Gel**
- **Particle Size : 5 µm**
- **Surface Area : 320 m^2/g**
- **Pore Size : 150 Å (15 nm)**
- **Pore Volume : 1.20 mL/g**
- **Bonded Phase : Octyl Groups**
- **End-capping : Yes**
- **Carbon Loading : 10.5 %**
- **USP Code : L1**
- **pH Range : 2 ~ 7.5**



Inertsil C8 columns have a pore size of 150 Å and it is recommended for rapid analysis of highly hydrophobic compounds. We recommend InertSustain C8 or Inertsil C8-4 columns for all new method development.

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
Particle Size: 5 µm	150	5020-01221	5020-01222	5020-01223	5020-01224
	250	5020-01225	5020-01226	5020-01227	5020-01228

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
2.1, 3.0	10	3.0	5020-19136	5020-19186
4.0, 4.6		4.0	5020-19036	5020-19086
2.1, 3.0	20	3.0	5020-19536	5020-19586
4.0, 4.6		4.0	5020-19436	5020-19486
Holder for Cartridge Guard Column E		For 10 mm Length		5020-08500
		For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

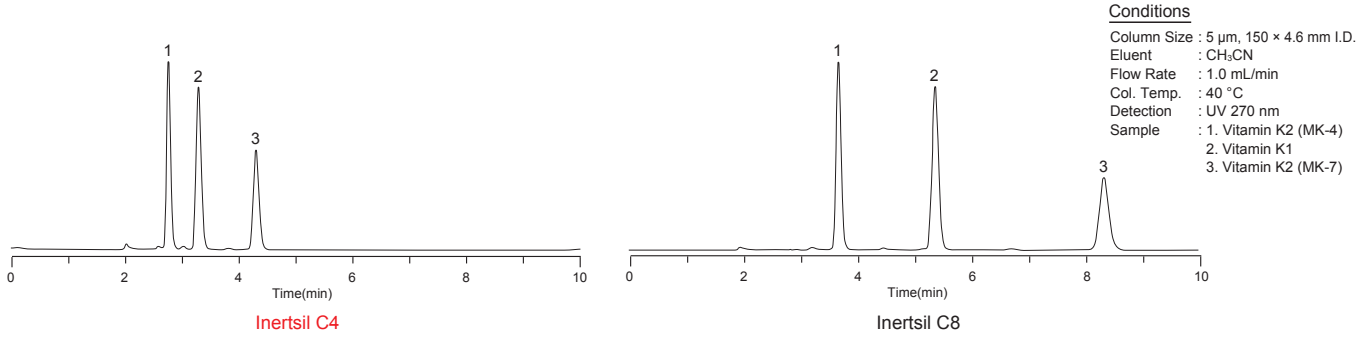
Inertsil® C4

Physical Properties

- **Silica : 2 Series High Purity Silica Gel**
- **Particle Size : 5 µm**
- **Surface Area : 320 m^2/g**
- **Pore Size : 150 Å (15 nm)**
- **Pore Volume : 1.20 mL/g**
- **Bonded Phase : Butyl Groups**
- **End-capping : Yes**
- **Carbon Loading : 7.5 %**
- **USP Code : L26**
- **pH Range : 2 ~ 7.5**

Inertsil C4 columns have a pore size of 150 Å and is recommended for rapid analysis of highly hydrophobic compounds such as fat-soluble vitamins.

Figure 1: Comparison of Retentivity between Inertsil® C4 and Inertsil® C8



Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
Particle Size: 5 µm	150	5020-01421	5020-01422	5020-01423	5020-01424
	250	5020-01425	5020-01426	5020-01427	5020-01428

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

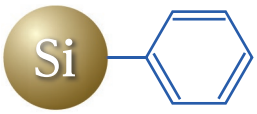
I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
2.1, 3.0	10	3.0	5020-19138	5020-19188
4.0, 4.6		4.0	5020-19038	5020-19088
2.1, 3.0	20	3.0	5020-19538	5020-19588
4.0, 4.6		4.0	5020-19438	5020-19488
Holder for Cartridge Guard Column E			For 10 mm Length	5020-08500
			For 20 mm Length	5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

InertSustain® Phenyl

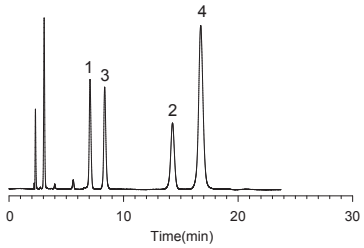
Physical Properties

- **Silica : Newly Developed ES Silica Gel**
- **Particle Size : 2 µm, 3 µm, 5 µm**
- **Surface Area : 350 m^2/g**
- **Pore Size : 100 Å (10 nm)**
- **Pore Volume : 0.85 mL/g**
- **Bonded Phase : Phenyl Groups**
- **End-capping : None**
- **Carbon Loading : 10 %**
- **USP Code : L11**
- **pH Range : 2 ~ 7.5**

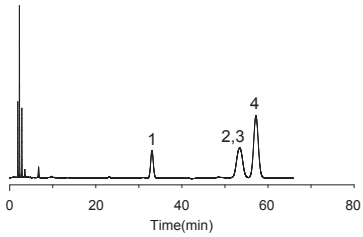


InertSustain Phenyl delivers an extremely unique reverse phase characteristics that are critical to resolving compounds that could not be separated on a C18 or C8 phase. InertSustain Phenyl provides not only pi-pi interactions, but also hydrogen bonding secondary interactions, which results in retaining polar compounds at the same time. As the phenyl groups are directly bonded to the silica gel, InertSustain Phenyl is compatible with the analysis of structural isomers due to it's high stereo-selectivity (figure 2) while other alkyl phenyl type columns fails to separate.

Figure 1 : Comparison of Selectivity between InertSustain® Phenyl and InertSustain® C18



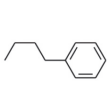
InertSustain Phenyl



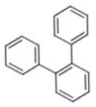
InertSustain C18

Conditions

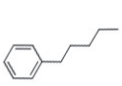
Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) CH_3OH
B) H_2O
A/B = 70/30, v/v
Flow Rate : 0.8 mL/min
Col. Temp. :40 °C
Detection : UV 254 nm



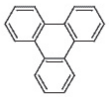
1. Butylbenzene



2.*o* -Terphenyl
Non - Planar Structure

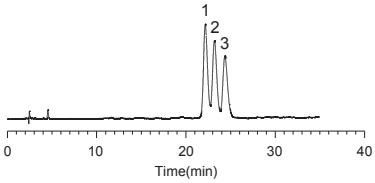


3. Amylbenzene

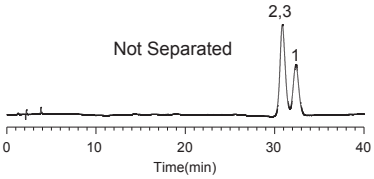


4. Triphenylene
Planar Structure

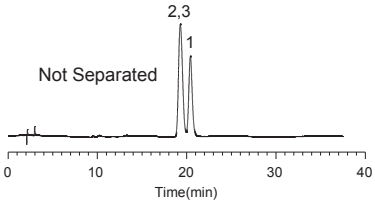
Figure 2 : Analysis of Structural Isomers (Positional Isomers of Cresol)



InertSustain Phenyl



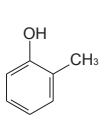
Ascentis Phenyl



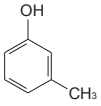
XBridge Phenyl

Conditions

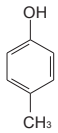
Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A)CH_3OH
B)H_2O
A/B = 20/80, v/v
Col. Temp. : 40 °C
Flow Rate : 0.8 mL/min
Detection : UV 254 nm



1. *o*-Cresol



2. *m*-Cresol



3. *p*-Cresol

Analytical Columns

	Length \ I.D.(mm)	2.1	3.0	
Particle Size: 2 µm	30	5020-16535	5020-16540	
	50	5020-16536	5020-16541	
	75	5020-16537	5020-16542	
	100	5020-16538	5020-16543	
	150	5020-16539	5020-16544	
	Length \ I.D. (mm)	2.1	3.0	4.6
HPSeries Particle Size: 3 µm 50 MPa (500 Bar)	30	5020-16517	5020-16523	5020-16529
	50	5020-16518	5020-16524	5020-16530
	75	5020-16519	5020-16525	5020-16531
	100	5020-16520	5020-16526	5020-16532
	150	5020-16521	5020-16527	5020-16533
	250	5020-16522	5020-16528	5020-16534

* End-fittings are 1/16" Waters-compatible.
* UHPLC compatible end-fittings are also available upon request for UHPLC systems (Ex: UPLC) to avoid dead volume.
* Indicate "UP Type end-fittings" when ordering. (Please note that UP type is not available for a 4.6 mm I.D. column)
* For maximum operating pressure information, please refer to page 46.

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	30	5020-16468	5020-16474		
	50	5020-16469	5020-16475		
	75	5020-16470	5020-16476		
	100	5020-16471	5020-16477		
	150	5020-16472	5020-16478		
	250	5020-16473	5020-16479		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-16432	5020-16439	5020-16446	5020-16453
	50	5020-16433	5020-16440	5020-16447	5020-16454
	75	5020-16434	5020-16441	5020-16448	5020-16455
	100	5020-16435	5020-16442	5020-16449	5020-16456
	150	5020-16436	5020-16443	5020-16450	5020-16457
	250	5020-16437	5020-16444	5020-16451	5020-16458
	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 5 µm	30	5020-16339	5020-16345		
	50	5020-16340	5020-16346		
	75	5020-16341	5020-16347		
	100	5020-16342	5020-16348		
	150	5020-16343	5020-16349		
	250	5020-16344	5020-16350		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-16302	5020-16309	5020-16316	5020-16323
	50	5020-16303	5020-16310	5020-16317	5020-16324
	75	5020-16304	5020-16311	5020-16318	5020-16325
	100	5020-16305	5020-16312	5020-16319	5020-16326
	150	5020-16306	5020-16313	5020-16320	5020-16327
	250	5020-16307	5020-16314	5020-16321	5020-16328

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-16507	5020-16406	5020-16508	5020-16407
1.5, 2.1		1.5	5020-16509	5020-16408	5020-16510	5020-16409
2.1, 3.0		3.0	5020-16505	5020-16404	5020-16506	5020-16405
4.0, 4.6		4.0	5020-16503	5020-16402	5020-16504	5020-16403
2.1, 3.0	20	3.0	5020-16513	5020-16412	5020-16514	5020-16413
4.0, 4.6		4.0	5020-16511	5020-16410	5020-16512	5020-16411
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

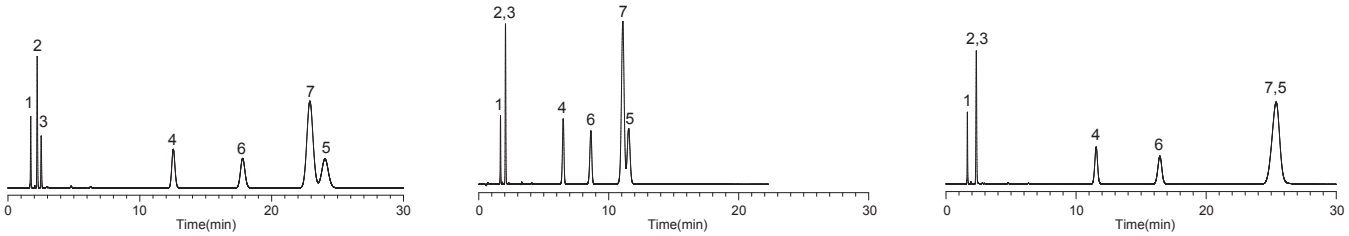
InertSustain® Phenylhexyl

Physical Properties

- **Silica** : **Newly Developed ES Silica Gel**
- **Particle Size** : **3 µm, 5 µm**
- **Surface Area** : **350 m^2/g**
- **Pore Size** : **100 Å (10 nm)**
- **Pore Volume** : **0.85 mL/g**
- **Bonded Phase** : **Phenylhexyl Groups**
- **End-capping** : **Yes**
- **Carbon Loading** : **9.0 %**
- **USP Code** : **L11**
- **pH Range** : **1.0 ~ 10.0**

InertSustain Phenylhexyl columns are bonded with phenylhexyl groups, which employs a phenyl ring with a hexyl (6- carbon) linker and is densely bonded to our newly developed ES silica gel delivering complementary selectivity to straight alkyl-chain columns, but with industry leading inertness, lot-to-lot reproducibility and low back pressure.

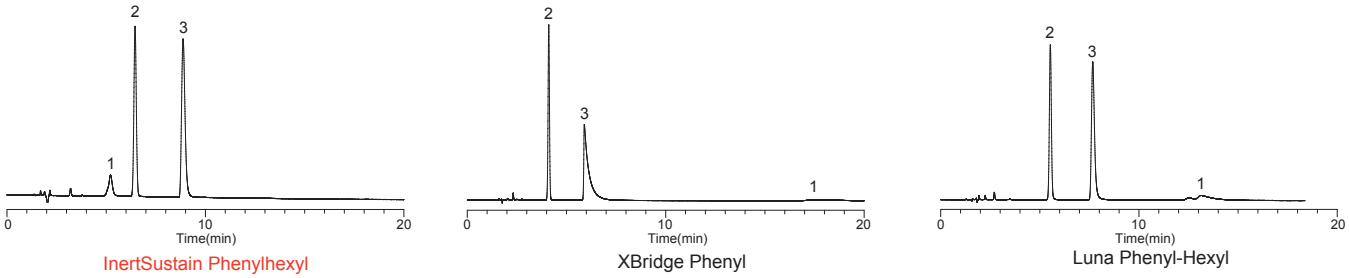
Figure 1 : Comparison of Selectivity with other brands



Conditions

Column Size	: 5 µm, 150 × 4.6 mm I.D.	Sample :	1. Uracil
Eluent	: A) CH_3OH		2. Caffeine
	B) H_2O		3. Phenol
	A/B = 70/30, v/v		4. Butylbenzene
Flow Rate	: 1.0 mL / min		5. o-Terphenyl
Col. Temp.	: 40 °C		6. Amylbenzene
Detection	: UV 254 nm		7. Triphenylene

Figure 2 : Analysis of Acidic Compounds



Conditions

Column Size	: 5 µm, 150 × 4.6 mm I.D.	Sample :	1. Brilliant Blue FCF
Eluent	: A) CH_3CN		2. Phenol
	B) 0.1% H_3PO_4		3. Salicylic acid
	A/B = 25/75, v/v		
Flow Rate	: 1.0 mL/min		
Col. Temp.	: 40 °C		
Detection	: UV 254 nm		

Analytical Columns

	Length \ I.D.(mm)	2.1	3.0	4.6
HP Series Particle Size: 3 µm 50 Mpa(500 Bar)	30	5020-89209	5020-89215	5020-89221
	50	5020-89210	5020-89216	5020-89222
	75	5020-89211	5020-89217	5020-89223
	100	5020-89212	5020-89218	5020-89224
	150	5020-89213	5020-89219	5020-89225
	250	5020-89214	5020-89220	5020-89226

* End-fi ttings are 1/16" Waters-compatible.
* UHPLC compatible end-fi ttings are also available upon request for UHPLC systems (Ex: UPLC) to avoid dead volume.
* Indicate "UP Type end-fi ttings" when ordering. (Please note that UP type is not available for a 4.6 mm I.D. column)
* For maximum operating pressure information, please refer to page 46.

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	30	5020-89160	5020-89166		
	50	5020-89161	5020-89167		
	75	5020-89162	5020-89168		
	100	5020-89163	5020-89169		
	150	5020-89164	5020-89170		
	250	5020-89165	5020-89171		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-89124	5020-89131	5020-89138	5020-89145
	50	5020-89125	5020-89132	5020-89139	5020-89146
	75	5020-89126	5020-89133	5020-89140	5020-89147
	100	5020-89127	5020-89134	5020-89141	5020-89148
	150	5020-89128	5020-89135	5020-89142	5020-89149
	250	5020-89129	5020-89136	5020-89143	5020-89150
Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	30	5020-89038	5020-89044		
	50	5020-89039	5020-89045		
	75	5020-89040	5020-89046		
	100	5020-89041	5020-89047		
	150	5020-89042	5020-89048		
	250	5020-89043	5020-89049		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-89001	5020-89008	5020-89015	5020-89022
	50	5020-89002	5020-89009	5020-89016	5020-89023
	75	5020-89003	5020-89010	5020-89017	5020-89024
	100	5020-89004	5020-89011	5020-89018	5020-89025
	150	5020-89005	5020-89012	5020-89019	5020-89026
	250	5020-89006	5020-89013	5020-89020	5020-89027

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

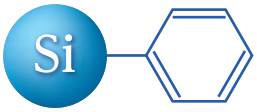
I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-89199	5020-89105	5020-89200	5020-89106
1.5, 2.1		1.5	5020-89201	5020-89107	5020-89202	5020-89108
2.1, 3.0		3.0	5020-89197	5020-89103	5020-89198	5020-89104
4.0, 4.6		4.0	5020-89195	5020-89101	5020-89196	5020-89102
2.1, 3.0	20	3.0	5020-89205	5020-89111	5020-89206	5020-89112
4.0, 4.6		4.0	5020-89203	5020-89109	5020-89204	5020-89110
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® Ph-3

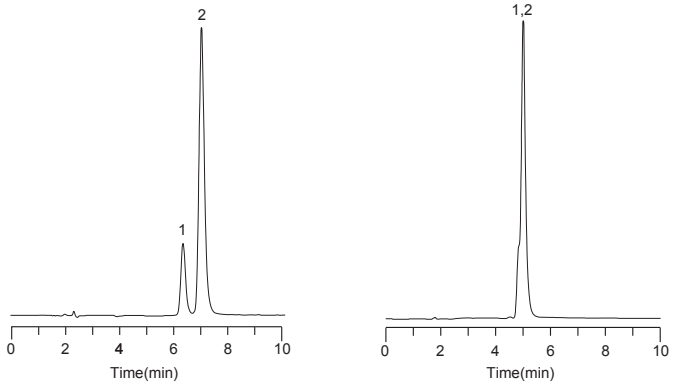
Physical Properties

- **Silica : 3 Series High Purity Silica Gel**
- **Particle Size : 2 µm, 3 µm, 5 µm**
- **Surface Area : 450 m^2/g**
- **Pore Size : 100 Å (10 nm)**
- **Pore Volume : 1.05 mL/g**
- **Bonded Phase : Phenyl Groups**
- **End-capping : None**
- **Carbon Loading : 9.5 %**
- **USP Code : L11**
- **pH Range : 2 ~ 7.5**



Just like InertSustain Phenyl, Inertsil Ph-3 have phenyl groups directly bonded to the silica gel which provides pure reverse phase characteristics that are critical to resolving highly polar compounds like acidic and basic pharmaceuticals. The near perfect phenyl phase coverage on this material results in symmetric, narrow peaks for even the most polar compounds while using simple eluents like aqueous acetonitrile or methanol.

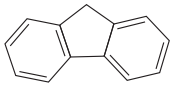
Figure 1 : Comparison of Selectivity with Inertsil® ODS-3



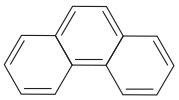
Inertsil Ph-3 | Inertsil ODS-3

Conditions

Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) CH_3OH
B) H_2O
A/B = 90/10, v/v (ODS-3)
A/B = 70/30, v/v (Ph-3)
Flow Rate : 1.0 mL/min
Col. Temp. : 30 °C
Detection : UV 254 nm

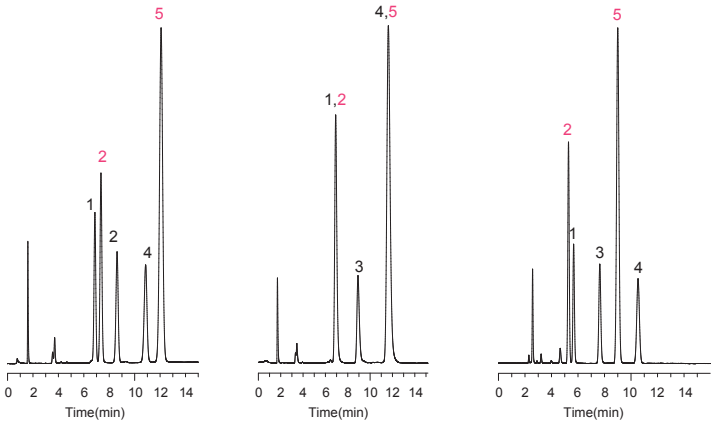


1. Fluorene



2. Phenanthrene

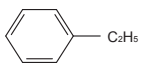
Figure 2 : Analysis of Aromatic Hydrocarbons with various Bonded Phases



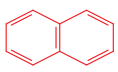
Inertsil Ph-3 (Phenyl Group) | Inertsil Ph (Alkyl Phenyl Group) | Inertsil ODS-3 (Alkyl Group)

Conditions

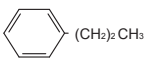
Column : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) CH_3CN
B) H_2O
A/B = 50/50, v/v (Phenyl columns)
A) CH_3CN
B) H_2O
A/B = 70/50, v/v (ODS)
Flow Rate : 1 mL/min
Col. Temp. : 40 °C
Detection : UV 254 nm



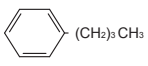
1. Ethylbenzene



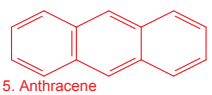
2. Naphthalene



3. n-Propyl benzene



4. n-Butylbenzene



5. Anthracene

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	
Particle Size: 2 µm	30	5020-85130	5020-85135	
	50	5020-85131	5020-85136	
	75	5020-85132	5020-85137	
	100	5020-85133	5020-85138	
	150	5020-85134	5020-85139	
	Length \ I.D. (mm)	2.1	3.0	4.6
HPSeries Particle Size: 3 µm 50 MPa (500 Bar)	30	5020-14111	5020-14114	5020-14117
	50	5020-14112	5020-14115	5020-14118
	75	5020-14113	5020-14116	5020-14119
	100	5020-14041	5020-14044	5020-14047
	150	5020-14042	5020-14045	5020-14048
	250	5020-14043	5020-14046	5020-14049

* End-fittings are 1/16" Waters-compatible.
* UHPLC compatible end-fittings are also available upon request for UHPLC systems (Ex: UPLC) to avoid dead volume.
* Indicate "UP Type end-fittings" when ordering. (Please note that UP type is not available for a 4.6 mm I.D. column)
* For maximum operating pressure information, please refer to page 46.

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	33	5020-85011	5020-85021		
	50	5020-85012	5020-85022		
	75	5020-85013	5020-85023		
	100	5020-85014	5020-85024		
	150	5020-13622	5020-13620		
	250	5020-	5020-		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05011	5020-05021	5020-05031	5020-05041
	50	5020-05012	5020-05022	5020-05032	5020-05042
	75	5020-05013	5020-05023	5020-05033	5020-01930
	100	5020-05014	5020-05024	5020-01933	5020-05044
	150	5020-05015	5020-05025	5020-05035	5020-01931
	250	5020-05016	5020-05026	5020-05036	5020-01932
	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 5 µm	33	5020-85111	5020-85121		
	50	5020-85112	5020-85122		
	75	5020-85113	5020-85123		
	100	5020-85114	5020-85124		
	150	5020-13612	5020-13610		
	250	5020-85116	5020-85126		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05111	5020-05121	5020-05131	5020-05141
	50	5020-05112	5020-05122	5020-05132	5020-05142
	75	5020-05113	5020-05123	5020-05133	5020-05143
	100	5020-05114	5020-05124	5020-05134	5020-05144
	150	5020-05115	5020-05125	5020-01922	5020-01920
	250	5020-05116	5020-05126	5020-01923	5020-01921

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19217	5020-19216	5020-19267	5020-19266
1.5, 2.1		1.5	5020-19317	5020-19316	5020-19367	5020-19366
2.1, 3.0		3.0	5020-19117	5020-19116	5020-19167	5020-19166
4.0, 4.6		4.0	5020-19017	5020-19016	5020-19067	5020-19066
2.1, 3.0	20	3.0	5020-19517	5020-19516	5020-19567	5020-19566
4.0, 4.6		4.0	5020-19417	5020-19416	5020-19467	5020-19466
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

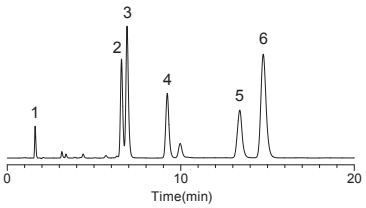
Inertsil® Ph

Physical Properties

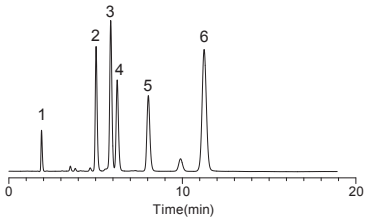
- **Silica : 2 Series High Purity Silica Gel**
- **Particle Size : 5 µm**
- **Surface Area : 320 m^2/g**
- **Pore Size : 150 Å (15 nm)**
- **Pore Volume : 1.20 mL/g**
- **Bonded Phase : Phenethyl Groups**
- **End-capping : Yes**
- **Carbon Loading : 10 %**
- **USP Code : L11**
- **pH Range : 2 ~ 7.5**

Inertsil Ph has phenethyl groups bonded to silica gel which offers weak pi-pi interactions. As it is modified with phenethyl groups, hydrophobic interactions between alkyl chain and analytes play an important role in separation as well as pi-pi interactions. To change the selectivity or elution pattern drastically, InertSustain Phenyl is recommended as it provides strong pi-pi interactions, resulting in resolving compounds that could not be separated on a C18 or C8 phase.

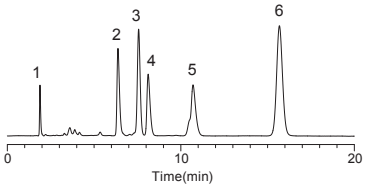
Figure 1 : Comparison of Selectivity with GL Sciences' Phenyl columns



Inertsil Ph



Inertsil Ph-3

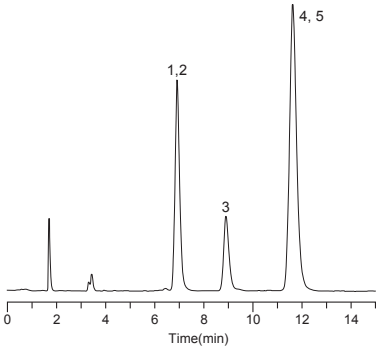


InertSustain Phenyl

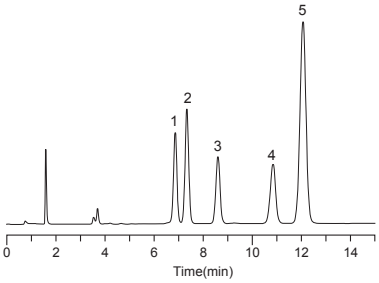
Conditions

Column Size	: 5 µm, 150 × 4.6 mm I.D.	Sample :
Eluent	: A) CH_3OH	1. Uracil
	B) H_2O	2. Ethylbenzene
	A/B = 60/40, v/v	3. Naphthalene
Flow Rate	: 1.0 mL/min	4. Propylbenzene
Col. Temp.	: 40 °C	5. Butylbenzene
Detection	: UV 254 nm	6. Anthracene

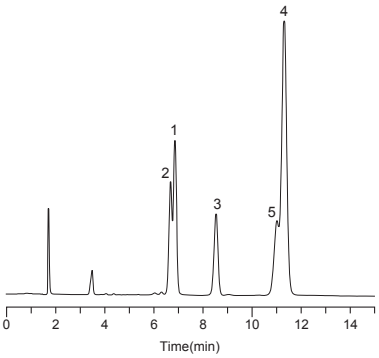
Figure 2 : Comparison of Selectivity between other brand's Phenyl column



Inertsil Ph



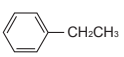
Inertsil Ph-3



other brand's Phenyl Column

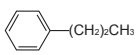
Conditions

Column Size	: 5 µm, 150 × 4.6 mm I.D.
Eluent	: A) CH_3CN
	B) H_2O
	A/B = 50/50, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm

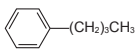


1. Ethylbenzene

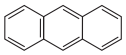
2. Naphthalene



3. n-Propylbenzene



4. n-Buthylbenzene



5. Anthracene

Analytical Columns

Particle Size: 5 µm	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	150	5020-01321	5020-01322	5020-01323	5020-01324
	250	5020-01325	5020-01326	5020-01327	5020-01328

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
2.1, 3.0	10	3.0	5020-19137	5020-19187
4.0, 4.6		4.0	5020-19037	5020-19087
2.1, 3.0	20	3.0	5020-19537	5020-19587
4.0, 4.6		4.0	5020-19437	5020-19487
Holder for Cartridge Guard Column E			For 10 mm Length	5020-08500
			For 20 mm Length	5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® CN-3

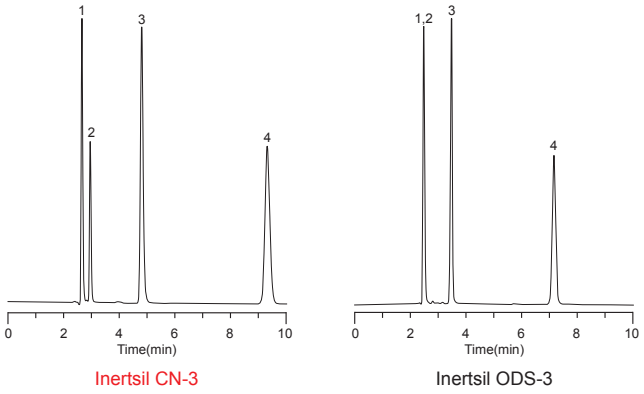
Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Cyanopropryl Groups
- **End-capping** : None
- **Carbon Loading** : 14 %
- **USP Code** : L10
- **pH Range** : 2 ~ 7.5

Inertsil CN-3 is a cyanopropyl bonded phase that provides pi-pi interactions offered by the triple bond in cyano groups. Due to its chemistry, separation can be achieved for those compounds that could not be separated on a straight-chain-alkyl columns such as C8 or C18 bonded phases (Figure. 1). Figure 2 illustrates the relative retention of each compound to n-Propylbenzene. Although Inertsil ODS-EP and Inertsil Ph-3 has the ability to recognize the electron-state, each column delivers different elution pattern.

Inertsil CN-3 column can be used for both reversed phase and normal phase separations. The column is originally shipped in a mixture of n-hexane/ethanol. When using the column for reversed phase applications, fully equilibrate the column before use.

Figure 1 : Comparison of Recognition of Electronic-State with Inertsil® ODS-3



Conditions

Column Size : 5 µm, 250 × 4.6 mm I.D.
Eluent : 20 mM KH_2PO_4(pH 4.0, H_3PO_4)
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 210 nm

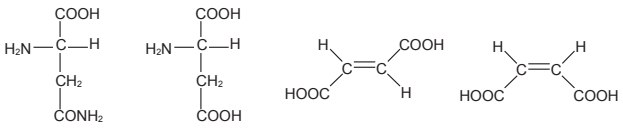
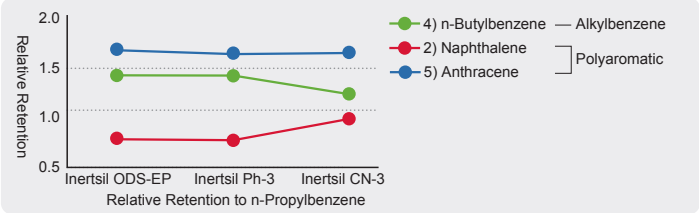
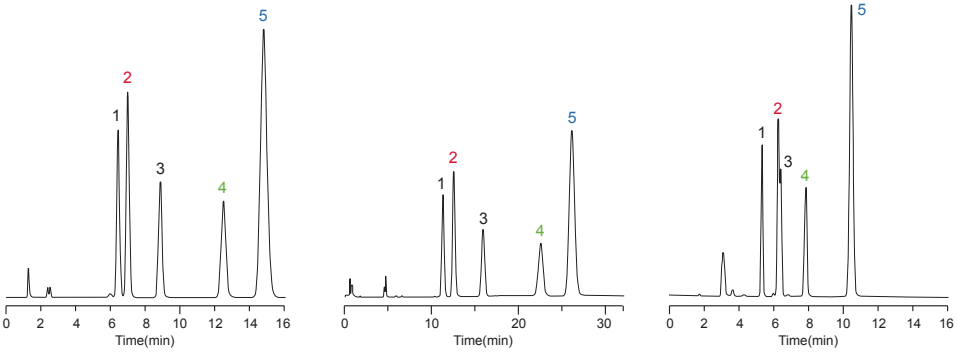


Figure 2 : Comparison of Recognition of Electronic-State between various Inertsil® columns





Conditions

Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) CH_3CN
B) H_2O
A/B = 70/30, v/v (ODS-EP)
A/B = 40/60, v/v (Ph-3, CN-3)
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 254 nm
Sample : 1. Ethylbenzene
2. Naphthalene
3. n-Propylbenzene
4. n-Butylbenzene
5. Anthracene

Analytical Columns

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	33	5020-85331	5020-85341		
	50	5020-85332	5020-85342		
	75	5020-85333	5020-85343		
	100	5020-85334	5020-85344		
	150	5020-85335	5020-85345		
	250	5020-85336	5020-85346		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05261	5020-05271	5020-05281	5020-05291
	50	5020-05262	5020-05272	5020-05282	5020-05292
	75	5020-05263	5020-05273	5020-05283	5020-05293
	100	5020-05264	5020-05274	5020-05284	5020-05294
	150	5020-05265	5020-05275	5020-05285	5020-05295
	250	5020-05266	5020-05276	5020-05286	5020-05296
Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-85311	5020-85321		
	50	5020-85312	5020-85322		
	75	5020-85313	5020-85323		
	100	5020-85314	5020-85324		
	150	5020-13712	5020-13710		
	250	5020-85316	5020-85326		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05311	5020-05321	5020-05331	5020-05341
	50	5020-05312	5020-05322	5020-05332	5020-05342
	75	5020-05313	5020-05323	5020-05333	5020-05343
	100	5020-05314	5020-05324	5020-05334	5020-05344
	150	5020-05315	5020-05325	5020-01942	5020-01940
	250	5020-05316	5020-05326	5020-01943	5020-01941

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19219	5020-19218	5020-19269	5020-19268
1.5, 2.1		1.5	5020-19319	5020-19318	5020-19369	5020-19368
2.1, 3.0		3.0	5020-19119	5020-19118	5020-19169	5020-19168
4.0, 4.6		4.0	5020-19019	5020-19018	5020-19069	5020-19068
2.1, 3.0	20	3.0	5020-19519	5020-19518	5020-19569	5020-19568
4.0, 4.6		4.0	5020-19419	5020-19418	5020-19469	5020-19468
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

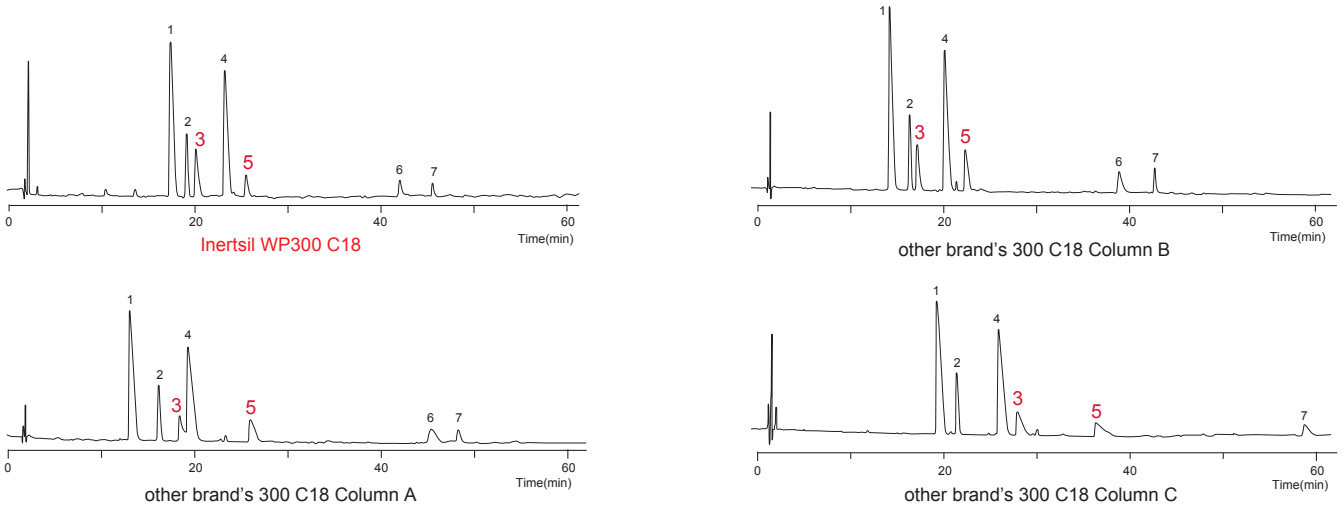
Inertsil® WP300 C18

Physical Properties

- **Silica** : **WP300 Series High Purity Silica Gel**
- **Particle Size** : **5 µm**
- **Surface Area** : **150 m^2/g**
- **Pore Size** : **300 Å (30 nm)**
- **Pore Volume** : **1.05 mL/g**
- **Bonded Phase** : **Octadecyl Groups**
- **End-capping** : **Yes**
- **Carbon Loading** : **9 %**
- **USP Code** : **L1**
- **pH Range** : **2 ~ 7.5**

Inertsil WP300 C18 (wide pore size of 300 Å) columns bring the same legendary performance of Inertsil's narrow-pore HPLC products to columns designed specifically for the reproducible separations of proteins and peptides.
The results of GL Sciences' original end-capping technique are shown in figure 1, which provide high efficiency and good peak shape for proteins and peptides.

Figure 1 : Comparison with other brands



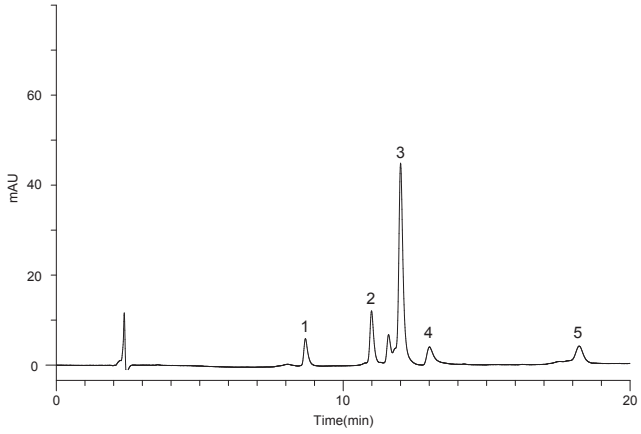
Conditions

Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) 0.05 % HCOOH in (CH_3CN/H_2O = 90/10, v/v)
B) 0.05 % HCOOH in H_2O
A/B = 10/90 – 60 min – 40/60, v/v

Flow Rate : 2.0 mL/min
Col. Temp. : 30 °C
Detection : UV 254 nm

Sample : 1. Methionine Enkephalin (Tyr-Gly-Gly-Phe-Met, M.W. 574)
2. Oxytocin (Cys-Tyr-Ile-Gln-Asn-Cys-Pro-Leu-Gly-NH2, M.W. 1,007)
3. Angiotensin Ⅱ (Asp-Arg-Val-Tyr-Ile-His-Pro-Phe, M.W. 1,032)
4. Leucin Enkephalin (Tyr-Gly-Gly-Phe-Leu, M.W. 556)
5. Angiotensin Ⅰ (Asp-Arg-Val-Tyr-Ile-His-Pro-Phe-His-Leu, M.W. 1,297)
6. Insulin (M.W. 6,000)
7. Insulin Chain B (M.W. 3,496)

Figure 2 : Analysis of Proteins



Conditions

Column : Inertsil WP300 C18 (5 µm, 150 × 3.0 mm I.D.)
Eluent : A) 0.1 % TFA in CH_3CN
B) 0.1 % TFA in H_2O
A/B = 20/80 – 20 min – 70/30, v/v
Flow Rate : 0.4 mL/min
Col. Temp. : 40 °C
Detection : UV 280 nm
Injection Vol. : 10 µL
Sample : 1. Ribonuclease B
2. Cytochrome C
3. Lysozyme
4. BSA
5. Ovalbumin

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	4.6	
Particle Size: 3 µm	50	5020-41100	5020-	5020-41103	
	150	5020-41101	5020-41102	5020-41104	
	250	5020-	5020-	5020-41105	
Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-85811	5020-85821		
	50	5020-85812	5020-85822		
	75	5020-85813	5020-85823		
	100	5020-85814	5020-85824		
	150	5020-85815	5020-85825		
	250	5020-85816	5020-85826		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05811	5020-05821	5020-05831	5020-05841
	50	5020-05812	5020-05822	5020-05832	5020-05842
	75	5020-05813	5020-05823	5020-05833	5020-05843
	100	5020-05814	5020-05824	5020-05834	5020-05844
	150	5020-05815	5020-05825	5020-05835	5020-05845
	250	5020-05816	5020-05826	5020-05836	5020-05846

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
1.0	10	1.0	5020-19228	5020-19278
1.5, 2.1		1.5	5020-19328	5020-19378
2.1, 3.0		3.0	5020-19128	5020-19178
4.0, 4.6		4.0	5020-19028	5020-19078
2.1, 3.0	20	3.0	5020-19528	5020-19578
4.0, 4.6		4.0	5020-19428	5020-19478
Holder for Cartridge Guard Column E		For 10 mm Length		5020-08500
		For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

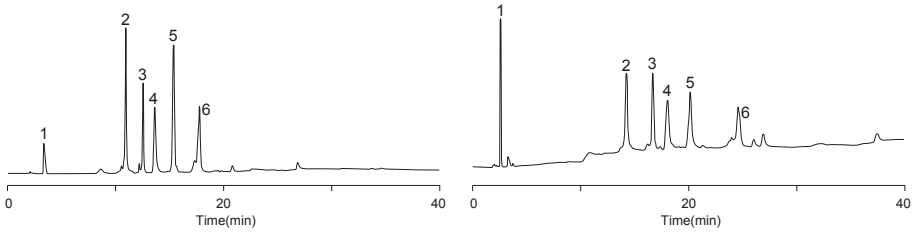
Inertsil® WP300 C8

Physical Properties

- **Silica** : **WP300 Series High Purity Silica Gel**
- **Particle Size** : **5 µm**
- **Surface Area** : **150 m^2/g**
- **Pore Size** : **300 Å (30 nm)**
- **Pore Volume** : **1.05 mL/g**
- **Bonded Phase** : **Octcyl Groups**
- **End-capping** : **Yes**
- **Carbon Loading** : **4 %**
- **USP Code** : **L7**
- **pH Range** : **2 ~ 7.5**

Inertsil WP300 C8 (wide pore size of 300 Å) columns bring the same legendary performance of Inertsil's narrow-pore HPLC products to columns designed specifically for the reproducible rapid separations of proteins and peptides.
As shown in figure 1, Inertsil WP300 C8 delivers rapid analysis with sharper peaks compared to Inertsil WP300 C18.

Figure 1 : Comparison with Inertsil® WP300 C18



Inertsil WP300 C8

Inertsil WP300 C18

Conditions

Column Size	: 5 µm, 150 × 4.6 mm I.D.	
Eluent	: A) CH_3CN/0.05 % TFA in H_2O = 80/20, v/v	
	B) CH_3CN/0.05 % TFA in H_2O = 10/90, v/v	
	A/B = 0/100 – 30 min – 100/0 – 10 min hold, v/v	
Flow Rate	: 1.0 mL/min	
Col. Temp.	: 30 °C	
Detection	: UV 280 nm	
Sample	: 1. DL-Phenylalanine	(M.W. 165)
	2. Cytochrome C	(M.W. 13,000)
	3. Lysozyme	(M.W. 14,000)
	4. BSA	(M.W. 66,000)
	5. α-Chymotrypsinogen A	(M.W. 25,600)
	6. Ovalbumin	(M.W. 45,000)

Analytical Columns

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 5 µm	33	5020-85711	5020-85721		
	50	5020-85712	5020-85722		
	75	5020-85713	5020-85723		
	100	5020-85714	5020-85724		
	150	5020-85715	5020-85725		
	250	5020-85716	5020-85726		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05711	5020-05721	5020-05731	5020-05741
	50	5020-05712	5020-05722	5020-05732	5020-05742
	75	5020-05713	5020-05723	5020-05733	5020-05743
	100	5020-05714	5020-05724	5020-05734	5020-05744
	150	5020-05715	5020-05725	5020-05735	5020-05745
	250	5020-05716	5020-05726	5020-05736	5020-05746

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
1.0	10	1.0	5020-19229	5020-19279
1.5, 2.1		1.5	5020-19329	5020-19379
2.1, 3.0		3.0	5020-19129	5020-19179
4.0, 4.6		4.0	5020-19029	5020-19079
2.1, 3.0	20	3.0	5020-19529	5020-19579
4.0, 4.6		4.0	5020-19429	5020-19479
Holder for Cartridge Guard Column E		For 10 mm Length		5020-08500
		For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® WP300 C4

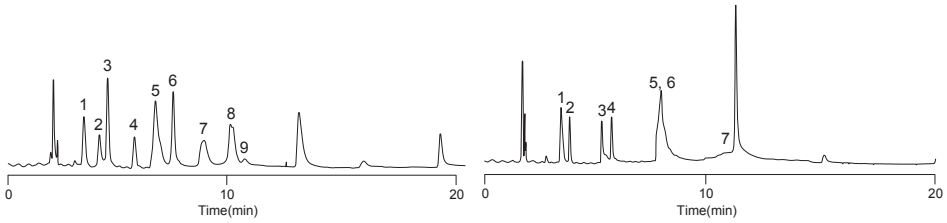
Physical Properties

- **Silica** : **WP300 Series High Purity Silica Gel**
- **Particle Size** : **5 µm**
- **Surface Area** : **150 m^2/g**
- **Pore Size** : **300 Å (30 nm)**
- **Pore Volume** : **1.05 mL/g**
- **Bonded Phase** : **Butyl Groups**
- **End-capping** : **None**
- **Carbon Loading** : **3 %**
- **USP Code** : **L26**
- **pH Range** : **2 ~ 7.5**

PG : Polar Group

Inertsil WP300 C4 is a butyl group bonded phase utilizing silica gel with wide pores (300 Å). Also, an optimal polar group is embedded between silica surface and butyl group, which reduces adsorption of basic compounds and fat-soluble proteins. Inertsil WP300 C4 is recommended for the analysis of large, highly fat-soluble proteins and peptides as illustrated in figure 1.

Figure 1 : Comparison of Performance between other brand's 300 C4 column



Inertsil WP300 C4

Commercially Available 300 C4 Column A

Conditions

Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) 0.2 % HCOOH in (CH_3CN/H_2O = 90/10, v/v)
B) 0.2 % HCOOH in H_2O
A/B = 20/80 – 20 min – 80/20, v/v
Flow Rate : 1.0 mL/min
Col. Temp. : 30 °C
Detection : UV 280 nm
Sample :

1. Neurotensin	(M.W. 1,673)
2. Leucin Enkephalin	(M.W. 556)
3. Cytochrome C	(M.W. 12,000)
4. Insulin	(M.W. 6,000)
5. BSA	(M.W. 66,000)
6. Myoglobin	(M.W. 17,000)
7. Creatine amidinohydrolase	(M.W. 43,000)
8. Ovalbumin	(M.W. 45,000)
9. Creatinine amidohydrolase	(M.W. 170,000)

Analytical Columns

Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-86111	5020-86121		
	50	5020-86112	5020-86122		
	75	5020-86113	5020-86123		
	100	5020-86114	5020-86124		
	150	5020-86115	5020-86125		
	250	5020-86116	5020-86126		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05861	5020-05871	5020-05881	5020-05891
	50	5020-05862	5020-05872	5020-05882	5020-05892
	75	5020-05863	5020-05873	5020-05883	5020-05893
	100	5020-05864	5020-05874	5020-05884	5020-05894
	150	5020-05865	5020-05875	5020-05885	5020-05895
	250	5020-05866	5020-05876	5020-05886	5020-05896

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
1.0	10	1.0	5020-19230	5020-19280
1.5, 2.1		1.5	5020-19330	5020-19380
2.1, 3.0		3.0	5020-19130	5020-19180
4.0, 4.6		4.0	5020-19030	5020-19080
2.1, 3.0	20	3.0	5020-19530	5020-19580
4.0, 4.6		4.0	5020-19430	5020-19480
Holder for Cartridge Guard Column E			For 10 mm Length	5020-08500
			For 20 mm Length	5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

HPLC Information

Operating Pressure of Columns

Maximum Operating Pressure of Analytical Columns

Analytical Columns	Particle Size	Maximum Operating Pressure (MPa)
InertSustainSwift C18	1.9 µm	80
InertSustain, Inertsil	2 µm	80 *
InertSustain, Inertsil	3 µm HP	50
InertSustain, Inertsil	3 µm, 4 µm, 5 µm, 10 µm	20
Unisil	5 µm, 10 µm	20
InertSphere Sugar-1	5 µm	15
Bioptic AV-1, AV-2	5 µm	15
Capillary EX	3 µm, 5 µm	20
Capillary EX-Nano	3 µm, 5 µm	15

* The maximum operating pressure of a 50 mm length column or shorter is 50 MPa for Inertsil ODS-3, C8-3, Ph-3.

Maximum Operating Pressure of Guard Columns

Guard Columns	Maximum Operating Pressure (MPa)
Cartridge Guard Column E	20
Cartridge Guard Column Ei	20
Guard Column for UHPLC	80
SILFILTER STD C18	35
Capillary Micro Guard	20

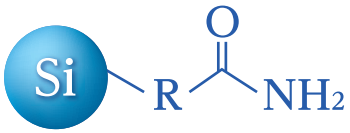
HILIC Columns

- Inertsil® Amide 048
- Inertsil® HILIC 050
- InertSustain® NH2 052
- Inertsil® NH2 054

Inertsil® Amide

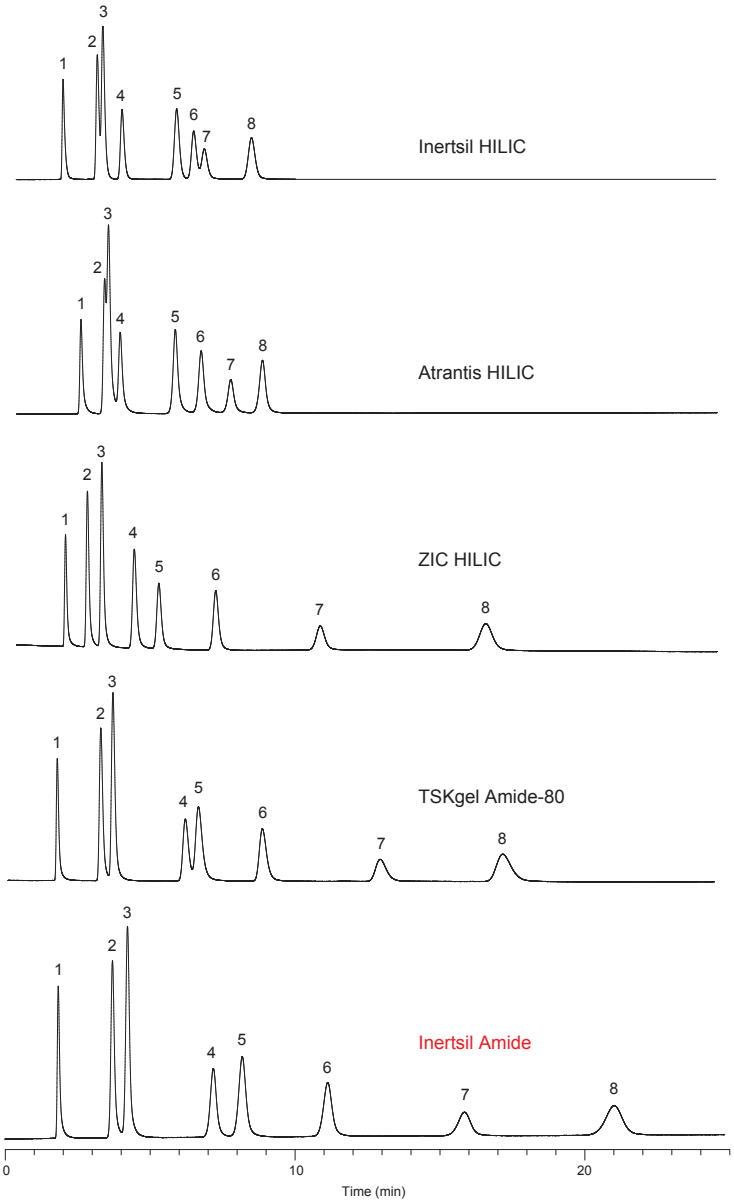
Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Carbamoyl Groups
- **End-capping** : None
- **Carbon Loading** : 18 %
- **USP Code** : None
- **pH Range** : 2 ~ 7.5



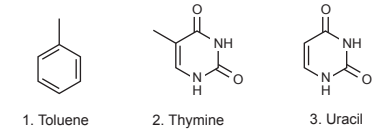
Inertsil Amide column is bonded of carbamoyl group, and it shows strong retention of highly polar compounds. As shown below, compare to other commercial columns, Inertsil Amide showed high retentivity. Inertsil Amide provides excellent performance for those hard to retain compounds using an ODS column with a long lifetime.

Figure 1 : Comparasion with other brands

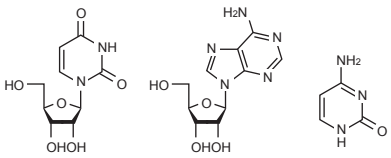


Conditions

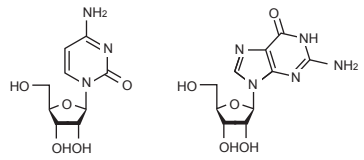
Column Size	:	5 µm, 150 × 2.0 or 2.1 mm I.D.
Eluent	:	A) CH_3CN
		B) 10 mM $HCOONH_4$
		A/B = 90/10, v/v
Flow Rate	:	0.2 mL/min
Col.Temp.	:	35 °C
Detection	:	UV 254 nm



1. Toluene 2. Thymine 3. Uracil



4. Uridine 5. Adenosine 6. Cytosine



7. Cytidine 8. Guanosine

Analytical Columns

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	33	5020-86831	5020-86841		
	50	5020-86832	5020-86842		
	75	5020-86833	5020-86843		
	100	5020-86834	5020-86844		
	150	5020-86835	5020-86845		
	250	5020-86836	5020-86846		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-07861	5020-07871	5020-07881	5020-07891
	50	5020-07862	5020-07872	5020-07882	5020-07892
	75	5020-07863	5020-07873	5020-07883	5020-07893
	100	5020-07864	5020-07874	5020-07884	5020-07894
	150	5020-07865	5020-07875	5020-07885	5020-07895
	250	5020-07866	5020-07876	5020-07886	5020-07896
	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 5 µm	33	5020-86811	5020-86821		
	50	5020-86812	5020-86822		
	75	5020-86813	5020-86823		
	100	5020-86814	5020-86824		
	150	5020-86815	5020-86825		
	250	5020-86816	5020-86826		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-07801	5020-07811	5020-07821	5020-07831
	50	5020-07802	5020-07812	5020-07822	5020-07832
	75	5020-07803	5020-07813	5020-07823	5020-07833
	100	5020-07804	5020-07814	5020-07824	5020-07834
	150	5020-07805	5020-07815	5020-07825	5020-07835
	250	5020-07806	5020-07816	5020-07826	5020-07836

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

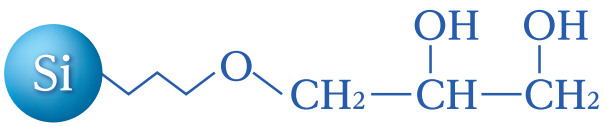
I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-20156	5020-20155	5020-20158	5020-20157
1.5, 2.1		1.5	5020-20160	5020-20159	5020-20162	5020-20161
2.1, 3.0		3.0	5020-20152	5020-20151	5020-20154	5020-20153
4.0, 4.6		4.0	5020-20148	5020-20147	5020-20150	5020-20149
2.1, 3.0	20	3.0	5020-20168	5020-20167	5020-20170	5020-20169
4.0, 4.6		4.0	5020-20164	5020-20163	5020-20166	5020-20165
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® HILIC

Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Diol Groups (Dihydroxypropyl Groups)
- **End-capping** : None
- **Carbon Loading** : 20 %
- **USP Code** : L20
- **pH Range** : 2 ~ 7.5



HILIC is, abbreviated name for Hydrophilic Interaction Chromatography, and it was developed as an alternative to reversed phase chromatography for highly polar compounds. (figure1.) Inertsil HILIC is the column which chemically bonded with diol group, and it provides excellent peak shape for neutral and basic compounds. In HILIC mode, generally when organic concentration is raised, it shows a strong retention (figure 2.). Moreover, it can get more stable analysis by adding basic solvent to the eluate, such as ammonium acetate.

Figure 1 : Separation mode from Reverse phase to HILIC

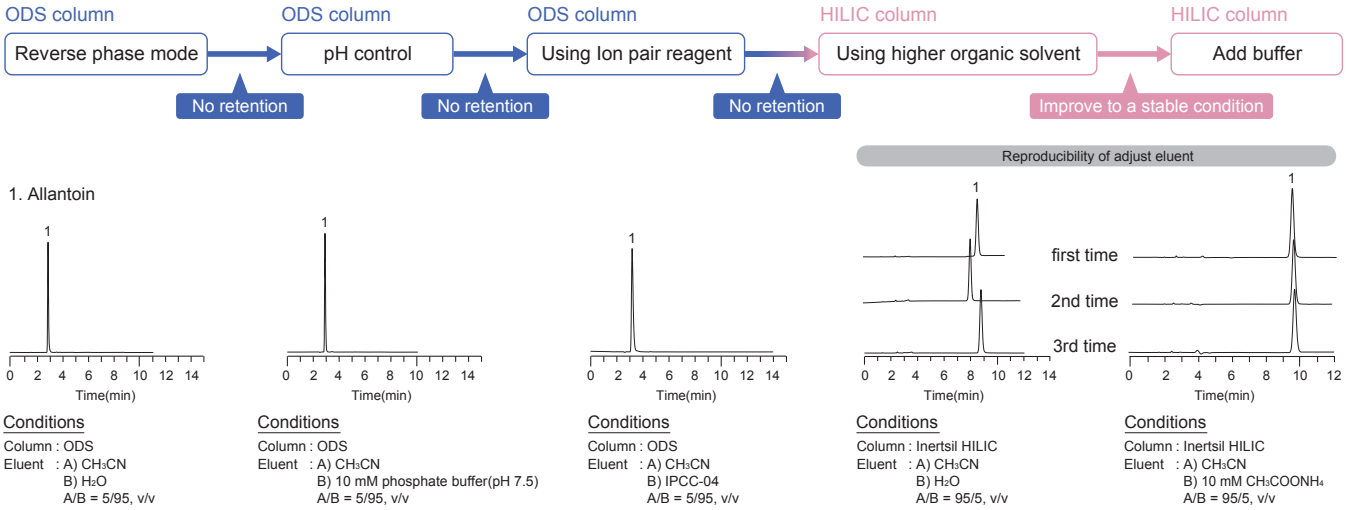
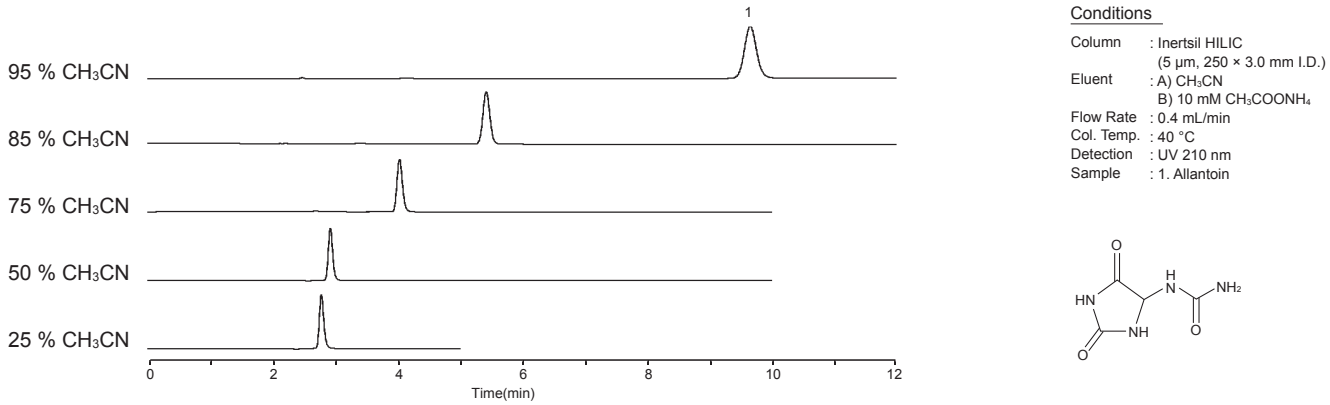


Figure 2 : Correlation between retention time and the concentration of CH_3CN in mobile phase



Conditions

Column : Inertsil HILIC (5 µm, 250 × 3.0 mm I.D.)
Eluent : A) CH_3CN
B) 10 mM CH_3COONH_4
Flow Rate : 0.4 mL/min
Col. Temp. : 40 °C
Detection : UV 210 nm
Sample : 1. Allantoin

Analytical Columns

Particle Size: 3 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-86731	5020-86741		
	50	5020-86732	5020-86742		
	75	5020-86733	5020-86743		
	100	5020-86734	5020-86744		
	150	5020-86735	5020-86745		
	250	5020-86736	5020-86746		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-07761	5020-07771	5020-07781	5020-07791
	50	5020-07762	5020-07772	5020-07782	5020-07792
	75	5020-07763	5020-07773	5020-07783	5020-07793
	100	5020-07764	5020-07774	5020-07784	5020-07794
	150	5020-07765	5020-07775	5020-07785	5020-07795
	250	5020-07766	5020-07776	5020-07786	5020-07796
Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-86711	5020-86721		
	50	5020-86712	5020-86722		
	75	5020-86713	5020-86723		
	100	5020-86714	5020-86724		
	150	5020-86715	5020-86725		
	250	5020-86716	5020-86726		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-07701	5020-07711	5020-07721	5020-07731
	50	5020-07702	5020-07712	5020-07722	5020-07732
	75	5020-07703	5020-07713	5020-07723	5020-07733
	100	5020-07704	5020-07714	5020-07724	5020-07734
	150	5020-07705	5020-07715	5020-07725	5020-07735
	250	5020-07706	5020-07716	5020-07726	5020-07736

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19225	5020-19224	5020-19275	5020-19274
1.5, 2.1		1.5	5020-19325	5020-19324	5020-19375	5020-19374
2.1, 3.0		3.0	5020-19125	5020-19124	5020-19175	5020-19174
4.0, 4.6		4.0	5020-19025	5020-19024	5020-19075	5020-19074
2.1, 3.0	20	3.0	5020-19525	5020-19524	5020-19575	5020-19574
4.0, 4.6		4.0	5020-19425	5020-19424	5020-19475	5020-19474
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

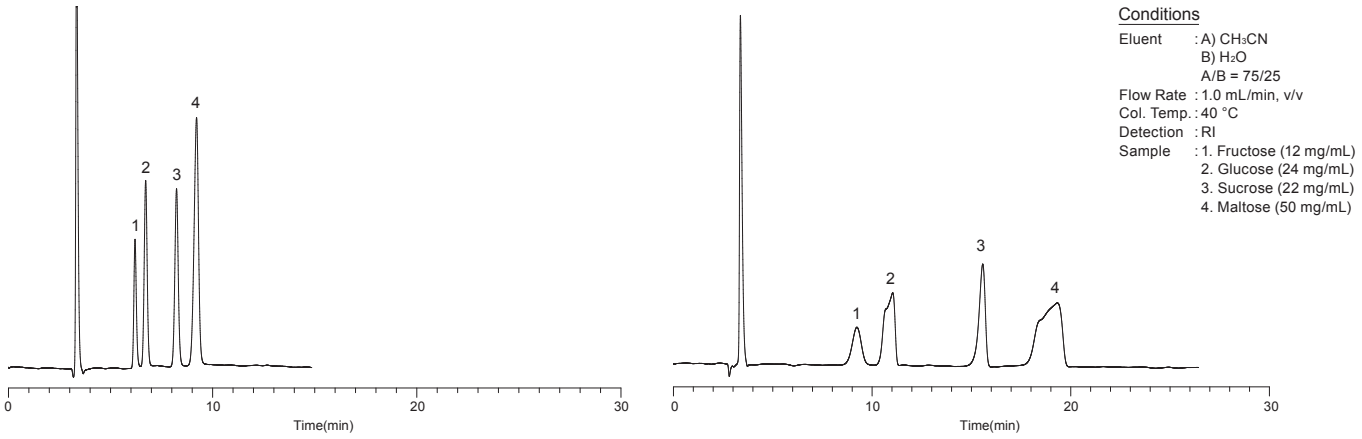
InertSustain® NH2

Physical Properties

- **Silica** : **Newly Developed ES Silica Gel**
- **Particle Size** : **3 µm, 5 µm**
- **Surface Area** : **350 m^2/g**
- **Pore Size** : **100 Å (10 nm)**
- **Pore Volume** : **0.85 mL/g**
- **Bonded Phase** : **Aminopropyl Groups**
- **End-capping** : **None**
- **Carbon Loading** : **7 %**
- **USP Code** : **L8**
- **pH Range** : **2 ~ 7.5**

InertSustain NH2 shows far superior stability compared to other brand available aminopropyl columns, as our newly developed “Evolved Surface Silica” is chemically bonded with aminopropyl group. Generally, aminopropyl columns are used for applications that are hard to be separated in a reversed phase mode, such as simultaneous analysis of sugars or vitamin E. However, the shift in retention time has been an issue for a long time. InertSustain NH2 delivers highly reliable reproducibility and stability with accurate qualitative and quantitative results. Further more, aminopropyl columns generally can not be washed by weakly acidic eluent, however InertSustain NH2 was improved and it can be washed by weakly acidic eluent.

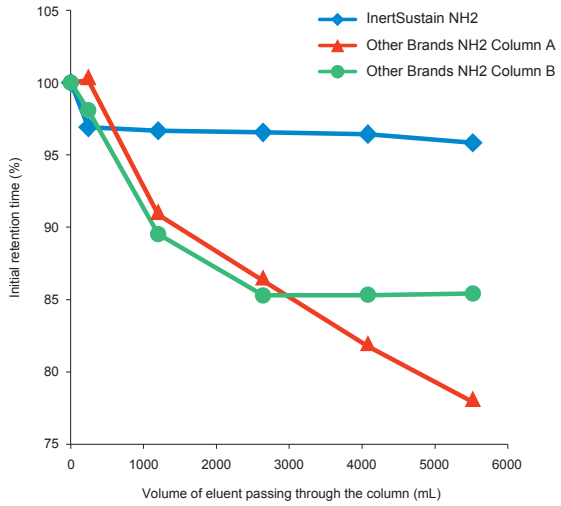
Figure 1 : Comparison of preventing anomer resolution of sugar analysis



InertSustain NH2

other brand Amide Column

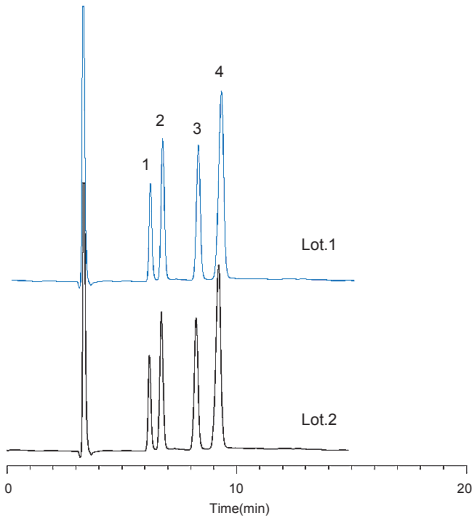
Figure 2 : Comparison of stability between various Amino column



Conditions

Column Size : 5 µm, 250 × 4.6 mm I.D. Sample:1. Maltose
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : RI

Figure 3 : Reliable reproducibility



Conditions

Column Size : 5 µm, 250 × 4.6 mm I.D. Sample : 1. Fructose
Eluent : A)CH3CN 2. Glucose
B)H2O 3. Sucrose
A/B = 85/15, v/v 4. Moltose
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : RI

Analytical Columns

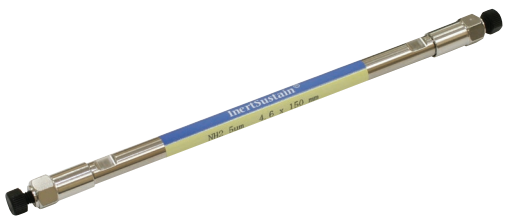
Particle Size: 3 µm	Length \ I.D. (mm)	1.0	1.5		
	30	5020-16768	5020-16774		
	50	5020-16769	5020-16775		
	75	5020-16770	5020-16776		
	100	5020-16771	5020-16777		
	150	5020-16772	5020-16778		
	250	5020-16773	5020-16779		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-16732	5020-16739	5020-16746	5020-16753
	50	5020-16733	5020-16740	5020-16747	5020-16754
	75	5020-16734	5020-16741	5020-16748	5020-16755
	100	5020-16735	5020-16742	5020-16749	5020-16756
	150	5020-16736	5020-16743	5020-16750	5020-16757
	250	5020-16737	5020-16744	5020-16751	5020-16758
Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	30	5020-16639	5020-16645		
	50	5020-16640	5020-16646		
	75	5020-16641	5020-16647		
	100	5020-16642	5020-16648		
	150	5020-16643	5020-16649		
	250	5020-16644	5020-16650		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-16602	5020-16609	5020-16616	5020-16623
	50	5020-16603	5020-16610	5020-16617	5020-16624
	75	5020-16604	5020-16611	5020-16618	5020-16625
	100	5020-16605	5020-16612	5020-16619	5020-16626
	150	5020-16606	5020-16613	5020-16620	5020-16627
	250	5020-16607	5020-16614	5020-16621	5020-16628

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-16807	5020-16706	5020-16808	5020-16707
1.5, 2.1		1.5	5020-16809	5020-16708	5020-16810	5020-16709
2.1, 3.0		3.0	5020-16805	5020-16704	5020-16806	5020-16705
4.0, 4.6		4.0	5020-16803	5020-16702	5020-16804	5020-16703
2.1, 3.0	20	3.0	5020-16813	5020-16712	5020-16814	5020-16713
4.0, 4.6		4.0	5020-16811	5020-16710	5020-16812	5020-16711
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.



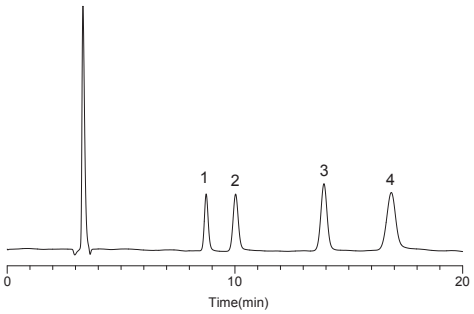
Inertsil® NH2

Physical Properties

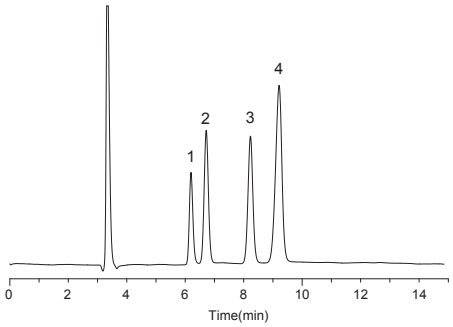
- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Aminopropyl Groups
- **End-capping** : None
- **Carbon Loading** : 8 %
- **USP Code** : L8
- **pH Range** : 2 ~ 7.5

IInertsil NH2 column is chemically bonded with Aminopropyl group. It is widely used for analyzing sugar in reversed phase mode. Compare to InertSustain NH2, InertSustain NH2 provides a better performance on durability. However, compare to other brand amiopropyl columns, Inertsil NH2 still shows excellent and strong retentivity.

Figure 1 : Comparision of Aminopropyl columns



Inertsil NH2



InertSustain NH2

Conditions

Column Size : 5 µm, 250 × 4.6 mm I.D.
Eluent : A) CH_3CN
B) H_2O
A/B = 75/25, v/v
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : RI
Sample : 1. Fructose
2. Glucose
3. Sucrose
4. Maltose

Analytical Columns

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	33	5020-85531	5020-85541		
	50	5020-85532	5020-85542		
	75	5020-85533	5020-85543		
	100	5020-85534	5020-85544		
	150	5020-85535	5020-85545		
	250	5020-85536	5020-85546		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05461	5020-05471	5020-05481	5020-05491
	50	5020-05462	5020-05472	5020-05482	5020-05492
	75	5020-05463	5020-05473	5020-05483	5020-05493
	100	5020-05464	5020-05474	5020-05484	5020-05494
	150	5020-05465	5020-05475	5020-05485	5020-05495
	250	5020-05466	5020-05476	5020-05486	5020-05496
	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 5 µm	33	5020-85511	5020-85521		
	50	5020-85512	5020-85522		
	75	5020-85513	5020-85523		
	100	5020-85514	5020-85524		
	150	5020-85515	5020-85525		
	250	5020-85516	5020-85526		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05511	5020-05521	5020-05531	5020-05541
	50	5020-05512	5020-05522	5020-05532	5020-05542
	75	5020-05513	5020-05523	5020-05533	5020-05543
	100	5020-05514	5020-05524	5020-05534	5020-05544
	150	5020-05515	5020-05525	5020-05535	5020-05545
	250	5020-05516	5020-05526	5020-05536	5020-05546

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19221	5020-19220	5020-19271	5020-19270
1.5, 2.1		1.5	5020-19321	5020-19320	5020-19371	5020-19370
2.1, 3.0		3.0	5020-19121	5020-19120	5020-19171	5020-19170
4.0, 4.6		4.0	5020-19021	5020-19020	5020-19071	5020-19070
2.1, 3.0	20	3.0	5020-19521	5020-19520	5020-19571	5020-19570
4.0, 4.6		4.0	5020-19421	5020-19420	5020-19471	5020-19470
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

InertSustain™ C18
Inertsil® HPLC COLUMN
Inertsil® ODS-4 FLOW
Inertsil® ODS-3
Inertsil® ODS-SP

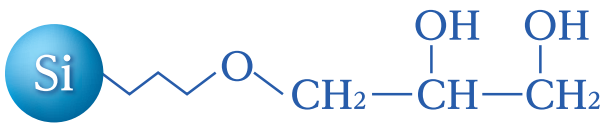
Normal Phase Columns

- Inertsil® Diol 058
- Inertsil® SIL-100A 060
- InertSustain® NH2 062
- Inertsil® NH2 064
- Inertsil® CN-3 066
- Inertsil® SIL-150A 068
- Inertsil® WP300 SIL 069

Inertsil® Diol

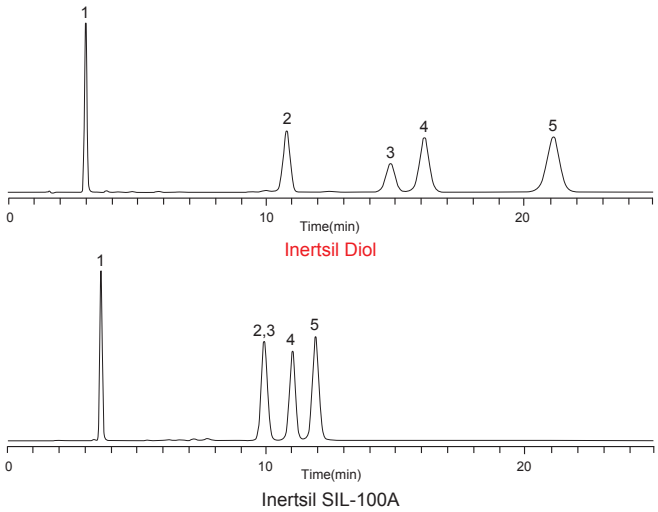
Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Diol Groups (Dihydroxypropyl Groups)
- **End-capping** : None
- **Carbon Loading** : 20 %
- **USP Code** : L20
- **pH Range** : 2 ~ 7.5



Inertsil Diol has characteristics of dihydroxypropyl group bonded phase. It shows unique selectivity normal phase mode.
The separation mechanism of diol column is featured by hydrogen bonding interactions between diol groups and polar compounds. Diol columns provide an alternative selectivity to silica columns often with increased retentivity.
Figure 1, selectivities of Inertsil Diol and Inertsil SIL-100A(a pure Silica gel column) are compared. Inertsil Diol shows higher selectivity for those compounds
Figure 2, 9 compounds are eluted by Inertsil Diol and other normal phase columns of “Inertsil series”. By comparing their retention times of each compound, it is noticeable that Inertsil Diol provides stable retention for all of the compounds, including basic and acidic compounds. As non-specific adsorption of water is reduced, Inertsil Diol can be washed by 100 % water eluent.

Figure 1 : Comparison of selectivity between Diol column and Silica column



Conditions

Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : A) *n*-Hexane
B) Ethanol
A/B = 85/15, v/v
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 254 nm

Sample :

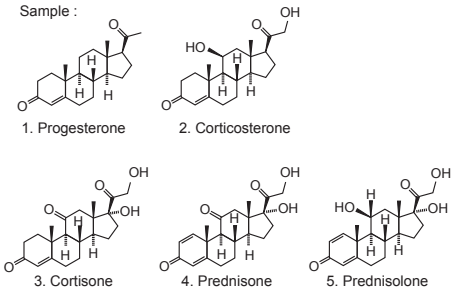
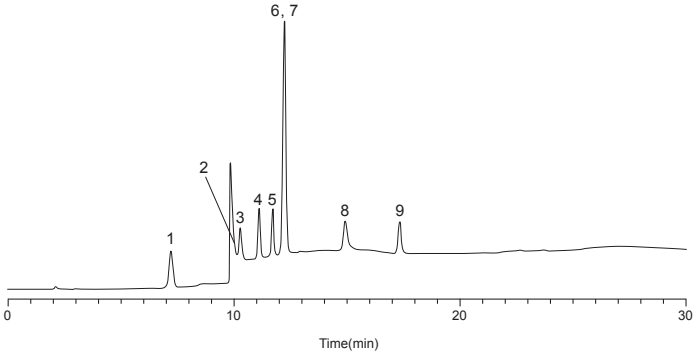
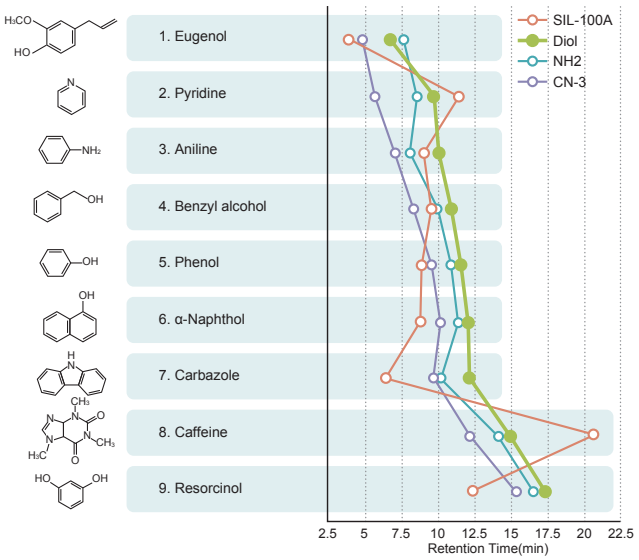


Figure 2 : Selectivity of Inertsil Diol

Conditions

Column : Inertsil Diol (5 µm, 150 × 3.0 mm I.D.)
Eluent : A) *n*-Hexane/Ethanol = 100/1, v/v
B) Ethanol
A/B = 100/0 – 30 min – 25/75, v/v
Flow Rate : 0.4 mL/min
Col. Temp. : 40 °C
Detection : UV 215 nm





Analytical Columns

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	33	5020-86531	5020-86541		
	50	5020-86532	5020-86542		
	75	5020-86533	5020-86543		
	100	5020-86534	5020-86544		
	150	5020-86535	5020-86545		
	250	5020-86536	5020-86546		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05411	5020-05421	5020-05431	5020-05441
	50	5020-05412	5020-05422	5020-05432	5020-05442
	75	5020-05413	5020-05423	5020-05433	5020-05443
	100	5020-05414	5020-05424	5020-05434	5020-05444
	150	5020-05415	5020-05425	5020-05435	5020-05445
	250	5020-05416	5020-05426	5020-05436	5020-05446
Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-86511	5020-86521		
	50	5020-86512	5020-86522		
	75	5020-86513	5020-86523		
	100	5020-86514	5020-86524		
	150	5020-86515	5020-86525		
	250	5020-86516	5020-86526		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05611	5020-05621	5020-05631	5020-05641
	50	5020-05612	5020-05622	5020-05632	5020-05642
	75	5020-05613	5020-05623	5020-05633	5020-05643
	100	5020-05614	5020-05624	5020-05634	5020-05644
	150	5020-05615	5020-05625	5020-05635	5020-05645
	250	5020-05616	5020-05626	5020-05636	5020-05646

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19223	5020-19222	5020-19273	5020-19272
1.5, 2.1		1.5	5020-19323	5020-19322	5020-19373	5020-19372
2.1, 3.0		3.0	5020-19123	5020-19122	5020-19173	5020-19172
4.0, 4.6		4.0	5020-19023	5020-19022	5020-19073	5020-19072
2.1, 3.0	20	3.0	5020-19523	5020-19522	5020-19573	5020-19572
4.0, 4.6		4.0	5020-19423	5020-19422	5020-19473	5020-19472
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® SIL-100A

Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : None
- **End-capping** : None
- **Carbon Loading** : - %
- **USP Code** : L3
- **pH Range** : 2 ~ 7.5

Inertsil SIL-100A is a pure silica gel column available in normal phase mode. Because of the high quality of its silica gel, Inertsil SIL-100A achievs separation with sharp peaks and provides high column-to-column reproducibility. This excellent silica gel ideally designed for HPLC is the basis for “Inertsil 3-series” of GL Scineces. GL Sciences is the first company which emphasized the importance of silica-gel purity and determined the nature of the silanol impurities in the Silica gel.
GL Sciences has established a successful manufacturing process for ultra pure silica gel with smooth and rigid surface. The SEM photos of Inertsil SIL-100A and other brands’ silica gel are shown as figure 1. Particles of Inertsil SIL-100A stand out by the smooth surface, uniformity in size and spherical shape. From figure 2, we can know as silanols on the sIlica surface interact with basic compounds, Inertsil SIL-100A retains basic compounds strongly and acidic compounds weakly.

Figure 1 : SEM photos of Inertsil SIL-100A and other brand available Silica gels

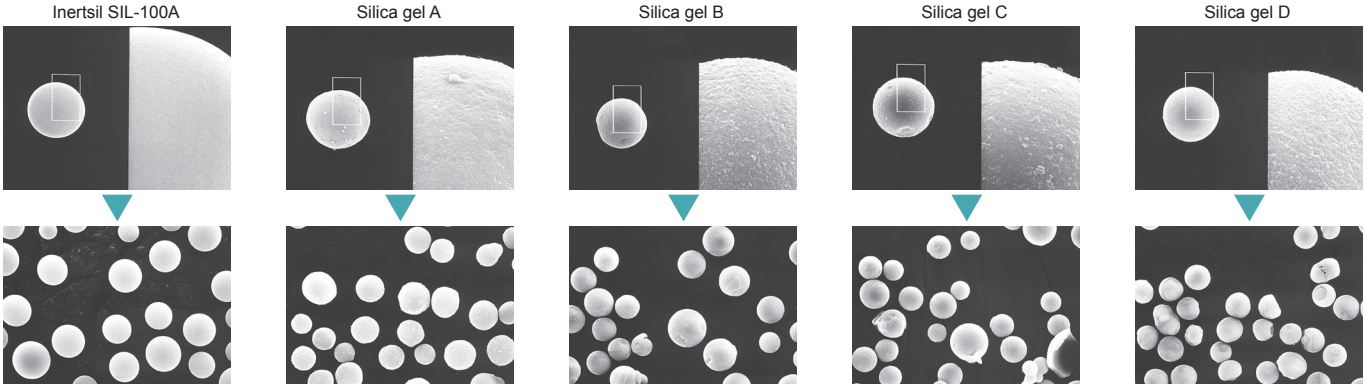
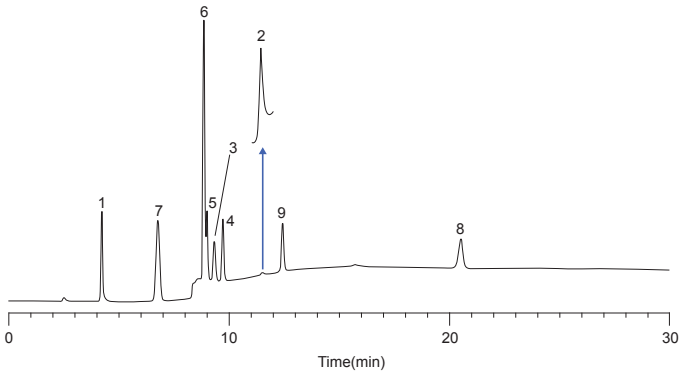
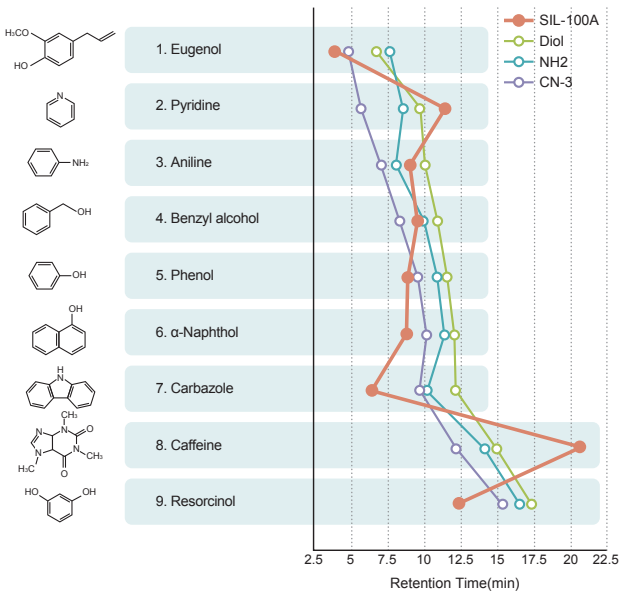


Figure 2 : Selectivity of Inertsil™ SIL-100A

Conditions
Column : Inertsil SIL-100A (5 µm, 150 × 3.0 mm I.D.)
Eluent : A) *n*-Hexane/Ethanol = 100/1, v/v
B) Ethanol
A/B = 100/0 – 30 min – 25/75, v/v
Flow Rate : 0.4 mL/min
Col. Temp. : 40 °C
Detection : UV 215 nm





Analytical Columns

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	33	5020-84211	5020-84221		
	50	5020-84212	5020-84222		
	75	5020-84213	5020-84223		
	100	5020-84214	5020-84224		
	150	5020-13422	5020-13420		
	250	5020-	5020-		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-04211	5020-04221	5020-04231	5020-04241
	50	5020-04212	5020-04222	5020-04232	5020-04242
	75	5020-04213	5020-04223	5020-04233	5020-01700
	100	5020-04214	5020-04224	5020-01703	5020-04244
	150	5020-04215	5020-04225	5020-04235	5020-01701
	250	5020-04216	5020-04226	5020-04236	5020-01702
Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-84311	5020-84321		
	50	5020-84312	5020-84322		
	75	5020-84313	5020-84323		
	100	5020-84314	5020-84324		
	150	5020-13412	5020-13410		
	250	5020-84316	5020-84326		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-04311	5020-04321	5020-04331	5020-04341
	50	5020-04312	5020-04322	5020-04332	5020-04342
	75	5020-04313	5020-04323	5020-04333	5020-04343
	100	5020-04314	5020-04324	5020-04334	5020-04344
	150	5020-04315	5020-04325	5020-04335	5020-01711
	250	5020-04316	5020-04326	5020-04336	5020-01712

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19227	5020-19226	5020-19277	5020-19276
1.5, 2.1		1.5	5020-19327	5020-19326	5020-19377	5020-19376
2.1, 3.0		3.0	5020-19127	5020-19126	5020-19177	5020-19176
4.0, 4.6		4.0	5020-19027	5020-19026	5020-19077	5020-19076
2.1, 3.0	20	3.0	5020-19527	5020-19526	5020-19577	5020-19576
4.0, 4.6		4.0	5020-19427	5020-19426	5020-19477	5020-19476
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

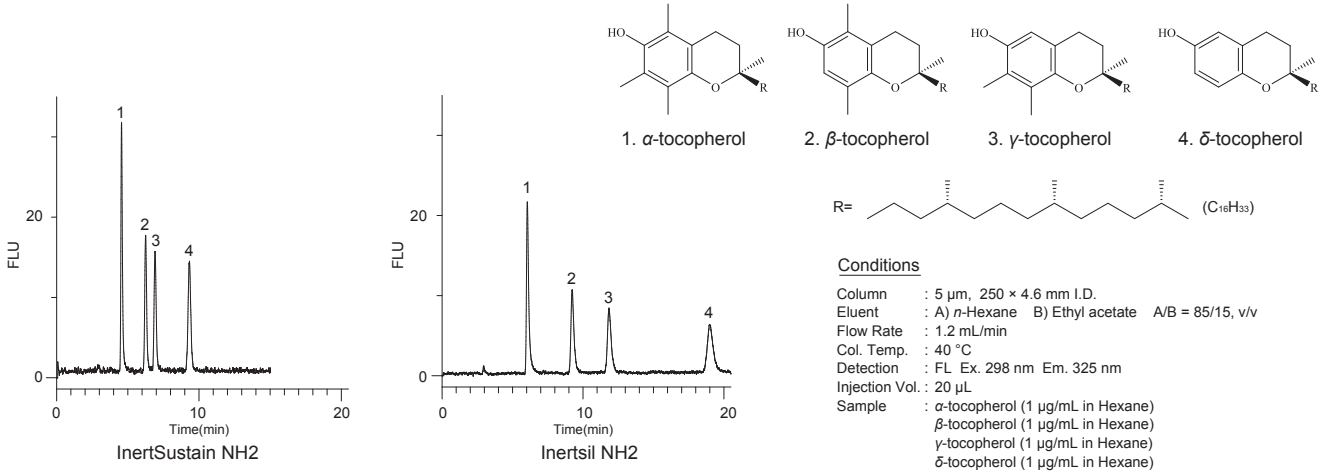
InertSustain® NH2

Physical Properties

- **Silica** : 3 Series Newly Developed ES Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area** : 350 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 0.85 mL/g
- **Bonded Phase** : Aminopropyl Groups
- **End-capping** : None
- **Carbon Loading** : 7 %
- **USP Code** : L8
- **pH Range** : 2 ~ 7.5

InertSustain NH2 is a newly developed ES silica column, compare to the other normal silica columns, InertSustain NH2 performs a sharp peaks, and high reproducible results with exceptional stability and durability that will maintain performance over the lifetime of the method. Also, InertSustain NH2 is an easily equilibrate column. Figure 2 is an analysis sample to show the equilibrate time of InertSustain NH2 column. Using an column was replaced with isopropanol, phthalic acid ester as the sample and measured the time until stabilized the analysis conditions. From the chromatogram we can know at the total flow time of 21 minutes of 4th injection, the column was stabled to be analyze.

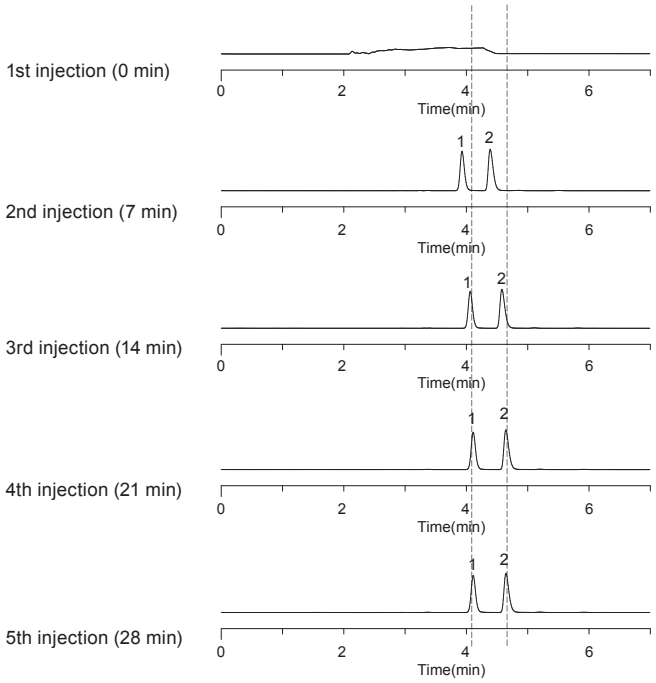
Figure 1 : Analysis of Vitamin E with InertSustain NH2 & Inertsil NH2 column

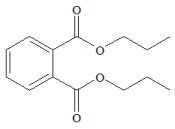


Conditions

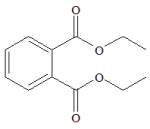
Column : 5 µm, 250 × 4.6 mm I.D.
Eluent : A) *n*-Hexane B) Ethyl acetate A/B = 85/15, v/v
Flow Rate : 1.2 mL/min
Col. Temp. : 40 °C
Detection : FL Ex. 298 nm Em. 325 nm
Injection Vol. : 20 µL
Sample : α-tocopherol (1 µg/mL in Hexane)
β-tocopherol (1 µg/mL in Hexane)
γ-tocopherol (1 µg/mL in Hexane)
δ-tocopherol (1 µg/mL in Hexane)

Figure 2 : Evaluation of equilibration time





Di-*n*-propylphthlate



Diethy phthalate

Conditions

Column : InertSustain NH2 (5 µm, 250 × 4.6 mm I.D.)
Eluent : A) n-Hexane/Isopropanol = 100/1, v/v
B) Isopropanol
A/B = 95/5, v/v (gradient mixer)
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 300 nm

Analytical Columns

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	30	5020-16768	5020-16774		
	50	5020-16769	5020-16775		
	75	5020-16770	5020-16776		
	100	5020-16771	5020-16777		
	150	5020-16772	5020-16778		
	250	5020-16773	5020-16779		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-16732	5020-16739	5020-16746	5020-16753
	50	5020-16733	5020-16740	5020-16747	5020-16754
	75	5020-16734	5020-16741	5020-16748	5020-16755
	100	5020-16735	5020-16742	5020-16749	5020-16756
	150	5020-16736	5020-16743	5020-16750	5020-16757
	250	5020-16737	5020-16744	5020-16751	5020-16758
	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 5 µm	30	5020-16639	5020-16645		
	50	5020-16640	5020-16646		
	75	5020-16641	5020-16647		
	100	5020-16642	5020-16648		
	150	5020-16643	5020-16649		
	250	5020-16644	5020-16650		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	30	5020-16602	5020-16609	5020-16616	5020-16623
	50	5020-16603	5020-16610	5020-16617	5020-16624
	75	5020-16604	5020-16611	5020-16618	5020-16625
	100	5020-16605	5020-16612	5020-16619	5020-16626
	150	5020-16606	5020-16613	5020-16620	5020-16627
	250	5020-16607	5020-16614	5020-16621	5020-16628

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

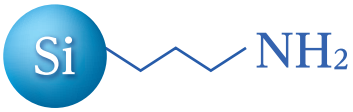
I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-16807	5020-16706	5020-16808	5020-16707
1.5, 2.1		1.5	5020-16809	5020-16708	5020-16810	5020-16709
2.1, 3.0		3.0	5020-16805	5020-16704	5020-16806	5020-16705
4.0, 4.6		4.0	5020-16803	5020-16702	5020-16804	5020-16703
2.1, 3.0	20	3.0	5020-16813	5020-16712	5020-16814	5020-16713
4.0, 4.6		4.0	5020-16811	5020-16710	5020-16812	5020-16711
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® NH2

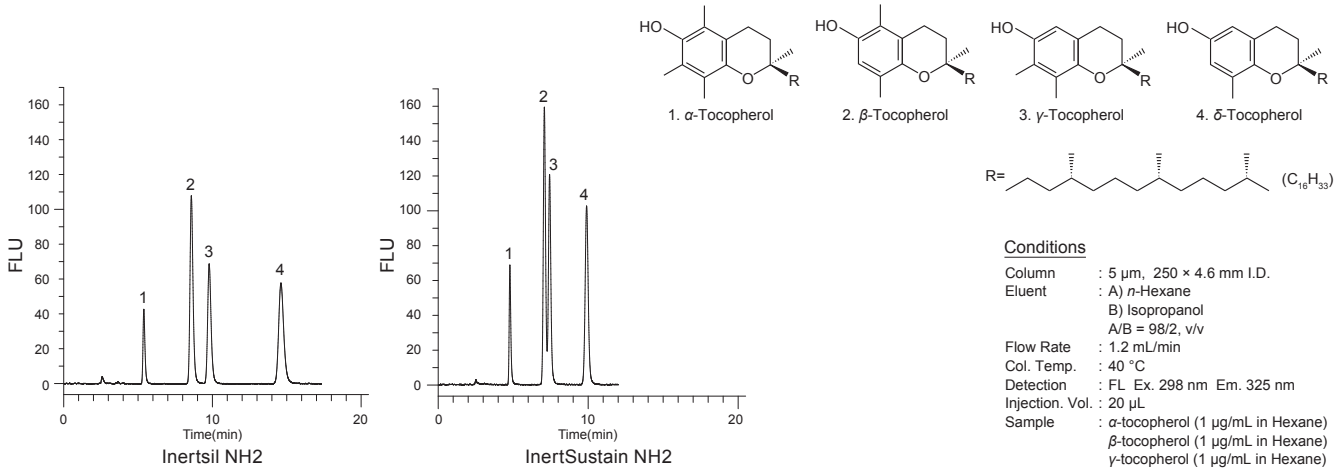
Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Aminopropyl Groups
- **End-capping** : None
- **Carbon Loading** : 8 %
- **USP Code** : L8
- **pH Range** : 2 ~ 7.5



Inertsil NH2 has a wide surface area, and bonded with aminopropyl groups, an amino column performs high retention time. Inertsil NH2 achieves better separation than other commercially available Amino columns as it is modified with Primary Amines. Figure 1 shows that Inertsil NH2 is able to separate isomers of Tocopherol with good peak shape in short time compared to other commercially Amino columns.
Primary Amines on the surface provides Inertsil NH2 unique selectivity as a normal phase column. Inertsil NH2 retains acidic compounds strongly and basic compound weakly. (Figure 2)

Figure 1 : Analysis of Vitamin E



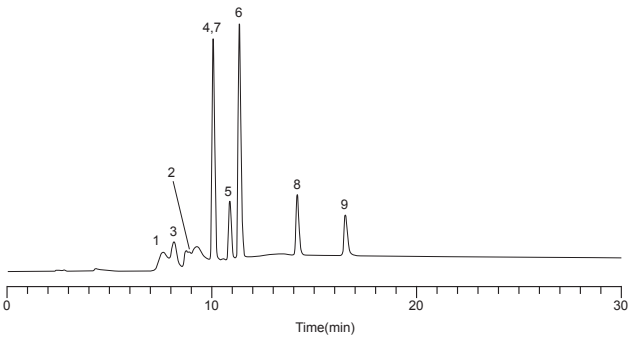
Conditions

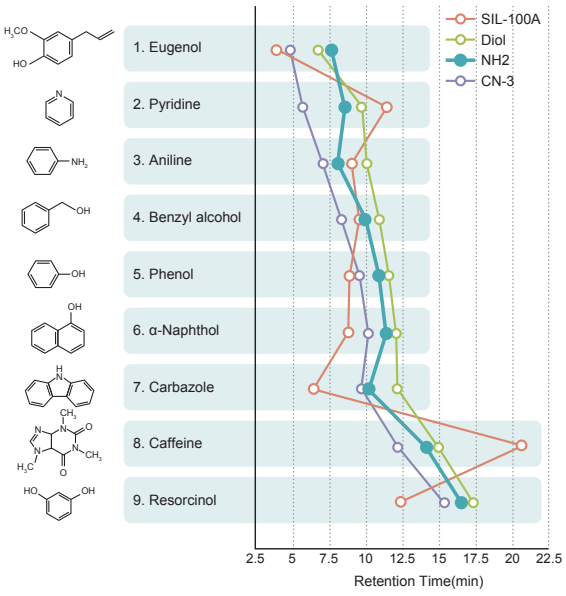
Column	: 5 µm, 250 × 4.6 mm I.D.
Eluent	: A) *n*-Hexane
	B) Isopropanol
	A/B = 98/2, v/v
Flow Rate	: 1.2 mL/min
Col. Temp.	: 40 °C
Detection	: FL Ex. 298 nm Em. 325 nm
Injection. Vol.	: 20 µL
Sample	: α-tocopherol (1 µg/mL in Hexane)
	β-tocopherol (1 µg/mL in Hexane)
	γ-tocopherol (1 µg/mL in Hexane)
	δ-tocopherol (1 µg/mL in Hexane)

Figure 2 : Selectivity of Inertsil® NH2

Conditions

Column	: 5 µm, 150 × 3.0 mm I.D.
Eluent	: A) Hexane/Ethanol = 100/1, v/v
	B) Ethanol
	A/B = 100/0 – 30 min – 25/75, v/v
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 °C
Detection	: UV 215 nm





Analytical Columns

Particle Size: 3 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-85531	5020-85541		
	50	5020-85532	5020-85542		
	75	5020-85533	5020-85543		
	100	5020-85534	5020-85544		
	150	5020-85535	5020-85545		
	250	5020-85536	5020-85546		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05461	5020-05471	5020-05481	5020-05491
	50	5020-05462	5020-05472	5020-05482	5020-05492
	75	5020-05463	5020-05473	5020-05483	5020-05493
	100	5020-05464	5020-05474	5020-05484	5020-05494
	150	5020-05465	5020-05475	5020-05485	5020-05495
	250	5020-05466	5020-05476	5020-05486	5020-05496
Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-85511	5020-85521		
	50	5020-85512	5020-85522		
	75	5020-85513	5020-85523		
	100	5020-85514	5020-85524		
	150	5020-85515	5020-85525		
	250	5020-85516	5020-85526		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05511	5020-05521	5020-05531	5020-05541
	50	5020-05512	5020-05522	5020-05532	5020-05542
	75	5020-05513	5020-05523	5020-05533	5020-05543
	100	5020-05514	5020-05524	5020-05534	5020-05544
	150	5020-05515	5020-05525	5020-05535	5020-05545
	250	5020-05516	5020-05526	5020-05536	5020-05546

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19221	5020-19220	5020-19271	5020-19270
1.5, 2.1		1.5	5020-19321	5020-19320	5020-19371	5020-19370
2.1, 3.0		3.0	5020-19121	5020-19120	5020-19171	5020-19170
4.0, 4.6		4.0	5020-19021	5020-19020	5020-19071	5020-19070
2.1, 3.0	20	3.0	5020-19521	5020-19520	5020-19571	5020-19570
4.0, 4.6		4.0	5020-19421	5020-19420	5020-19471	5020-19470
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

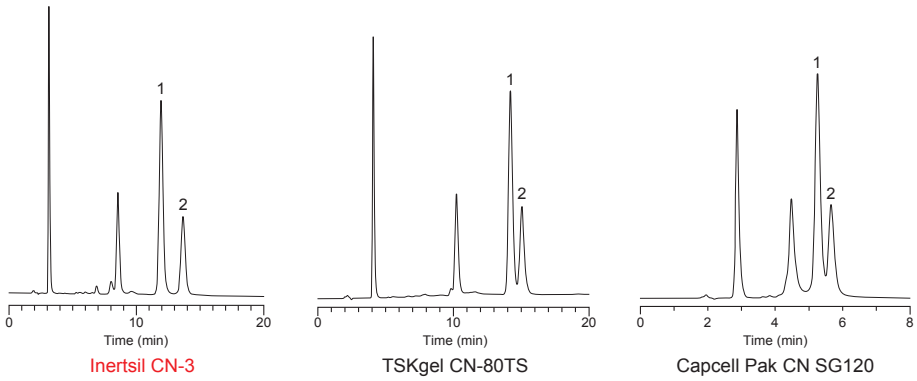
Inertsil® CN-3

Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Cyanopropryl Groups
- **End-capping** : None
- **Carbon Loading** : 14 %
- **USP Code** : L10
- **pH Range** : 2 ~ 7.5

Inertsil CN-3, Cyanopropryl groups bonded to Silica gel with high density. And it is not only increase difference recognition of hydrophilicity, but also increase the durability. It is difficult to increase the both performance with other previous cyanopropryl columns. Inertsil CN-3 can be cleaned with 100 % aqueous solvent because non-specific adsorption of water effected with silanol base is prevented.
Figure 2 shows 9 compounds analysis with Inertsil CN-3. And also it shows different selectivity of the other Inertsil series columns. Each compounds are detected adequate retentivity. And then they are easy to use as same as Inertsil Diol on normal phase mode. Regarding the reversed phase mode, please refer to page 40.

Figure1 : Comparison of selectivity between Inertsil® CN-3 and Commercially available Cyano Columns



Conditions

Column	: Cyano Column (5 µm, 150 × 4.6 mm I.D.)
Eluent	: A) Hexane B) Ethanol A/B = 90/10, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm

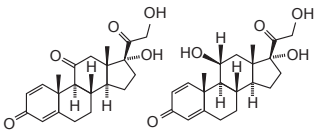
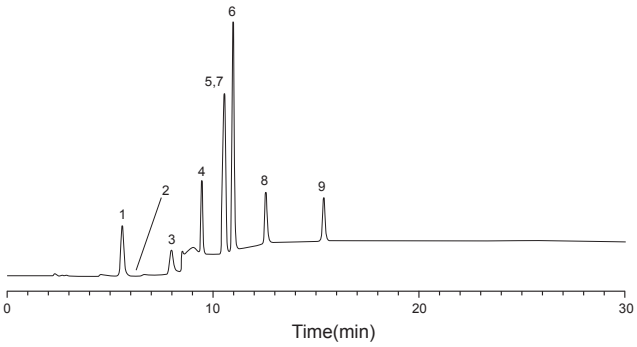
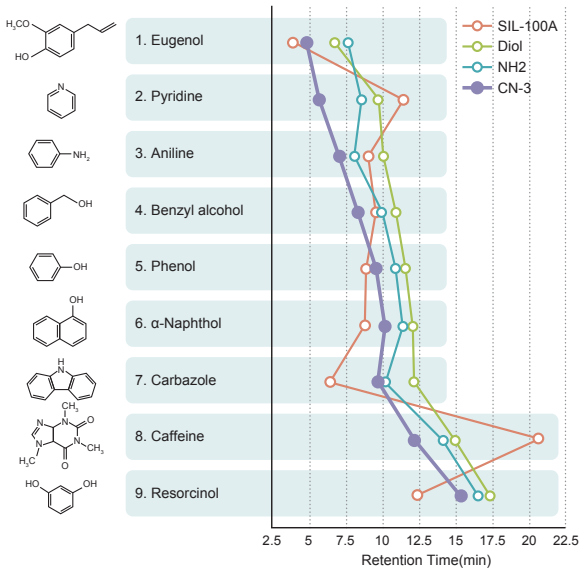


Figure2 : Selectivity of Inertsil® CN-3

Conditions

Column	: Inertsil CN-3 (5 µm, 150 × 3.0 mm I.D.)
Eluent	: A) Hexane/Ethanol = 100/1, v/v B) Ethanol A/B = 100/0 – 30 min – 25/75, v/v
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 °C
Detection	: UV 215 nm





Analytical Columns

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	33	5020-85331	5020-85341		
	50	5020-85332	5020-85342		
	75	5020-85333	5020-85343		
	100	5020-85334	5020-85344		
	150	5020-85335	5020-85345		
	250	5020-85336	5020-85346		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05261	5020-05271	5020-05281	5020-05291
	50	5020-05262	5020-05272	5020-05282	5020-05292
	75	5020-05263	5020-05273	5020-05283	5020-05293
	100	5020-05264	5020-05274	5020-05284	5020-05294
	150	5020-05265	5020-05275	5020-05285	5020-05295
	250	5020-05266	5020-05276	5020-05286	5020-05296
Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-85311	5020-85321		
	50	5020-85312	5020-85322		
	75	5020-85313	5020-85323		
	100	5020-85314	5020-85324		
	150	5020-13712	5020-13710		
	250	5020-85316	5020-85326		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05311	5020-05321	5020-05331	5020-05341
	50	5020-05312	5020-05322	5020-05332	5020-05342
	75	5020-05313	5020-05323	5020-05333	5020-05343
	100	5020-05314	5020-05324	5020-05334	5020-05344
	150	5020-05315	5020-05325	5020-01942	5020-01940
	250	5020-05316	5020-05326	5020-01943	5020-01941

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19219	5020-19218	5020-19269	5020-19268
1.5, 2.1		1.5	5020-19319	5020-19318	5020-19369	5020-19368
2.1, 3.0		3.0	5020-19119	5020-19118	5020-19169	5020-19168
4.0, 4.6		4.0	5020-19019	5020-19018	5020-19069	5020-19068
2.1, 3.0	20	3.0	5020-19519	5020-19518	5020-19569	5020-19568
4.0, 4.6		4.0	5020-19419	5020-19418	5020-19469	5020-19468
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16” Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

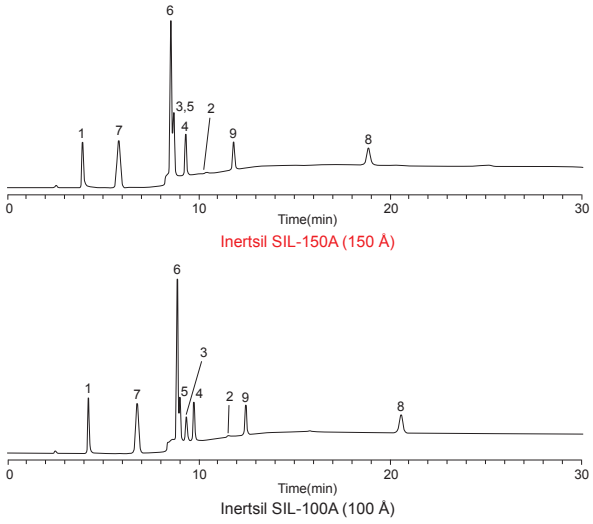
Inertsil® SIL-150A

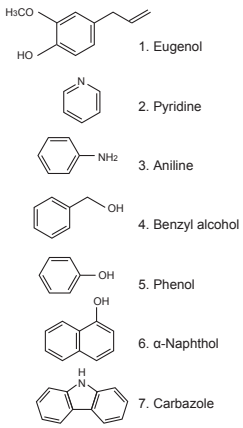
Physical Properties

- **Silica** : **2 Series High Purity Silica Gel**
- **Particle Size** : **5 µm**
- **Surface Area** : **320 m^2/g**
- **Pore Size** : **150 Å (15 nm)**
- **Pore Volume** : **1.20 mL/g**
- **Bonded Phase** : **None**
- **End-capping** : **None**
- **Carbon Loading** : **- %**
- **USP Code** : **L3**
- **pH Range** : **2 ~ 7.5**

Inertsil SIL-150A is ultra pure silica gel column, and this ultra pure silica gel contains very low level of metal impurities and is durable and free from dents and cracks which can cause premature column failure. Compared to Inertsil SIL-100A, the silica's surface area is smaller (320 m²/g). Retentivity of Inertsil SIL-150A is weaker than that of Inertsil SIL-100A. (Figure 1)

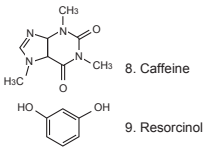
Figure 1 : Comparison of retentivity and selectivity between Inertsil® SIL-150A and Inertsil® SIL-100A





Conditions

Column Size : 5 µm, 150 × 3.0 mm I.D.
Eluent : A) *n*-Hexane/Ethanol = 100/1, v/v
B) Ethanol
A/B = 100/0 – 30 min – 25/75, v/v
Flow Rate : 0.4 mL/min
Col. Temp. : 40 °C
Detection : UV 215 nm



Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
Particle Size: 5 µm	150	5020-01021	5020-01022	5020-01023	5020-01024
	250	5020-01025	5020-01026	5020-01027	5020-01028

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
2.1, 3.0	10	3.0	5020-19139	5020-19189
4.0, 4.6		4.0	5020-19039	5020-19089
2.1, 3.0	20	3.0	5020-19539	5020-19589
4.0, 4.6		4.0	5020-19439	5020-19489
Holder for Cartridge Guard Column E			For 10 mm Length	5020-08500
			For 20 mm Length	5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

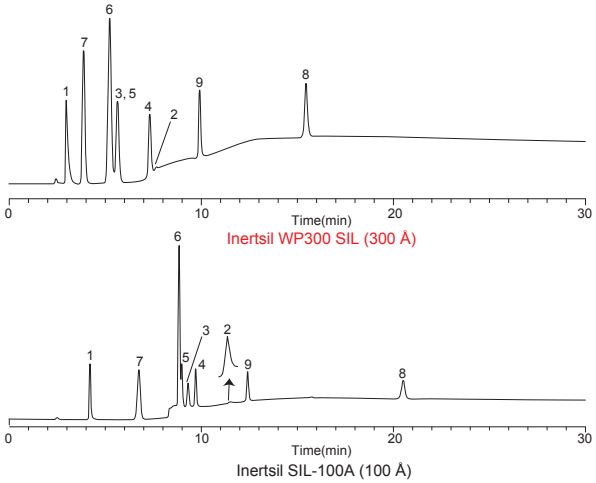
Inertsil® WP300 SIL

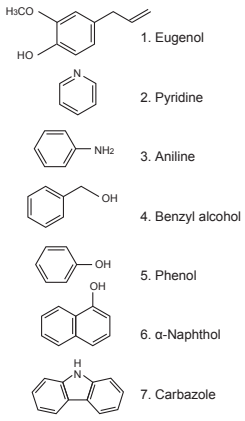
Physical Properties

- **Silica** : **High Purity Silica Gel**
- **Particle Size** : **5 µm**
- **Surface Area** : **150 m^2/g**
- **Pore Size** : **300 Å (30 nm)**
- **Pore Volume** : **1.05 mL/g**
- **Bonded Phase** : **None**
- **End-capping** : **None**
- **Carbon Loading** : **- %**
- **USP Code** : **L3**
- **pH Range** : **2 ~ 7.5**

Inertsil WP300 SIL is pure silica gel phase with wide pores(300 Å). It is available for analysing compounds including large molecules. As the pore becomes wider, the surface area of silica gel is smaller. Since the interactions between the analyte and silica gel occur on the sIlica surface, smaller surface area means less interactions and faster elution. In the figure below, Inertsil WP300 SIL and Inertsil SIL-100A are compared to see their separation and eluting speed. The pore size of Inertsil SIL-100A is 100 Å and the surface area is 450 m²/g. As shown, Inertsil WP300 SIL elutes faster than Inertsil SIL-100A though their separating patterns are similar.

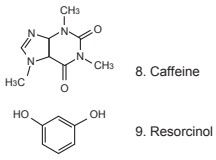
Figure 1 : Comparison of selectivity and retentivity between Silica gel columns with different pore size.





Conditions

Column Size : 5 µm, 150 × 3.0 mm I.D.
Eluent : A) *n*-Hexane/Ethanol = 100/1, v/v
B) Ethanol
A/B = 100/0 – 30 min – 25/75. v/v
Flow Rate : 0.4 mL/min
Col. Temp. : 40 °C
Detection : UV 215 nm



Analytical Columns

Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-86011	5020-86021		
	50	5020-86012	5020-86022		
	75	5020-86013	5020-86023		
	100	5020-86014	5020-86024		
	150	5020-86015	5020-86025		
	250	5020-86016	5020-86026		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-06011	5020-06021	5020-06031	5020-06041
	50	5020-06012	5020-06022	5020-06032	5020-06042
	75	5020-06013	5020-06023	5020-06033	5020-06043
	100	5020-06014	5020-06024	5020-06034	5020-06044
	150	5020-06015	5020-06025	5020-06035	5020-06045
	250	5020-06016	5020-06026	5020-06036	5020-06046

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
1.0	10	1.0	5020-19232	5020-19282
1.5, 2.1		1.5	5020-19332	5020-19382
2.1, 3.0		3.0	5020-19132	5020-19182
4.0, 4.6		4.0	5020-19032	5020-19082
2.1, 3.0	20	3.0	5020-19532	5020-19582
4.0, 4.6		4.0	5020-19432	5020-19482
Holder for Cartridge Guard Column E			For 10 mm Length	5020-08500
			For 20 mm Length	5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

GL Sciences Inc.
GL Sciences Inc.
GL Sciences Inc.

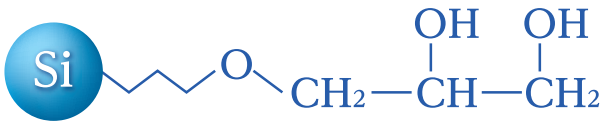
SEC Columns

- Inertsil® Diol 072
- Inertsil® WP300 Diol 074

Inertsil® Diol

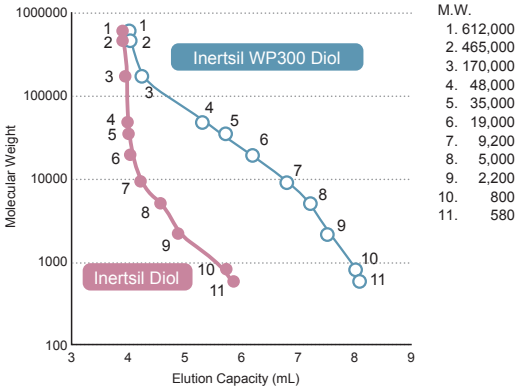
Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 3 µm, 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Diol Groups (Dihydroxypropyl Groups)
- **End-capping** : None
- **Carbon Loading** : 20 %
- **USP Code** : L20
- **pH Range** : 2 ~ 7.5



Inertsil Diol, dihydroxypropyl groups chemical bonded onto silica gel, can be used for water group SEC(GFC) or organic solvents SEC(GPC). (Figure 1).
As features of the packing material, it can analyze with several columns in series since 20 Mpa as the maximum operating pressure, and it is higher than polymer base columns.
Figure 2 shows an example of polystyrene analysis with Inertsil Diol and Inertsil WP300 Diol in series. With coupling 2 columns in different pore size in series, it can be used for broader range of molecular weight compared with figure 1 calibration curve.
General internal diameter of SEC columns are 7-8 mm. But even if 4.6 mmI.D. column, it can obtain calibration curve with smaller elution volume rather than 7.6 mm I.D. column. Therefore it can be analyzed with saving solvent, environment conservation, and low cost.

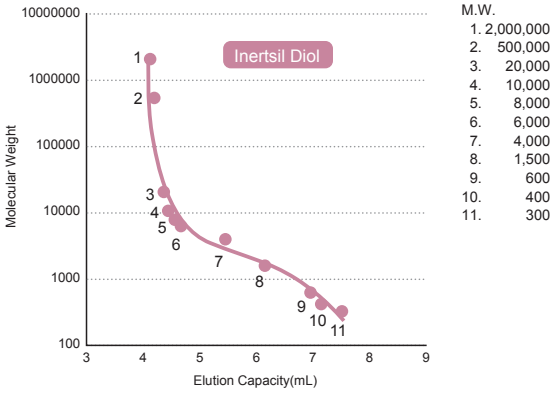
Figure1 : Calibration curve for aqueous and organic SEC analysis



Calibration curve for polystyrenes

Conditions

Column : Inertsil WP300 Diol (5 µm, 250 × 7.6 mm I.D.)
Eluent : THF
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 254 nm

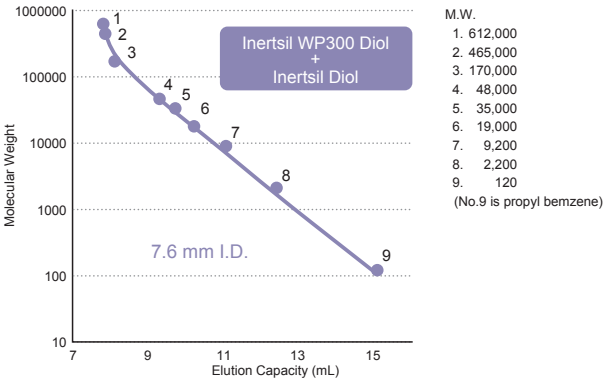


Calibration curve for polystyrene glycol

Conditions

Column : Inertsil Diol (5 µm, 250 × 7.6 mm I.D.)
Eluent : H_2O
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : RI (Cell Temp. 35 °C)

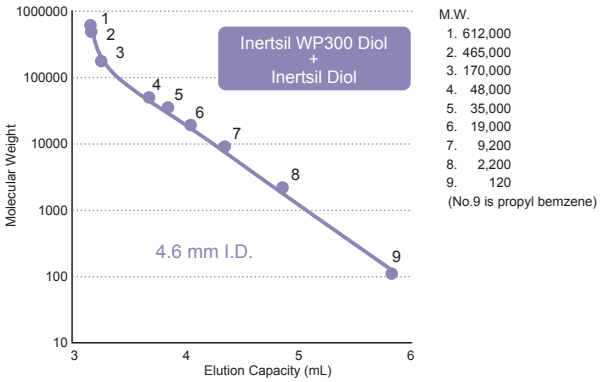
Figure2 : Calibration curve for small I.D. SEC columns



Calibration curve for polystyrene with 7.6 mm I.D. column

Conditions

Column : Inertsil WP300 Diol (5 µm, 250 × 7.6 mm I.D.) + Inertsil Diol (5 µm, 250 × 7.6 mm I.D.)
Eluent : THF
Flow Rate : 1.0 mL/min
Col. Temp. : 35 °C
Detection : UV 254 nm



Calibration curve for polystyrene with 4.6 mm I.D. column

Conditions

Column : Inertsil WP300 Diol (5 µm, 250 × 4.6 mm I.D.) + Inertsil Diol (5 µm, 250 × 4.6 mm I.D.)
Eluent : THF
Flow Rate : 0.3 mL/min
Col. Temp. : 35 °C
Detection : UV 254 nm

Analytical Columns

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 3 µm	33	5020-86531	5020-86541		
	50	5020-86532	5020-86542		
	75	5020-86533	5020-86543		
	100	5020-86534	5020-86544		
	150	5020-86535	5020-86545		
	250	5020-86536	5020-86546		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05411	5020-05421	5020-05431	5020-05441
	50	5020-05412	5020-05422	5020-05432	5020-05442
	75	5020-05413	5020-05423	5020-05433	5020-05443
	100	5020-05414	5020-05424	5020-05434	5020-05444
	150	5020-05415	5020-05425	5020-05435	5020-05445
	250	5020-05416	5020-05426	5020-05436	5020-05446
Particle Size: 5 µm	Length \ I.D. (mm)	1.0	1.5		
	33	5020-86511	5020-86521		
	50	5020-86512	5020-86522		
	75	5020-86513	5020-86523		
	100	5020-86514	5020-86524		
	150	5020-86515	5020-86525		
	250	5020-86516	5020-86526		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-05611	5020-05621	5020-05631	5020-05641
	50	5020-05612	5020-05622	5020-05632	5020-05642
	75	5020-05613	5020-05623	5020-05633	5020-05643
	100	5020-05614	5020-05624	5020-05634	5020-05644
	150	5020-05615	5020-05625	5020-05635	5020-05645
	250	5020-05616	5020-05626	5020-05636	5020-05646
	Length \ I.D. (mm)	6.0	7.6	10	
	50	5020-05652	5020-05662	5020-86552	
	100	5020-05654	5020-05664	5020-86554	
	150	5020-05655	5020-05665	5020-86555	
	250	5020-05656	5020-05666	5020-86556	

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

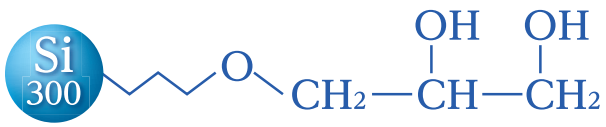
I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19223	5020-19222	5020-19273	5020-19272
1.5, 2.1		1.5	5020-19323	5020-19322	5020-19373	5020-19372
2.1, 3.0		3.0	5020-19123	5020-19122	5020-19173	5020-19172
4.0, 4.6		4.0	5020-19023	5020-19022	5020-19073	5020-19072
2.1, 3.0	20	3.0	5020-19523	5020-19522	5020-19573	5020-19572
4.0, 4.6		4.0	5020-19423	5020-19422	5020-19473	5020-19472
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.
* For the guard column I.D. over 6.0 mm.Please refer to page 115.

Inertsil® WP300 Diol

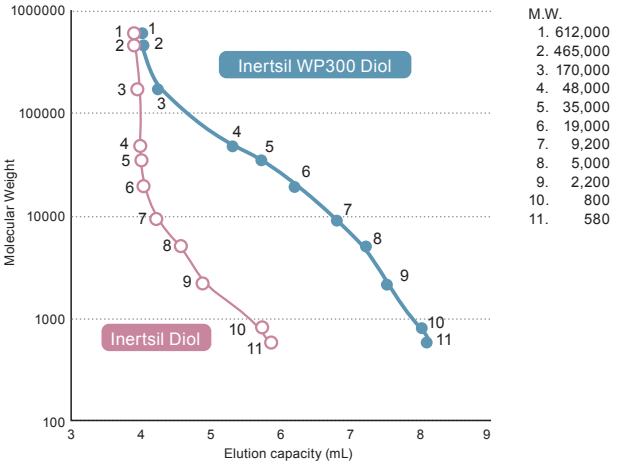
Physical Properties

- **Silica** : **WP300 Series High Purity Silica Gel**
- **Particle Size** : **5 µm**
- **Surface Area** : **150 m^2/g**
- **Pore Size** : **300 Å (30 nm)**
- **Pore Volume** : **1.05 mL/g**
- **Bonded Phase** : **Diol Groups (Dihydroxypropyl Groups)**
- **End-capping** : **None**
- **Carbon Loading** : **9 %**
- **USP Code** : **L20, L33**
- **pH Range** : **2 ~ 7.5**



Inertsil WP300 Diol has dihydroxypropyl group bonded to silica gel with pore size 300 Å and is capable of analyzing large molecules. Like Inertsil Diol, Inertsil WP300 Diol can be used for both aqueous SEC (Size Exclusion Chromatography) and organic SEC. Also, as a diol column, Inertsil WP300 Diol can be used in both normal phase and reversed phase mode.
As the pore size of silica gel is wider than that of Inertsil Diol, Inertsil WP300 Diol is capable of separating compounds with a broader range of molecular weight than Inertsil Diol. (Figure 1.)

Figure 1 : Calibration curve and analysis of polystyrenes



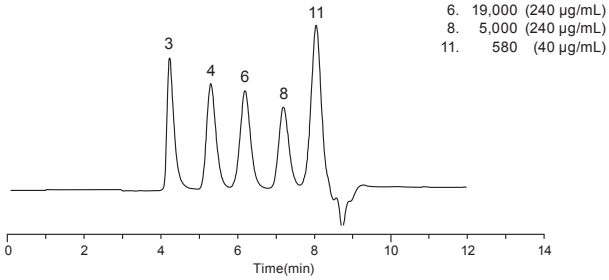
M.W.
1. 612,000
2. 465,000
3. 170,000
4. 48,000
5. 35,000
6. 19,000
7. 9,200
8. 5,000
9. 2,200
10. 800
11. 580

Calibration curve for polystyrenes by organic SEC

Conditions

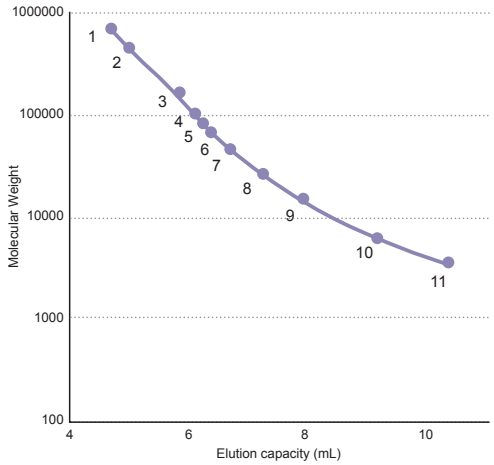
Column Size	: 5 µm, 250 × 7.6 mm I.D.
Eluent	: THF
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm

M.W.
3. 170,000 (240 µg/mL)
4. 48,000 (240 µg/mL)
6. 19,000 (240 µg/mL)
8. 5,000 (240 µg/mL)
11. 580 (40 µg/mL)



Analysis of polystyrenes by Inertsil WP300 Diol

Figure 2 : Calibration curve and analysis of proteins



M.W.

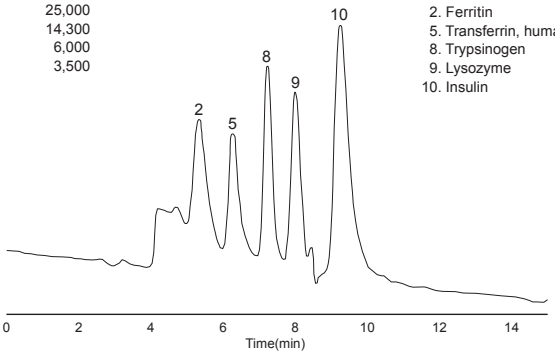
1. Thyroglobulin	660,000
2. Ferritin	444,000
3. γ-Globulins	160,000
4. Phosphorylase	97,400
5. Transferrin, human	80,000
6. BSA	66,000
7. Ovalbumin	45,000
8. Trypsinogen	25,000
9. Lysozyme	14,300
10. Insulin	6,000
11. Insulin chain B	3,500

Calibration curve for proteins

Conditions

Column	: Inertsil WP300 Diol (5 µm, 250 × 7.6 mm I.D.)
Eluent	: 0.2 M NaCl, 0.1 M NaH_2PO_4 (pH 6.7, Na_2HPO_4)
Flow Rate	: 1.0 mL/min
Col. Temp.	: 35 °C
Detection	: UV 280 nm
Injection. Vol.	: 10 µL

2. Ferritin	(40 µg/mL)
5. Transferrin, human	(260 µg/mL)
8. Trypsinogen	(160 µg/mL)
9. Lysozyme	(80 µg/mL)
10. Insulin	(460 µg/mL)



Analysis of proteins by Inertsil WP300 Diol

Analytical Columns

	Length \ I.D. (mm)	1.0	1.5	2.1	3.0	4.0	4.6
Particle Size: 5 µm	33	5020-85911	5020-85921	5020-05911	5020-05921	5020-05931	5020-05941
	50	5020-85912	5020-85922	5020-05912	5020-05922	5020-05932	5020-05942
	75	5020-85913	5020-85923	5020-05913	5020-05923	5020-05933	5020-05943
	100	5020-85914	5020-85924	5020-05914	5020-05924	5020-05934	5020-05944
	150	5020-85915	5020-85925	5020-05915	5020-05925	5020-05935	5020-05945
	250	5020-85916	5020-85926	5020-05916	5020-05926	5020-05936	5020-05946
	Length \ I.D. (mm)	6.0	7.6	10			
	50	5020-05980	5020-05985	5020-85932			
	100	5020-05981	5020-05986	5020-85934			
	150	5020-05982	5020-05987	5020-85935			
	250	5020-05983	5020-05988	5020-85936			

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
1.0	10	1.0	5020-19231	5020-19281
1.5, 2.1		1.5	5020-19331	5020-19381
2.1, 3.0		3.0	5020-19131	5020-19181
4.0, 4.6		4.0	5020-19031	5020-19081
2.1, 3.0	20	3.0	5020-19531	5020-19581
4.0, 4.6		4.0	5020-19431	5020-19481
Holder for Cartridge Guard Column E		For 10 mm Length		5020-08500
		For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.
* For the guard column I.D. over 6.0 mm.Please refer to page 115.

Inertsil® ODS
Inertsil ODS-3V
Validation Support Column

Ion Exchange Columns

- Inertsil® AX 078
- Inertsil® CX 080

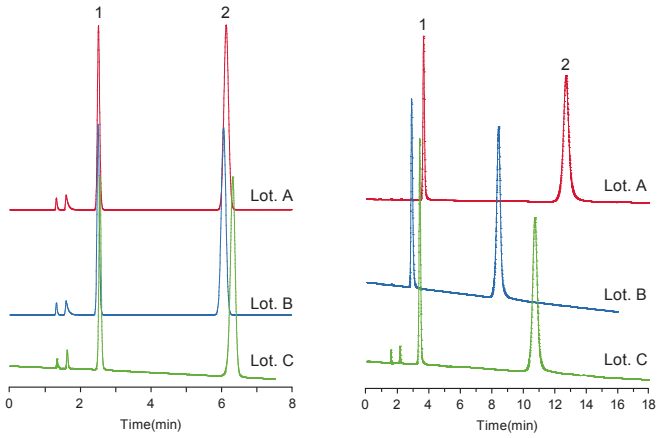
Inertsil® AX

Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Diethylaminopropyl Groups
- **End-capping** : None
- **Carbon Loading** : 17 %
- **AEC** : 0.4 meq/g
- **USP Code** : -
- **pH Range** : 2 ~ 7.5

Inertsil AX has diethylamino groups bonded to silica gel by an alkyl chain. The diethylamino groups offer anionic functions required for anion exchange chromatography. It is mainly used for analyses of acidic compounds. Conventional ion-exchange columns used to show inconsistent results from lot to lot. However, Inertsil AX is manufactured under strict quality control in order to offer excellent lot-to-lot reproducibility.
The retentivity of Inertsil AX is influenced by the concentration of buffer. The retention time can be adjusted by the concentration of buffer (Refer to Fig. 2).

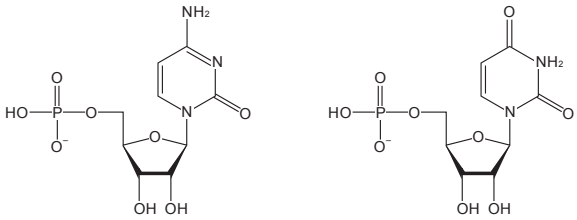
Figure 1 : Comparison of lot-to-lot reproducibility with other brands



Inertsil AX　　other brand's ion-exchange column

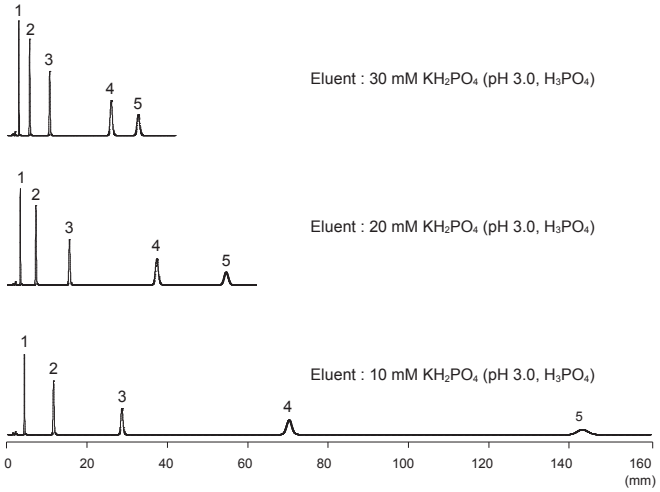
Conditions

Column Size	: 5 µm, 150 × 4.6 mm I.D.
Eluent	: 60 mM KH_2PO_4 (pH 3.0, H_3PO_4)
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Injection Vol.	: 1 µL
Sample	: 1. Cytidine 5'-monophosphate (CMP)
	2. Uridine 5'-monophosphate (UMP)



Cytidine 5'-monophosphate (CMP)　　Uridine 5'-monophosphate (UMP)

Figure 2 : Effect of buffer concentration in eluent



Conditions

Column	: Inertsil AX (5 µm, 150 × 4.6 mm I.D.)
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Injection Vol.	: 10 µL
Sample	: 1. Cytidine 5'-monophosphate (CMP)
	2. Adenine 5'-monophosphate (AMP)
	3. Uridine 5'-monophosphate (UMP)
	4. Guanosine 5'-monophosphate (GMP)
	5. Xanthosine 5'-monophosphate (XMP)

Analytical Columns

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 5 µm	33	5020-80111	5020-80121		
	50	5020-80112	5020-80122		
	75	5020-80113	5020-80123		
	100	5020-80114	5020-80124		
	150	5020-80115	5020-80125		
	250	5020-80116	5020-80126		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-07211	5020-07221	5020-07231	5020-07241
	50	5020-07212	5020-07222	5020-07232	5020-07242
	75	5020-07213	5020-07223	5020-07233	5020-07243
	100	5020-07214	5020-07224	5020-07234	5020-07244
	150	5020-07215	5020-07225	5020-07235	5020-07245
	250	5020-07216	5020-07226	5020-07236	5020-07246

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

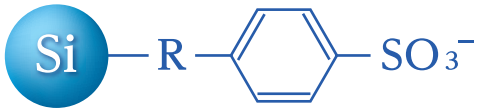
I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
1.0	10	1.0	5020-19233	5020-19283
1.5, 2.1		1.5	5020-19333	5020-19383
2.1, 3.0		3.0	5020-19133	5020-19183
4.0, 4.6		4.0	5020-19033	5020-19083
2.1, 3.0	20	3.0	5020-19533	5020-19583
4.0, 4.6		4.0	5020-19433	5020-19483
Holder for Cartridge Guard Column E			For 10 mm Length	5020-08500
			For 20 mm Length	5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® CX

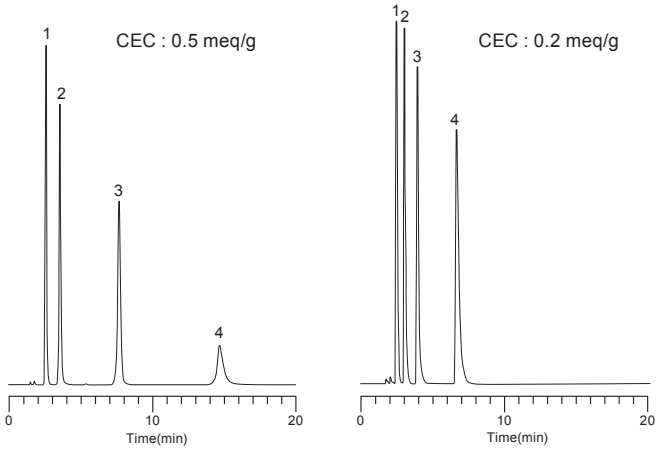
Physical Properties

- **Silica** : 3 Series High Purity Silica Gel
- **Particle Size** : 5 µm
- **Surface Area** : 450 m^2/g
- **Pore Size** : 100 Å (10 nm)
- **Pore Volume** : 1.05 mL/g
- **Bonded Phase** : Benzensulfonyl Groups
- **End-capping** : None
- **Carbon Loading** : 14 %
- **CEC** : 0.5 meq/g
- **USP Code** : L9
- **pH Range** : 2 ~ 7.5



Inertsil CX has benzenesulfonyl groups bonded to silica gel by an alkyl chain. The sulfony groups at the end of the structure offer cationic functions required for the cation exchange chromatography. It is mainly used for analyses of basic compounds. Inertsil CX is manufactured under strict quality control in order to offer excellent lot-to-lot reproducibility as the same as Inertsil AX. Inertsil CX has high ion exchange capacity and provides high retentivity and selectivity. Therefore, it is also suited for analyzing amino acids and nucleobases shown in Fig. 2 and Fig. 3

Figure 1 : Comparison of lot-to-lot reproducibility with other brands

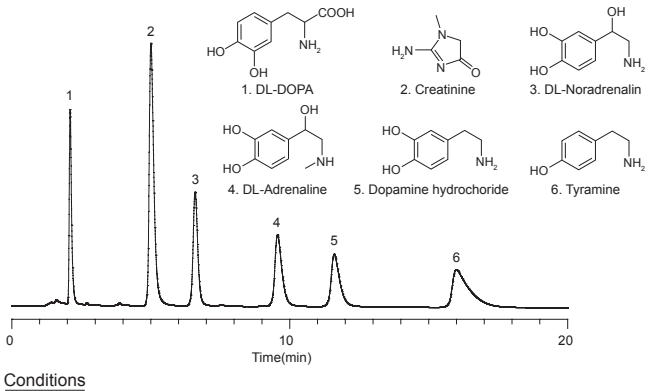


Inertsil CX　　Comitial Cation-Exchange column

Conditions

Column Size : 5 µm, 150 × 4.6 mm I.D.
Eluent : 0.2 M CH_3COONH_4 (pH 5.0, HCOOH)
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 260 nm
Injection vol. : 10 µL
Sample : 1. Uracil (0.02 mg/mL)
2. Thymine (0.02 mg/mL)
3. Cytosine (0.02 mg/mL)
4. Adenine (0.02 mg/mL)

Figure 2 : Biogenic Amine Analysis

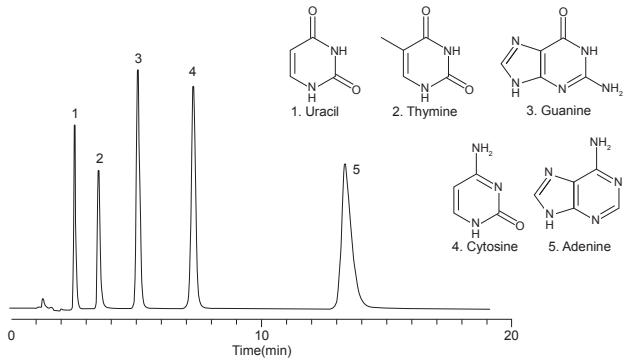


Conditions

Column : Inertsil CX (5 µm, 150 × 4.6 mm I.D.)
Eluent : 0.2 M K_2HPO_4 (pH 6.0, KH_2PO_4)
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 254 nm
Injection Vol. : 10 µL

Sample : 1. DL-DOPA (0.98 mg/mL)
2. Creatinine (0.31 mg/mL)
3. DL-Noradrenalin (1.02 mg/mL)
4. DL-Adrenaline (1.05 mg/mL)
5. Dopamine hydrochloride (0.99 mg/mL)
6. Tyramine (1.10 mg/mL)

Figure 3 : Nucleoside Analysis



Conditions

Column : Inertsil CX (5 µm, 150 × 4.6 mm I.D.)
Eluent : 0.2 M $HCOONH_4$ (pH 5.0, HCOOH)
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 260 nm
Injection Vol. : 10 µL

Sample : 1. Uracil (0.05 mg/mL)
2. Thymine (0.05 mg/mL)
3. Guanine (0.15 mg/mL)
4. Cytosine (0.15 mg/mL)
5. Adenine (0.15 mg/mL)

Analytical Columns

	Length \ I.D. (mm)	1.0	1.5		
Particle Size: 5 µm	33	5020-80011	5020-80021		
	50	5020-80012	5020-80022		
	75	5020-80013	5020-80023		
	100	5020-80014	5020-80024		
	150	5020-80015	5020-80025		
	250	5020-80016	5020-80026		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	33	5020-07111	5020-07121	5020-07131	5020-07141
	50	5020-07112	5020-07122	5020-07132	5020-07142
	75	5020-07113	5020-07123	5020-07133	5020-07143
	100	5020-07114	5020-07124	5020-07134	5020-07144
	150	5020-07115	5020-07125	5020-07135	5020-07145
	250	5020-07116	5020-07126	5020-07136	5020-07146

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			5 µm	5 µm
1.0	10	1.0	5020-19234	5020-19284
1.5, 2.1		1.5	5020-19334	5020-19384
2.1, 3.0		3.0	5020-19134	5020-19184
4.0, 4.6		4.0	5020-19034	5020-19084
2.1, 3.0	20	3.0	5020-19534	5020-19584
4.0, 4.6		4.0	5020-19434	5020-19484
Holder for Cartridge Guard Column E			For 10 mm Length	5020-08500
			For 20 mm Length	5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Application Specific Columns

- Bioptic AV-1, AV-2 084
- Inertsil® Peptides C18 085
- Inertsil® Acrolein C18 085
- InertSphere® Sugar-1 086
- Inertsil® Sulfa C18 087
- Inertsil® AS 087
- Corresponding Pharmacopeia (JP, USP, EP) 088
- Corresponding SFC 090

Application Specific Columns

Bioptic AV-1, AV-2

Physical Properties

- **Silica : Spherical shape**
- **Particle Size : 5 µm**
- **Bonded Phase : Avidin**
- **Temperature Range : 4 ~ 40 deg.C**
- **pH Range : 2 ~ 7.5**
- **Max. concentration of organic solvent**
  For AV-1 ; < 20 %
  For AV-2 ; No restriction

- **Feature**
  - Glycoprotein bonded silica
  - Protein elutes as a void volume peak
  - Large sample capacity
  - Analysis of drug moving state

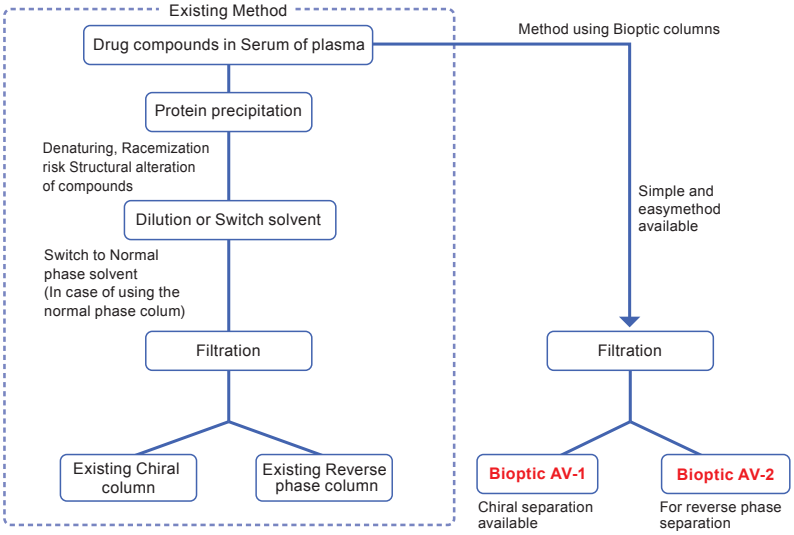
Bioptic AV-1

- Chiral separation capability
- Chiral separation in a reversed phase mode

Bioptic AV-2

- Compatible with high concentrations of organic solvents
- Similar retention behavior as reversed phase mode

Simplified method by using Bioptic columns



Analytical Columns

	Length (mm)	I.D. (mm)	Bioptic AV-1	Bioptic AV-2
			Particle Size	Particle Size
			5 µm	5 µm
Particle Size: 5 µm	150	1.5	5020-18153	5020-18154
		2.1	5020-02521	5020-02531
		3.0	5020-02522	5020-02532
		4.0	5020-02523	5020-02533
		4.6	5020-02524	5020-02534

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Bioptic AV-1		Bioptic AV-2	
			Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size	Particle Size	Particle Size
			5 µm	5 µm	5 µm	5 µm
1.5, 2.1	10	1.5	5020-19343	5020-19393	5020-19344	5020-19394
2.1, 3.0		3.0	5020-19143	5020-19193	5020-08622	5020-08623
4.0, 4.6		4.0	5020-19043	5020-19093	5020-08620	5020-08621
2.1, 3.0	20	3.0	5020-19543	5020-19593	5020-08626	5020-08627
4.0, 4.6		4.0	5020-19443	5020-19493	5020-08624	5020-08625
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® Peptides C18

Physical Properties

- **Silica : 3 Series High Purity Silica Gel**
- **Particle Size : 4 µm**
- **Surface Area : 450 m^2/g**
- **Pore Size : 100 Å (10 nm)**
- **Pore Volume : 1.05 mL/g**
- **Bonded Phase : Octadecyl Groups**
- **End-capping : Yes**
- **Carbon Loading : 15 %**
- **USP Code : L1**
- **pH Range : 2~7.5**

The whole manufacturing process; synthesis of silica gel, chemical modification, packing, quality test, is under the strict quality control. The number of theoretical plates is as many as 100,000 plates/m.
For peptide mapping, analytical result of standard peptides obtained by each lot is attached to the column. For protein analysis, Inertsil WP300 or Inertsil WP300 C8 is recommended.

Analytical Columns

Particle Size: 4 µm	Length \ I.D. (mm)	1.0	1.5		
	50	5020-08002	5020-08012		
	100	5020-08004	5020-08014		
	150	5020-08005	5020-08015		
	250	5020-08006	5020-08016		
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
	50	5020-08022	5020-08032	5020-08042	5020-08052
	100	5020-08024	5020-08034	5020-08044	5020-08054
	150	5020-08025	5020-08035	5020-08045	5020-08055
	250	5020-08026	5020-08036	5020-08046	5020-08056

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Particle Size	Particle Size
			4 µm	4 µm
1.0	10	1.0	5020-19211	5020-19261
1.5, 2.1		1.5	5020-19311	5020-19361
2.1, 3.0		3.0	5020-19111	5020-19161
4.0, 4.6		4.0	5020-19011	5020-19061
2.1, 3.0	20	3.0	5020-19511	5020-19561
4.0, 4.6		4.0	5020-19411	5020-19461
Holder for Cartridge Guard Column E			For 10 mm Length	5020-08500
			For 20 mm Length	5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® Acrolein C18

Physical Properties

- **Silica : 3 Series High Purity Silica Gel**
- **Particle Size : 5 µm**
- **Surface Area : 450 m^2/g**
- **Pore Size : 100 Å (10 nm)**
- **Pore Volume : 1.05 mL/g**
- **Bonded Phase : Octadecyl Groups**
- **End-capping : Yes**
- **Carbon Loading : 9 %**
- **USP Code : L1**
- **pH Range : 2~7.5**

Inertsil Acrolein offers rapid separation of DNPH-Acetone and DNPH-Acrolein under a general mobile phase condition such as Acetonitrile / Water.

Analytical Columns

	Length(mm)	I.D.(mm)	Cat.No.
Particle Size: 5 µm	250	4.6	5020-18051

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Application Specific Columns

InertSphere™ Sugar-1

Physical Properties

- **Silica** : **Styrene Divinylbenzene copolymerization**
- **Particle size** : **5 µm**
- **Exchange capacity** : **0.7 meq/g**
- **Organic solvent resist** : **0 ~ 100 % (Methanol only)**
- **Bonded Phase** : **Quaternary Alkylamine**
- **pH Range** : **2~14**

InertSphere Sugar-1 is a suitable anion-exchange column for sugar analysis. It is packed quaternary ammonium group binding polymer. High sensitivity sugar analysis is available using an electrochemical detector ED723. Especially InertSphere Sugar-1 is suitable for Monosaccharide and Disaccharide analysis.
Note ; Solvent Bottle with CO_2 Trap Cartridge is necessary for analysis to avoid dissolving carbonate ion in the solvent. The Solvent Bottle CO_2 Trap Cartridge contains hazardous material which requires special freight handling. Additional charges apply.

Analytical Columns

Particle Size: 5µm	Length(mm)	I.D.(mm)	Cat.No.
	150	4.6	5020-11001

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Cat.No.	Cat.No.
4.6	10	4.0	5020-19048	5020-19098

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® Sulfa C18

Physical Properties

- **Silica : 3 Series High Purity Silica Gel**
- **Particle Size : 3 µm, 5 µm**
- **Surface Area: 450 m²/g**
- **Pore Size : 100 Å (10 nm)**
- **Pore Volume : 1.05 mL/g**
- **Bonded Phase : Octadecyl**
- **End-capping : Yes**
- **Carbon Loading : 15 %**
- **USP Code : L1**

As drug residues in food has became a major problem today, developing analytical methods of synthetic bacterial drugs including Sulfa drugs is important. Inertsil Sulfa C18 is a superb ODS column designed for analysis of sulfa drugs.
Each lot of Inertsil Sulfa C18 is tested for the effective separation of sulfa drugs and will be delivered to you with its annalistic data.

Analytical Columns

	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
Particle Size: 3 µm	100	5020-07504	5020-07514	5020-07524	5020-07534
	150	5020-07505	5020-07515	5020-07525	5020-07535
	Length \ I.D. (mm)	2.1	3.0	4.0	4.6
Particle Size: 5 µm	150	5020-07545	5020-07555	5020-07565	5020-07575
	250	5020-07546	5020-07556	5020-07566	5020-07576

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
2.1, 3.0	10	3.0	5020-19113	5020-19112	5020-19163	5020-19162
4.0, 4.6		4.0	5020-19013	5020-19012	5020-19063	5020-19062
2.1, 3.0	20	3.0	5020-19513	5020-19512	5020-19563	5020-19562
4.0, 4.6		4.0	5020-19413	5020-19412	5020-19463	5020-19462
Holder for Cartridge Guard Column E				For 10 mm Length		5020-08500
				For 20 mm Length		5020-08550

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Inertsil® AS

Physical Properties

- **Silica : 3 Series High Purity Silica Gel**
- **Particle Size : 5 µm**
- **Surface Area: 450 m²/g**
- **Pore Size : 100 Å (10 nm)**
- **Pore Volume : 1.05 mL/g**
- **Bonded Phase : Octadecyl**
- **End-capping : Yes**
- **Carbon Loading : 15 %**
- **USP Code : L1**

Inertsil AS is for analysis of Arsenic compounds which are Toxic compounds in environment water. As an Arsenic speciation analysis column, simultaneous analysis of Arsenic compounds is available with HPLC/ICP-MS.

Analytical Columns

	Length \ I.D. (mm)	2.1
Particle Size: 3 µm	150	5020-18030
	250	5020-18032

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Cartridge Guard Column E

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder / Cartridge Set (2 Cartridge E Guard Columns & 1 Holder)
			Cat.No.	Cat.No.
2.1	10	1.5	5020-18031	5020-18035
4.6		4.0	5020-18041	5020-18045
Holder for Cartridge Guard Column E			For 10 mm Length	5020-08500

* End-fittings are 1/16" Waters-compatible.
* For maximum operating pressure information, please refer to page 46.

Corresponding Pharmacopeia (JP, USP, EP)

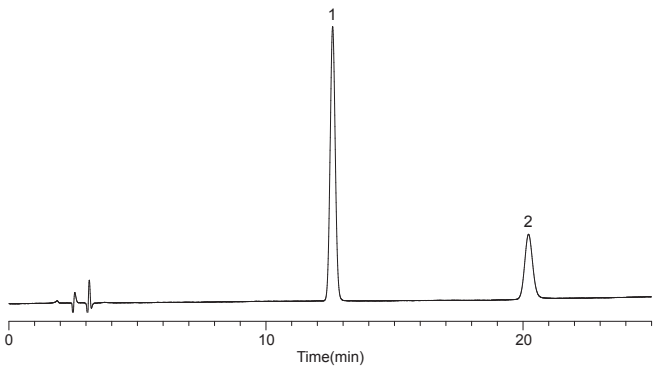
GL Sciences offers varies particle sizes and lengths corresponding to Japanese Pharmacopeias (JP), US Pharmacopeias (USP) or European Pharmacopeias (EP).

5 µm Particle Size HPLC Columns

Packing material	Column I.D.	Column length	Description	Cat. No.
C18(ODS)	3.9 mm	150 mm	InertSustain C18	5020-87030
			Inertsil ODS-4	5020-87023
			Inertsil ODS-3	5020-87008
			Inertsil WP300 C18	5020-87045
		300 mm	InertSustain C18	5020-87031
			Inertsil ODS-4	5020-87024
			Inertsil ODS-3	5020-87009
	4.0 mm	125 mm	InertSustainSwift C18	5020-88251
			Inertsil ODS-SP	5020-87043
			Inertsil WP300 C18	5020-87037
		300 mm	InertSustain C18	5020-87032
			Inertsil ODS-4	5020-87025
			Inertsil ODS-3	5020-87010
	4.6 mm	300 mm	InertSustain C18	5020-87033
			Inertsil ODS-4	5020-87026
			Inertsil ODS-3	5020-87011
C8	3.0 mm	60 mm	Inertsil C8	5020-87000
	3.9 mm	150 mm	InertSustain C8	5020-87028
			Inertsil C8-4	5020-87021
			Inertsil C8-3	5020-87005
			Inertsil WP300 C8	5020-87046
	4.0 mm	80 mm	InertSustain C8	5020-87029
			Inertsil C8-4	5020-87022
			Inertsil C8-3	5020-87006
		125 mm	Inertsil C8	5020-87001
Pre-column	4.0 mm	25 mm	InertSustain C18	5020-03399
			InertSustain C8	5020-87040

* Please contact us for other sizes of columns.

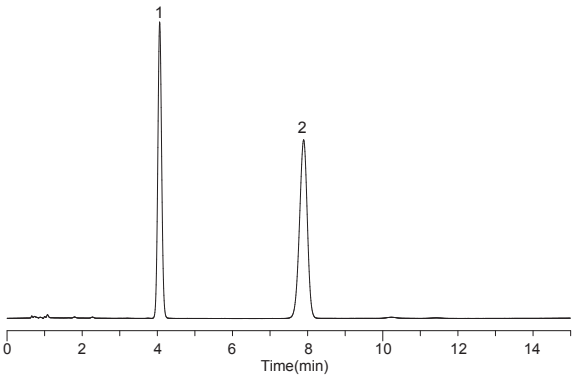
Figure 1 : Crospovidone



Conditions

Column	: InertSustain C18 (5 µm, 250 × 4.0 mm I.D.)	Sample :
Guard Column	: InertSustain C18 (5 µm, 25 × 4.0 mm I.D.)	1. 1-Vinyl-2-pyrrolidone
Eluent	: A) CH_3CN	2. Vinyl acetate
	B) H_2O	
	A/B = 1/9, v/v	
Flow Rate	: 1.0 mL/min	
Col. Temp.	: 40 °C	
Detection	: UV 235 nm	
Injection Vol.	: 50 µL	
Data Source	: LC InertSearch No. LB167	

Figure 2 : Clopidogrel sulfate



Conditions

Column	: InertSustain C18 (5 µm, 150 × 3.9 mm I.D.)	
Eluent	: A) 0.87 g/L IPCC-05 in H_2O (pH 2.5, H_3PO_4)	
	/CH_3OH = 19/1, v/v (IPCC-05: Sodium 1- Pentanesulfonate)	
	B) CH_3CN/CH_3OH = 19/1, v/v	
	A/B = 60/40, v/v	
Flow Rate	: 1.5 mL/min	
Col. Temp.	: 30 °C	Sample :
Detection	: UV 220 nm	1. p-Hydroxybenzoic acid iso-propyl ester (133 mg/L)
Injection Vol.	: 10 µL	2. Clopidogrel sulfate (132 mg/L)
Data Source	: LC InertSearch No. LB161	

7 µm Particle Size HPLC Columns

Packing material	Column I.D.	Column length	Description	Cat. No.
C18(ODS)	4.0 mm	250 mm	Inertsil ODS-3	5020-87012
		300 mm	Inertsil ODS-3	5020-87013
	4.6 mm	120 mm	Inertsil ODS-3	5020-87041
		125 mm	Inertsil ODS-3	5020-87038
		250 mm	Inertsil ODS-3	5020-87014
		300 mm	Inertsil ODS-3	5020-87015
NH2	4.6 mm	125 mm	Inertsil NH2	5020-87044

10 µm Particle Size HPLC Columns

Packing material	Column I.D.	Column length	Description	Cat. No.
C18(ODS)	3.9 mm	300 mm	Inertsil ODS-3	5020-87016
			Inertsil ODS	5020-87002
	4.0 mm	150 mm	Inertsil ODS-3	5020-87017
		250 mm	Inertsil ODS-3	5020-87018
		300 mm	Inertsil ODS-3	5020-87019
			Inertsil ODS	5020-87003
	4.6 mm	300 mm	Inertsil ODS-3	5020-87020
			Inertsil ODS	5020-87004

Other ODS(C18)Columns

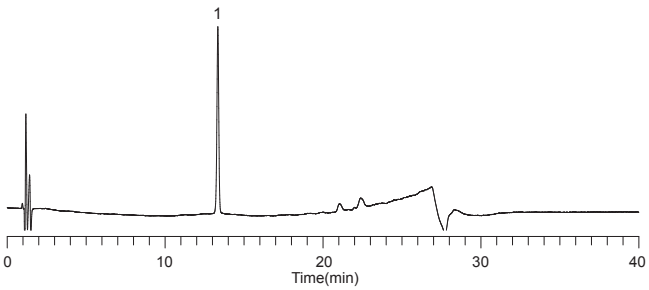
Packing material	Column I.D.	Column length	Description	Cat. No.
3 µm	4.6 mm	33 mm	Inertsil ODS-SP	5020-87035
3.5 µm	3.0 mm	150 mm	Inertsil WP300 C18	5020-87034
4 µm	3.9 mm	150 mm	Inertsil ODS-3	5020-87007

* Please contact us for other sizes of columns.

Pharmacopeias applications are available on page 137~138.
Also many other applications are available at InertSearch and Technical Note on our website.

InertSearch..... http://www.glsciences.com/tech/inertsearch/
LC Technical Note..... http://www.glsciences.com/tech/lc_technicalnote/

Figure 3 : Telmisartan

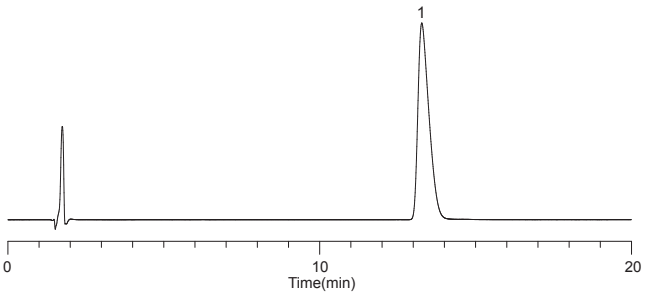


Conditions

Column : Inertsil ODS-SP (5 µm, 125 × 4.0 mm I.D.)
Eluent : A) CH_3CN/CH_3OH = 4/1, v/v
B) 2.0 g/L KH_2PO_4 + 3.4 g/L IPCC-05 (pH 3.0, 10 % H_3PO_4 in H_2O)
(IPCC-05: Sodium 1-Pentanesulfonate)
A/B = 30/70 - 25 min - 80/20, v/v
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : UV 230 nm
Injection Vol. : 2 µL
Data Source : LC InertSearch No. LB163

Sample :
1. Telmisartan

Figure 4 : Risperidone



Conditions

Column : Inertsil WP300 C18 (3.5 µm, 150 × 3.0 mm I.D.)
Eluent : A) CH_3CN
B) H_2O
C) THF
A/B = 200/800/1.5, v/v/v (pH 3.0, 28 % NH_4 Solution)
Flow Rate : 0.55 mL/min
Col. Temp. : 25 °C
Detection : UV 275 nm
Injection Vol. : 10 µL
Data Source : LC InertSearch No. LB125

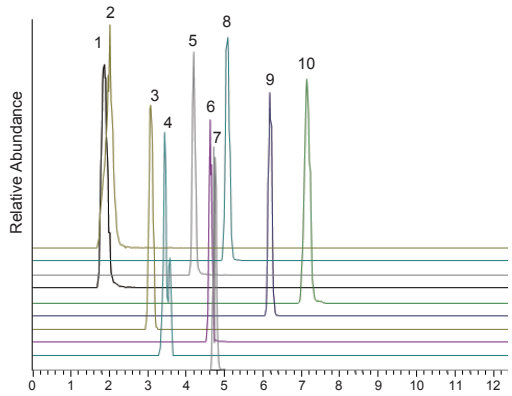
Sample :
1. Risperidone(100 mg/L)

Corresponding SFC

Mainly supercritical CO_2 is used as mobile phase in SFC (Supercritical Fluid Chromatography). It is said suitable for high speed analysis because of lower viscosity than the general HPLC mobile phase and fast diffusion speed is fast in mobile phase. It is exceptional method for preparative and purification purpose because almost mobile phase is volatilized when back to normal pressure.
InertSustain and Inertsil series columns are available for SFC analysis.
The packing materials are the same as HPLC columns but they are packed in stainless tubes which correspond to SFC.
Various packing materials are available, and then utilize for expand the SFC application range.

Example of SFC/MS Analysis

Ten(10) kinds of pesticides are analyzed with Inertsil ODS-EP which contains a polar group embedded between the silica surface and Octadecyl group (C18) as the below. The separation patterns are different from polar group chemical bonded column like mainly used on SFC.



Conditions

Column Size	: Inertsil ODS-EP (5 µm, 250 × 4.6 mm I.D.)
Eluent	: A) Supercritical carbon dioxide
	B) 0.1 % ammonium formate in methanol
	A/B = 95/5 - 1 min - 95/5 - 2 min - 90/10 -10 min - 80/20
Flow Rate	: 3 mL/min
Col. Temp.	: 35 °C
Injection vol.	: 5 mL
Back Pressure	: 10 MPa

Sample:

1. Methamidophos
2. Acetamiprid
3. Carbendazim
4. Dimethirimol
5. Emamectin benzoate (B1a)
6. Chlorfluazuron
7. Acequinocyl
8. Pyridaben
9. Cypermethrin
10. Etofenprox

This data is provided by Prof. Dr. Akio Baba.

About packing materials

InertSustain and Inertsil series are available. Please contact us the details.
* Inspected with HPLC only, not with SFC.

Sizes

The following four(4) sizes are available as standard SFC columns.
Please describe the packing materials when you order.

Description	Cat.No.
Corresponding SFC column 5 µm, 2.1 × 150 mm	5020-01007
Corresponding SFC column 5 µm, 4.6 × 250 mm	5020-01006
Corresponding SFC column 5 µm, 10 × 250 mm	5020-01008
Corresponding SFC column 5 µm, 20 × 250 mm	5020-01009

* Maximum operating column pressures are 28 MPa on 2.1 × 150 mm and 25 MPa on 4.6 × 250 mm.
* End-fittings are 1/16" Waters-compatible only.

Guard Columns

- Guard Column's selection and Use 092
- Cartridge Guard Column E 093
- Cartridge Guard Column Ei (Non-metal type) ... 094
- Guard Columns for UHPLC 096
- GL Cart 098
- Packed Guard Columns, Mini Guard Columns 099
- SILFILTER™ STD C18 104
- Filters, Impurity Remove Columns 105

Guard Column's Selection and Use

Guard columns are installed between the injector and the analytical column of a HPLC system, mainly to protect analytical columns. Guard columns are widely used as a cost effective for prolong HPLC column life. Exchangeable cartridge design and unchangeable packing design are offered.
Exchangeable cartridge design contains holder and cartridge column, and the cartridge columns are disposable, easy -to-use, and you can change the guard column in seconds.
Packed design is packed as same as analytical column, using as a guard column.

Guard column design	Description	Compatible analytical columns' ID	Guard columns' length
Exchangeable Cartridge design	**Cartridge Guard Column E** Page 93 First choice for Guard Column	1.0~1.5 mm	10 mm
	Cartridge Guard Column Ei Page 94 Guard column with PEEK inlet and outlet	2.1~4.6 mm	10, 20 mm
	UHPLC Guard Column Page 96 For high speed, high efficiency separations	1.0~3.0 mm	10 mm
	SILFILTER STD C18 Page 104 Almightily for various ODS columns	3.0~4.6 mm	10 mm
	GL-Cart Guard Column Page 98 Direct-Connection and Indirect-Connection designs with economic cost	4.0, 4.6 mm	5 mm
Unchangeable packed design	**Packed Guard Column** Page 99 Packed as same as analytical column	1.0~4.6 mm	33, 50 mm
	Packed Mini Guard Column Page 103 Short length type of packed guard column	4.0, 4.6 mm	10 mm
	Preparative Guard Column Page 114 Guard columns for preparative columns	6.0~100 mm	50 mm 75 mm(for 50 mm I.D.) 100 mm (for 100 mm I.D.)

Selecting packing material

When selecting the packing material for the guard columns, we recommend to choose the same with analytical columns'. However, SILFILTER STD C18 is an monolithic guard column, it can fit different kinds of ODS columns.

Selecting dimensions

Particle size : To not alter the chromatography of the analytical column, the packing of the guard column should be the same as the analytical column. Inner diameter : Choose a guard column with an internal diameter similar to the analytical column internal diameter.

Connectors

Universal self-adjusting connector – Column Coupler, using for when connect guard columns and analytical column.

Pre-column Coupler W (PCTFE)

Pre-column Coupler SUS

Cartridge Guard Column E

Cartridge Guard Column E

Cartridge guard column E designed with an special holder and cartridge, universal self-adjusting connections, reusable by changing cartridges.
Cartridges contain the same high performance packing material that are used in our GL Sciences analytical columns. Easy-to-use, convenient, and disposable guard columns can protect your more expensive analytical columns.

Line-up list

InertSustain® C18

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder/Cartridge Set (2 Cartridge E Guard Column & Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19250	5020-19249	5020-19300	5020-19299
1.5, 2.1		1.5	5020-19350	5020-19349	5020-19400	5020-19399
2.1, 3.0		3.0	5020-19150	5020-19149	5020-19200	5020-19199
4.0, 4.6		4.0	5020-19050	5020-19049	5020-19100	5020-19099
2.1, 3.0	20	3.0	5020-19550	5020-19549	5020-19600	5020-19599
4.0, 4.6		4.0	5020-19450	5020-19449	5020-19500	5020-19499

Inertsil® ODS-4

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)		Cartridge E Holder/Cartridge Set (2 Cartridge E Guard Column & Holder)	
			Particle Size		Particle Size	
			3 µm	5 µm	3 µm	5 µm
1.0	10	1.0	5020-19202	5020-19201	5020-19252	5020-19251
1.5, 2.1		1.5	5020-19302	5020-19301	5020-19352	5020-19351
2.1, 3.0		3.0	5020-19102	5020-19101	5020-19152	5020-19151
4.0, 4.6		4.0	5020-19002	5020-19001	5020-19052	5020-19051
2.1, 3.0	20	3.0	5020-19502	5020-19501	5020-19552	5020-19551
4.0, 4.6		4.0	5020-19402	5020-19401	5020-19452	5020-19451

Inertsil® ODS-3

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)			Cartridge E Holder/Cartridge Set (2 Cartridge E Guard Column & Holder)		
			Particle Size			Particle Size		
			3 µm	4 µm	5 µm	3 µm	4 µm	5 µm
1.0	10	1.0	5020-19205	5020-19204	5020-19203	5020-19255	5020-19254	5020-19253
1.5, 2.1		1.5	5020-19305	5020-19304	5020-19303	5020-19355	5020-19354	5020-19353
2.1, 3.0		3.0	5020-19105	5020-19104	5020-19103	5020-19155	5020-19154	5020-19153
4.0, 4.6		4.0	5020-19005	5020-19004	5020-19003	5020-19055	5020-19054	5020-19053
2.1, 3.0	20	3.0	5020-19505	5020-19504	5020-19503	5020-19555	5020-19554	5020-19553
4.0, 4.6		4.0	5020-19405	5020-19404	5020-19403	5020-19455	5020-19454	5020-19453

Inertsil® ODS-2

I.D. of the Analytical Column Applicable (mm)	Length (mm)	I.D. (mm)	Replacement Cartridge E Guard Column (2 EA.)	Cartridge E Holder/Cartridge Set (2 Cartridge E Guard Column & Holder)
			Particle Size	Particle Size
			5 µm	5 µm
1.0	10	1.0	5020-19235	5020-19285
1.5, 2.1		1.5	5020-19335	5020-19385
2.1, 3.0		3.0	5020-19135	5020-19185
4.0, 4.6		4.0	5020-19035	5020-19085
2.1, 3.0	20	3.0	5020-19535	5020-19585
4.0, 4.6		4.0	5020-19435	5020-19485

* All the guard columns are Waters type end-fitting.
* Recommend Max. Operating Pressure is 20 MPa.
* Other packing material of cartridge guard columns E are available, please confirm page 5~87 of each analytical columns.

Cartridge Guard Column Ei (Non-metal type)

Cartridge Guard Column Ei (Non-metal type)

Cartridge Guard column Ei is a special design for the separation which need to avoid the metal accessible surface. It is signed with a special PEEK holder and cartridge.

* Length of Cartridge Guard column Ei is 10mm

InertSustain® C18

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19949	5020-19999
2.1	2.1	5020-19849	5020-19899
3.0	3.0	5020-19749	5020-19799
4.0, 4.6	4.0	5020-19649	5020-19699

Inertsil® ODS-3

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19903	5020-19953
2.1	2.1	5020-19803	5020-19853
3.0	3.0	5020-19703	5020-19753
4.0, 4.6	4.0	5020-19603	5020-19653

Inertsil® ODS-SP

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19906	5020-19956
2.1	2.1	5020-19806	5020-19856
3.0	3.0	5020-19706	5020-19756
4.0, 4.6	4.0	5020-19606	5020-19656

Inertsil® ODS-EP

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19910	5020-19960
2.1	2.1	5020-19810	5020-19860
3.0	3.0	5020-19710	5020-19760
4.0, 4.6	4.0	5020-19610	5020-19660

Inertsil® C8-4

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19946	5020-19996
2.1	2.1	5020-19846	5020-19896
3.0	3.0	5020-19746	5020-19796
4.0, 4.6	4.0	5020-19646	5020-19696

Inertsil® ODS-4

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19901	5020-19951
2.1	2.1	5020-19801	5020-19851
3.0	3.0	5020-19701	5020-19751
4.0, 4.6	4.0	5020-19601	5020-19651

Inertsil® ODS-2

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19935	5020-19985
2.1	2.1	5020-19835	5020-19885
3.0	3.0	5020-19735	5020-19785
4.0, 4.6	4.0	5020-19635	5020-19685

Inertsil® ODS-P

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19908	5020-19958
2.1	2.1	5020-19808	5020-19858
3.0	3.0	5020-19708	5020-19758
4.0, 4.6	4.0	5020-19608	5020-19658

InertSustain® C8

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-16120	5020-16121
2.1	2.1	5020-16118	5020-16119
3.0	3.0	5020-16116	5020-16117
4.0, 4.6	4.0	5020-16114	5020-16115

Inertsil® C8-3

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19914	5020-19964
2.1	2.1	5020-19814	5020-19864
3.0	3.0	5020-19714	5020-19764
4.0, 4.6	4.0	5020-19614	5020-19664

* All Cartridge Guard column Ei designed with 10 mm length.
* All the guard columns are Waters type end-fitting.
* Recommend Max. Operating Pressure is 20 MPa.

InertSustain® Phenyl

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-16420	5020-16421
2.1	2.1	5020-16418	5020-16419
3.0	3.0	5020-16416	5020-16417
4.0, 4.6	4.0	5020-16414	5020-16415

Inertsil® CN-3

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19918	5020-19968
2.1	2.1	5020-19818	5020-19868
3.0	3.0	5020-19718	5020-19768
4.0, 4.6	4.0	5020-19618	5020-19668

Inertsil® Amide

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-20183	5020-20185
2.1	2.1	5020-20179	5020-20181
3.0	3.0	5020-20175	5020-20177
4.0, 4.6	4.0	5020-20171	5020-20173

InertSustain® NH2

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-16720	5020-16721
2.1	2.1	5020-16718	5020-16719
3.0	3.0	5020-16716	5020-16717
4.0, 4.6	4.0	5020-16714	5020-16715

Inertsil® Diol

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19922	5020-19972
2.1	2.1	5020-19822	5020-19872
3.0	3.0	5020-19722	5020-19772
4.0, 4.6	4.0	5020-19622	5020-19672

Inertsil® WP300 Diol

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19931	5020-19981
2.1	2.1	5020-19831	5020-19881
3.0	3.0	5020-19731	5020-19781
4.0, 4.6	4.0	5020-19631	5020-19681

Inertsil® Ph-3

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19916	5020-19966
2.1	2.1	5020-19816	5020-19866
3.0	3.0	5020-19716	5020-19766
4.0, 4.6	4.0	5020-19616	5020-19666

Inertsil® WP300 C18

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19928	5020-19978
2.1	2.1	5020-19828	5020-19878
3.0	3.0	5020-19728	5020-19778
4.0, 4.6	4.0	5020-19628	5020-19678

Inertsil® HILIC

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19924	5020-19974
2.1	2.1	5020-19824	5020-19874
3.0	3.0	5020-19724	5020-19774
4.0, 4.6	4.0	5020-19624	5020-19674

Inertsil® NH2

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19920	5020-19970
2.1	2.1	5020-19820	5020-19870
3.0	3.0	5020-19720	5020-19770
4.0, 4.6	4.0	5020-19620	5020-19670

Inertsil® SIL-100A

I.D. of the Analytical Column Applicable (mm)	I.D. (mm)	Replacement Cartridge Ei Guard Column (2 EA.)	Cartridge Ei Holder/ Cartridge Set (2 Cartridge Ei Guard Column & Holder)
		Particle Size	Particle Size
		5 µm	5 µm
1.0, 1.5	1.0	5020-19926	5020-19976
2.1	2.1	5020-19826	5020-19876
3.0	3.0	5020-19726	5020-19776
4.0, 4.6	4.0	5020-19626	5020-19676

* All Cartridge Guard column Ei designed with 10 mm length.
* All the guard columns are Waters type end-fitting.
* Recommend Max. Operating Pressure is 20 MPa.
* Other packing material of cartridge guard columns Ei are available , please contact your local distributor for more information.

Guard Columns for UHPLC

Holder for UHPLC Guard Column

Replacement Cartridge Guard Column

Guard column for UHPLC significantly extends column lifetime of your analytical column. The replacement cartridge guard column can be exchanged easily. A 1/16 inch tube is connected at the outlet of the holder for easy installation with minimized dead volume.

Specifications

- **Silica : High Purity Silica Gel**
- **Particle Size : 2 µm, 3 µm**
- **Maximum Pressure : 80 MPa**
- **Analytical column I.D. : 1.0 ~ 3.0 mm I.D.**

InertSustain® C18

Length (mm)	I.D. (mm)	Replacement Cartridge Guard Column (2 EA)		Cartridge Guard column (2 EA) + Holder (1 EA) set	
		Particle Size		Particle Size	
		2 µm	3 µm	2 µm	3 µm
10	1.5	5020-20314	5020-20306	5020-20365	5020-20357
	2.1	5020-20331	5020-20323	5020-20382	5020-20374
	3.0	5020-20348	5020-20340	5020-20399	5020-20391

InertSustainSwift™ C18

Length (mm)	I.D. (mm)	Replacement Cartridge Guard Column (2 EA)		Cartridge Guard column (2 EA) + Holder (1 EA) set	
		Particle Size		Particle Size	
		1.9 µm	3 µm	1.9 µm	3 µm
10	1.5	5020-88238	5020-88237	5020-88244	5020-88243
	2.1	5020-88240	5020-88239	5020-88246	5020-88245
	3.0	5020-88242	5020-88241	5020-88248	5020-88247

Inertsil® ODS-4

Length (mm)	I.D. (mm)	Replacement Cartridge Guard Column (2 EA)		Cartridge Guard column (2 EA) + Holder (1 EA) set	
		Particle Size		Particle Size	
		2 µm	3 µm	2 µm	3 µm
10	1.5	5020-20309	5020-20300	5020-20360	5020-20351
	2.1	5020-20326	5020-20317	5020-20377	5020-20368
	3.0	5020-20343	5020-20334	5020-20394	5020-20385

Inertsil® ODS-3

Length (mm)	I.D. (mm)	Replacement Cartridge Guard Column (2 EA)		Cartridge Guard column (2 EA) + Holder (1 EA) set	
		Particle Size		Particle Size	
		2 µm	3 µm	2 µm	3 µm
10	1.5	5020-20311	5020-20301	5020-20362	5020-20352
	2.1	5020-20328	5020-20318	5020-20379	5020-20369
	3.0	5020-20345	5020-20335	5020-20396	5020-20386

Inertsil® ODS-SP

Length (mm)	I.D. (mm)	Replacement Cartridge Guard Column (2 EA)	Cartridge Guard column (2 EA) + Holder (1 EA) set
		Particle Size 3 µm	Particle Size 3 µm
10	1.5	5020-20302	5020-20353
	2.1	5020-20319	5020-20370
	3.0	5020-20336	5020-20387

InertSustain® C8

Length (mm)	I.D. (mm)	Replacement Cartridge Guard Column (2 EA)		Cartridge Guard column (2 EA) + Holder (1 EA) set	
		Particle Size		Particle Size	
		2 µm	3 µm	2 µm	3 µm
10	1.5	5020-20315	5020-20307	5020-20366	5020-20358
	2.1	5020-20332	5020-20324	5020-20383	5020-20375
	3.0	5020-20349	5020-20341	5020-20400	5020-20392

Inertsil® C8-4

Length (mm)	I.D. (mm)	Replacement Cartridge Guard Column (2 EA)		Cartridge Guard column (2 EA) + Holder (1 EA) set	
		Particle Size		Particle Size	
		2 µm	3 µm	2 µm	3 µm
10	1.5	5020-20310	5020-20305	5020-20361	5020-20356
	2.1	5020-20327	5020-20322	5020-20378	5020-20373
	3.0	5020-20344	5020-20339	5020-20395	5020-20390

Inertsil® C8-3

Length (mm)	I.D. (mm)	Replacement Cartridge Guard Column (2 EA)		Cartridge Guard column (2 EA) + Holder (1 EA) set	
		Particle Size		Particle Size	
		2 µm	3 µm	2 µm	3 µm
10	1.5	5020-20312	5020-20303	5020-20363	5020-20354
	2.1	5020-20329	5020-20320	5020-20380	5020-20371
	3.0	5020-20346	5020-20337	5020-20397	5020-20388

InertSustain® Phenyl

Length (mm)	I.D. (mm)	Replacement Cartridge Guard Column (2 EA)		Cartridge Guard column (2 EA) + Holder (1 EA) set	
		Particle Size		Particle Size	
		2 µm	3 µm	2 µm	3 µm
10	1.5	5020-20316	5020-20308	5020-20367	5020-20359
	2.1	5020-20333	5020-20325	5020-20384	5020-20376
	3.0	5020-20350	5020-20342	5020-20401	5020-20393

Inertsil® Ph-3

Length (mm)	I.D. (mm)	Replacement Cartridge Guard Column (2 EA)		Cartridge Guard column (2 EA) + Holder (1 EA) set	
		Particle Size		Particle Size	
		2 µm	3 µm	2 µm	3 µm
10	1.5	5020-20313	5020-20304	5020-20364	5020-20355
	2.1	5020-20330	5020-20321	5020-20381	5020-20372
	3.0	5020-20347	5020-20338	5020-20398	5020-20389

Holder

Description	Cat.No.
Holder for UHPLC Guard Column	5020-08630

* The tube size at the holder is 1/16 inch O.D. × 0.18 mmI.D. × 30 mm length.

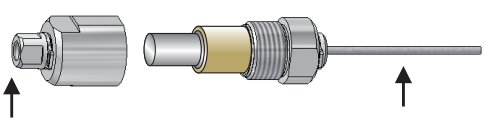
Joint

Very High Pressure Re-useable Fitting

Description	Max. Pressure	QTY	Cat.No.
VHP-300	137 MPa	1 set	6010-77001
VHP-320	172 MPa	1 set	6010-77007

* The tube size at the holder is 1/16 inch O.D. × 0.18 mmI.D. × 30 mm length.

Installation



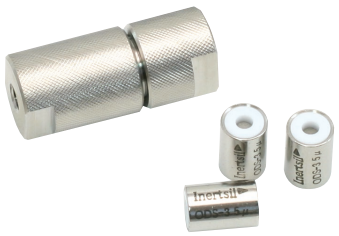
Outlet side of the injector
1/16 inch Female (No.10-32UNF)
Tubing tip length is 2.4 mm.

Column side
Purchase a proper joint.

VHP-300

VHP-320

GL Cart



GL Cart

GL Cart guard column are designed as economical type to protect your expensive analytical column. GL Cart is one dimension 5mmL × 4.6mmI.D.
(Compatible analytical columns' ID is 4.0 mm, 4.6 mm.) GL Cart holder is reusable.

Packing material	Particle size (μm)	Cartridge guard column GL Cart 10 EA.(5 × 4.6 mm I.D.)	GL Cart Set (5 GL Cart cartridge + 1 holder)
		Cat. No.	Cat. No.
InertSustain C18	3	5020-20146	5020-20246
	5	5020-20145	5020-20245
Inertsil ODS-4	3	5020-20102	5020-20202
	5	5020-20101	5020-20201
Inertsil ODS-3	3	5020-20105	5020-20205
	4	5020-20104	5020-20204
	5	5020-20103	5020-20203
Inertsil ODS-2	5	5020-20135	5020-20235
Inertsil ODS-SP	3	5020-20107	5020-20207
	5	5020-20106	5020-20206
Inertsil ODS-P	3	5020-20109	5020-20209
	5	5020-20108	5020-20208
Inertsil ODS-EP	5	5020-20110	5020-20210
InertSustain C8	3	5020-16215	5020-16216
	5	5020-16122	5020-16123
Inertsil C8-4	3	5020-20144	5020-20244
	5	5020-20143	5020-20243
Inertsil C8-3	3	5020-20115	5020-20215
	5	5020-20114	5020-20214
InertSustain Phenyl	3	5020-16515	5020-16516
	5	5020-16422	5020-16423
Inertsil Ph-3	3	5020-20117	5020-20217
	5	5020-20116	5020-20216
Inertsil CN-3	3	5020-20119	5020-20219
	5	5020-20118	5020-20218
Inertsil WP300 C18	5	5020-20128	5020-20228
Inertsil WP300 C8	5	5020-20129	5020-20229
Inertsil WP300 C4	5	5020-20130	5020-20230
Inertsil Amide	3	5020-20190	5020-20248
	5	5020-20189	5020-20247
Inertsil HILIC	3	5020-20125	5020-20225
	5	5020-20124	5020-20224
InertSustain NH2	3	5020-16815	5020-16816
	5	5020-16722	5020-16723
Inertsil NH2	3	5020-20121	5020-20221
	5	5020-20120	5020-20220
Inertsil Diol	3	5020-20123	5020-20223
	5	5020-20122	5020-20222
Inertsil SIL-100A	3	5020-20127	5020-20227
	5	5020-20126	5020-20226
Inertsil SIL-150A	5	5020-20139	5020-20239
Inertsil WP300 SIL	5	5020-20132	5020-20232
Inertsil WP300 Diol	5	5020-20131	5020-20231

* All the guard columns are Waters type end-fitting.
* Recommend Max. Operating Pressure is 20 MPa.
* Other packing material of GL Cart guard columns are available , please contact your local distributor for more information.

Packed Guard Columns, Packed Mini Guard Columns

Packed Guard Column

Packed Mini Guard Column

Packed guard column and Mini guard column are designed different with cartridges' type, using a high pressure to pack it as a guard column, and also can sustain analytical column's performance.
Packed guard column has length 33 mm and 50 mm two types, and Mini guard column has length 10 mm.

Packed Guard Columns

Packing material	I.D. (mm)	Length 33 mm		Length 50 mm	
		Particle Size		Particle Size	
		3 µm	5 µm	3 µm	5 µm
InertSustain C18	1.0	5020-15996	5020-15995	5020-15896	5020-15895
	1.5	5020-15946	5020-15945	5020-15846	5020-15845
	2.1	5020-04896	5020-04895	5020-03596	5020-03595
	3.0	5020-04496	5020-04495	5020-03496	5020-03495
	4.0	5020-04296	5020-04295	5020-03396	5020-03395
	4.6	5020-04196	5020-04195	5020-03296	5020-03295
Inertsil ODS-4	1.0	5020-15952	5020-15951	5020-15852	5020-15851
	1.5	5020-15902	5020-15901	5020-15802	5020-15801
	2.1	5020-04852	5020-04851	5020-03552	5020-03551
	3.0	5020-04452	5020-04451	5020-03452	5020-03451
	4.0	5020-04252	5020-04251	5020-03352	5020-03351
	4.6	5020-04152	5020-04151	5020-03252	5020-03251
Inertsil ODS-3	1.0	5020-15955	5020-15953	5020-15855	5020-15853
	1.5	5020-15905	5020-15903	5020-15805	5020-15803
	2.1	5020-04855	5020-04853	5020-03555	5020-03553
	3.0	5020-04455	5020-04453	5020-03455	5020-03453
	4.0	5020-04255	5020-04253	5020-03355	5020-03353
	4.6	5020-04155	5020-04153	5020-03255	5020-03253
Inertsil ODS-2	1.0	–	5020-15985	–	5020-15885
	1.5	–	5020-15935	–	5020-15835
	2.1	–	5020-04885	–	5020-03585
	3.0	–	5020-04485	–	5020-03485
	4.0	–	5020-04285	–	5020-03385
	4.6	–	5020-04185	–	5020-03285
Inertsil ODS-SP	1.0	5020-15957	5020-15956	5020-15857	5020-15856
	1.5	5020-15907	5020-15906	5020-15807	5020-15806
	2.1	5020-04857	5020-04856	5020-03557	5020-03556
	3.0	5020-04457	5020-04456	5020-03457	5020-03456
	4.0	5020-04257	5020-04256	5020-03357	5020-03356
	4.6	5020-04157	5020-04156	5020-03257	5020-03256
Inertsil ODS-P	1.0	5020-15959	5020-15958	5020-15859	5020-15858
	1.5	5020-15909	5020-15908	5020-15809	5020-15808
	2.1	5020-04859	5020-04858	5020-03559	5020-03558
	3.0	5020-04459	5020-04458	5020-03459	5020-03458
	4.0	5020-04259	5020-04258	5020-03359	5020-03358
	4.6	5020-04159	5020-04158	5020-03259	5020-03258
Inertsil ODS-EP	1.0	–	5020-15960	–	5020-15860
	1.5	–	5020-15910	–	5020-15810
	2.1	–	5020-04860	–	5020-03560
	3.0	–	5020-04460	–	5020-03460
	4.0	–	5020-04260	–	5020-03360
	4.6	–	5020-04160	–	5020-03260

* All the guard columns are Waters type end-fitting.
* Recommend Max. Operating Pressure is 20 MPa.

Packed Guard Columns, Packed Mini Guard Columns

Packed Guard columns

Packing material	I.D. (mm)	Length 33 mm		Length 50 mm	
		Particle Size		Particle Size	
		3 µm	5 µm	3 µm	5 µm
InertSustain C8	1.0	5020-16183	5020-16054	5020-16181	5020-16052
	1.5	5020-16182	5020-16053	5020-16180	5020-16051
	2.1	5020-16167	5020-16038	5020-16162	5020-16033
	3.0	5020-16166	5020-16037	5020-16161	5020-16032
	4.0	5020-16165	5020-16036	5020-16160	5020-16031
	4.6	5020-16164	5020-16035	5020-16159	5020-16030
Inertsil C8-4	1.0	5020-15994	5020-15993	5020-15894	5020-15893
	1.5	5020-15944	5020-15943	5020-15844	5020-15843
	2.1	5020-04894	5020-04893	5020-03594	5020-03593
	3.0	5020-04494	5020-04493	5020-03494	5020-03493
	4.0	5020-04294	5020-04293	5020-03394	5020-03393
	4.6	5020-04194	5020-04193	5020-03294	5020-03293
Inertsil C8-3	1.0	5020-15965	5020-15964	5020-15865	5020-15864
	1.5	5020-15915	5020-15914	5020-15815	5020-15814
	2.1	5020-04865	5020-04864	5020-03565	5020-03564
	3.0	5020-04465	5020-04464	5020-03465	5020-03464
	4.0	5020-04265	5020-04264	5020-03365	5020-03364
	4.6	5020-04165	5020-04164	5020-03265	5020-03264
Inertsil C8	1.0	–	5020-15986	–	5020-15886
	1.5	–	5020-15936	–	5020-15836
	2.1	–	5020-04886	–	5020-03586
	3.0	–	5020-04486	–	5020-03486
	4.0	–	5020-04286	–	5020-03386
	4.6	–	5020-04186	–	5020-03286
Inertsil C4	1.0	–	5020-15988	–	5020-15888
	1.5	–	5020-15938	–	5020-15838
	2.1	–	5020-04888	–	5020-03588
	3.0	–	5020-04488	–	5020-03488
	4.0	–	5020-04288	–	5020-03388
	4.6	–	5020-04188	–	5020-03288
InertSustain Phenyl	1.0	5020-16483	5020-16354	5020-16481	5020-16352
	1.5	5020-16482	5020-16353	5020-16480	5020-16351
	2.1	5020-16467	5020-16338	5020-16462	5020-16333
	3.0	5020-16466	5020-16337	5020-16461	5020-16332
	4.0	5020-16465	5020-16336	5020-16460	5020-16331
	4.6	5020-16464	5020-16335	5020-16459	5020-16330
Inertsil Ph-3	1.0	5020-15967	5020-15966	5020-15867	5020-15866
	1.5	5020-15917	5020-15916	5020-15817	5020-15816
	2.1	5020-04867	5020-04866	5020-03567	5020-03566
	3.0	5020-04467	5020-04466	5020-03467	5020-03466
	4.0	5020-04267	5020-04266	5020-03367	5020-03366
	4.6	5020-04167	5020-04166	5020-03267	5020-03266
Inertsil Ph	1.0	–	5020-15987	–	5020-15887
	1.5	–	5020-15937	–	5020-15837
	2.1	–	5020-04887	–	5020-03587
	3.0	–	5020-04487	–	5020-03487
	4.0	–	5020-04287	–	5020-03387
	4.6	–	5020-04187	–	5020-03287

* All the guard columns are Waters type end-fitting.
* Recommend Max. Operating Pressure is 20 MPa.

Packed Guard columns

Packing material	I.D. (mm)	Length 33 mm		Length 50 mm	
		Particle Size		Particle Size	
		3 µm	5 µm	3 µm	5 µm
Inertsil CN-3	1.0	5020-15969	5020-15968	5020-15869	5020-15868
	1.5	5020-15919	5020-15918	5020-15819	5020-15818
	2.1	5020-04869	5020-04868	5020-03569	5020-03568
	3.0	5020-04469	5020-04468	5020-03469	5020-03468
	4.0	5020-04269	5020-04268	5020-03369	5020-03368
	4.6	5020-04169	5020-04168	5020-03269	5020-03268
Inertsil WP300 C18	1.0	–	5020-15978	–	5020-15878
	1.5	–	5020-15928	–	5020-15828
	2.1	–	5020-04878	–	5020-03578
	3.0	–	5020-04478	–	5020-03478
	4.0	–	5020-04278	–	5020-03378
	4.6	–	5020-04178	–	5020-03278
Inertsil WP300 C8	1.0	–	5020-15979	–	5020-15879
	1.5	–	5020-15929	–	5020-15829
	2.1	–	5020-04879	–	5020-03579
	3.0	–	5020-04479	–	5020-03479
	4.0	–	5020-04279	–	5020-03379
	4.6	–	5020-04179	–	5020-03279
Inertsil WP300 C4	1.0	–	5020-15980	–	5020-15880
	1.5	–	5020-15930	–	5020-15830
	2.1	–	5020-04880	–	5020-03580
	3.0	–	5020-04480	–	5020-03480
	4.0	–	5020-04280	–	5020-03380
	4.6	–	5020-04180	–	5020-03280
Inertsil Amide	1.0	5020-15998	5020-15997	5020-15898	5020-15897
	1.5	5020-15948	5020-15947	5020-15848	5020-15847
	2.1	5020-04898	5020-04897	5020-03598	5020-03597
	3.0	5020-04498	5020-04497	5020-03498	5020-03497
	4.0	5020-04298	5020-04297	5020-03398	5020-03397
	4.6	5020-04198	5020-04197	5020-03298	5020-03297
Inertsil HILIC	1.0	5020-15975	5020-15974	5020-15875	5020-15874
	1.5	5020-15925	5020-15924	5020-15825	5020-15824
	2.1	5020-04875	5020-04874	5020-03575	5020-03574
	3.0	5020-04475	5020-04474	5020-03475	5020-03474
	4.0	5020-04275	5020-04274	5020-03375	5020-03374
	4.6	5020-04175	5020-04174	5020-03275	5020-03274
InertSustain NH2	1.0	5020-16783	5020-16654	5020-16781	5020-16652
	1.5	5020-16782	5020-16653	5020-16780	5020-16651
	2.1	5020-16767	5020-16638	5020-16762	5020-16633
	3.0	5020-16766	5020-16637	5020-16761	5020-16632
	4.0	5020-16765	5020-16634	5020-16760	5020-16631
	4.6	5020-16764	5020-16635	5020-16759	5020-16630
Inertsil NH2	1.0	5020-15971	5020-15970	5020-15871	5020-15870
	1.5	5020-15921	5020-15920	5020-15821	5020-15820
	2.1	5020-04871	5020-04870	5020-03571	5020-03570
	3.0	5020-04471	5020-04470	5020-03471	5020-03470
	4.0	5020-04271	5020-04270	5020-03371	5020-03370
	4.6	5020-04171	5020-04170	5020-03271	5020-03270

* All the guard columns are Waters type end-fitting.
* Recommend Max. Operating Pressure is 20 MPa.

Packed Guard Columns, Packed Mini Guard Columns

Packed Guard columns

Packing material	I.D. (mm)	Length 33 mm		Length 50 mm	
		Particle Size		Particle Size	
		3 µm	5 µm	3 µm	5 µm
Inertsil Diol	1.0	5020-15973	5020-15972	5020-15873	5020-15872
	1.5	5020-15923	5020-15922	5020-15823	5020-15822
	2.1	5020-04873	5020-04872	5020-03573	5020-03572
	3.0	5020-04473	5020-04472	5020-03473	5020-03472
	4.0	5020-04273	5020-04272	5020-03373	5020-03372
	4.6	5020-04173	5020-04172	5020-03273	5020-03272
Inertsil SIL-100A	1.0	5020-15977	5020-15976	5020-15877	5020-15876
	1.5	5020-15927	5020-15926	5020-15827	5020-15826
	2.1	5020-04877	5020-04876	5020-03577	5020-03576
	3.0	5020-04477	5020-04476	5020-03477	5020-03476
	4.0	5020-04277	5020-04276	5020-03377	5020-03376
	4.6	5020-04177	5020-04176	5020-03277	5020-03276
Inertsil SIL-150A	1.0	–	5020-15989	–	5020-15889
	1.5	–	5020-15939	–	5020-15839
	2.1	–	5020-04889	–	5020-03589
	3.0	–	5020-04489	–	5020-03489
	4.0	–	5020-04289	–	5020-03389
	4.6	–	5020-04189	–	5020-03289
Inertsil WP300 SIL	1.0	–	5020-15982	–	5020-15882
	1.5	–	5020-15932	–	5020-15832
	2.1	–	5020-04882	–	5020-03582
	3.0	–	5020-04482	–	5020-03482
	4.0	–	5020-04282	–	5020-03382
	4.6	–	5020-04182	–	5020-03282
Inertsil WP300 Diol	1.0	–	5020-15981	–	5020-15881
	1.5	–	5020-15931	–	5020-15831
	2.1	–	5020-04881	–	5020-03581
	3.0	–	5020-04481	–	5020-03481
	4.0	–	5020-04281	–	5020-03381
	4.6	–	5020-04181	–	5020-03281

* All the guard columns are Waters type end-fitting.
* Recommend Max. Operating Pressure is 20 MPa.

Packed Mini Guard columns

Packing material	Particle Size(μm)	I.D.(mm)	Length(mm)	Cat. No
InertSustain C18	3	4.0	10	5020-03696
	5	4.0	10	5020-03695
Inertsil ODS-4	3	4.0	10	5020-03652
	5	4.0	10	5020-03651
Inertsil ODS-3	3	4.0	10	5020-03655
	4	4.0	10	5020-03654
	5	4.0	10	5020-03653
Inertsil ODS-2	5	4.0	10	5020-03685
Inertsil ODS-SP	3	4.0	10	5020-03657
	5	4.0	10	5020-03656
Inertsil ODS-P	3	4.0	10	5020-03659
	5	4.0	10	5020-03658
Inertsil ODS-EP	5	4.0	10	5020-03660
Inertsil ODS-80A	5	4.0	10	5020-03690
InertSustain C8	3	4.0	10	5020-16163
	5	4.0	10	5020-16034
Inertsil C8-4	3	4.0	10	5020-03694
	5	4.0	10	5020-03693
Inertsil C8-3	3	4.0	10	5020-03665
	5	4.0	10	5020-03664
Inertsil C8	5	4.0	10	5020-03686
Inertsil C4	5	4.0	10	5020-03688
InertSustain Phenyl	3	4.0	10	5020-16463
	5	4.0	10	5020-16334
Inertsil Ph-3	3	4.0	10	5020-03667
	5	4.0	10	5020-03666
Inertsil Ph	5	4.0	10	5020-03687
Inertsil CN-3	3	4.0	10	5020-03669
	5	4.0	10	5020-03668
Inertsil WP300 C18	5	4.0	10	5020-03678
Inertsil WP300 C8	5	4.0	10	5020-03679
Inertsil WP300 C4	5	4.0	10	5020-03680
Inertsil Amide	3	4.0	10	5020-03698
	5	4.0	10	5020-03697
Inertsil HILIC	3	4.0	10	5020-03675
	5	4.0	10	5020-03674
InertSustain NH2	3	4.0	10	5020-16763
	5	4.0	10	5020-16634
Inertsil NH2	3	4.0	10	5020-03671
	5	4.0	10	5020-03670
Inertsil Diol	3	4.0	10	5020-03673
	5	4.0	10	5020-03672
Inertsil SIL-100A	3	4.0	10	5020-03677
	5	4.0	10	5020-03676
Inertsil SIL-150A	5	4.0	10	5020-03689
Inertsil WP300 SIL	5	4.0	10	5020-03682
Inertsil WP300 Diol	5	4.0	10	5020-03681

* All the guard columns are Waters type end-fitting.
* Recommend Max. Operating Pressure is 20 MPa.

SILFILTER™ STD C18

SILFILTER STD C18 is a guard column with cartridge size 3.0 mm I.D. × 10 mm. The cartridge is packed with a monolithic silica, chemically bonded with a C18 and uniquely end-capped based on our 45 years of experience. SILFILTER STD C18 can be installed and used for all C18 columns available in the market without interfering and influencing the elution or separation patterns. Also, deterioration of the packing in the cartridge can be confirmed visually.

● **Feature**

·Can be installed for all C18 columns available in the market .
·Deterioration of the packing in the cartridge can be confirmed visually.
·Easy to replace the cartridges.
·Effectively removes particulate and strongly retained sample compounds
·Delivers the lowest dead-volume.

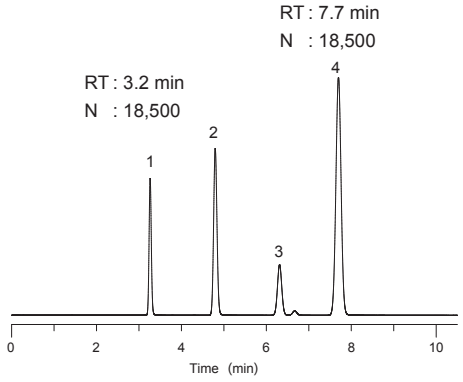
● **Specification**

·Base Material : High Purity Monolithic Silica
·Max.Operating Pressure : 35 MPa (350 Bar)
·Bonded Phase : Octadecyl Groups
·Size : 10 × 3.0 mm I.D.
·End-capping : Yes
·pH Range : 1~7.5
·Max.Temperature : 50 °C
·Compatible analytical Columns' ID : 3.0~4.6 mm I.D.

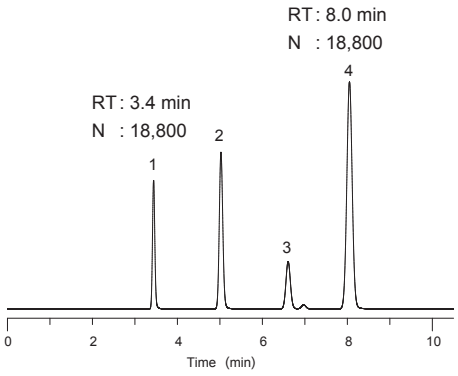
No Sacrifice in Separation Efficiency

The following test was conducted to confirm the efficiency of SILFILTER STD C18.
As shown below, the efficiency didn't decrease even for those fast eluting samples when installing SILFILTER STD C18.

Analytical C18 column only

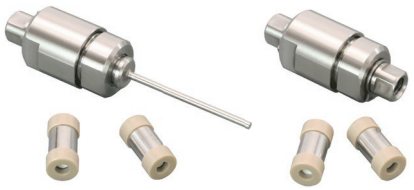


With SILFILTER STD C18



Conditions

Column	:	C18 Column (3 µm, 150 × 3.0 mm I.D.)
Eluent	:	A) CH_3CN B) H_2O A/B = 65/35, v/v
Flow Rate	:	0.4 mL/min
Col. Temp.	:	40 °C
Detection	:	UV 254 nm
Sample		Acetaminophen Benzene Toluene Naphthalene



Set A (with tube)

Set B (without tube)

PEEK Tough Connector

Item	Cat.No.
SILFILTER STD C18, Set A*[1] 2 Cartridges with 1 Holder and Tubes	5020-10404
SILFILTER STD C18, Set B *[2] 2 Cartridges with 1 Holder, without Tubes	5020-10405
SILFILTER(with Tubes) Holder for A type*[1]	5020-10402
SILFILTER(without Tubes) Holder for B type*[2]	5020-10403
Replaceable Cartridge, 2 ea	5020-10401
PEEK Tough Connector, 5 pcs	6010-48600

* 1: Tube size is, 1/16 inch O.D. × 0.18 mm I.D. × 30 mmL
* 2: Tubing tip length is 2.4 mm

Filters, Impurity Remove Columns

Pre-Column Coupler

Pre-column Coupler W (PCTFE)

Pre-column Coupler SUS

Precolumn Coupler is an easy-to-use tool to connect guard columns and analytical columns. Pre-column Coupler has two designs, one is using PCTFE material, except common organic solvents, acidic solvent and basic solvent also can be used. And another one is stainless design, it can be used as high pressure.

- **Specification**

  Max. operation pressure: 14.7 MPa (PCTFE), 80 MPa (stainless)

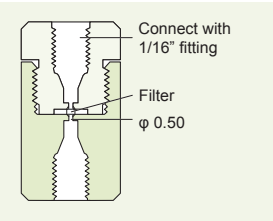
  Tube O.D.: 1/16”

Item	Material	Connection	Cat.No.
Pre-column Coupler W	PCTFE	Waters type	6010-49211
Pre-column Coupler SUS	Stainless	–*	6010-49210

* Product Pre-column Coupler SUS doe not fixed with Ferrules, therefore columns with 10-32UNF specification all can be used.

Pre-Column Filter

Pre-column filter



- **Specification**

  Fit in tube O.D. : 1/16”

  Screw specification : 10-32UNF

  Filter pore size : 2 μm

  Max. operation pressure : 41.4 MPa(SUS) 34.5 MPa(PEEK)

Item	Jacket material	P/N	Qty. (pc)	Cat.No.
Pre-column filter 2 μm	Stainless	A-315	1	6010-55100
Replacement pre-column filter 2 μm	–	A-101	1	6010-55110
PEEK pre-column filter 2 μm	PEEK	A-355	1	6010-55300
Replacement PEEK pre-column filter 2 μm	–	A-700	1	6010-55310

Pre-Clean ORG

Pre-clean ORG

- A guard column to install between the pump and injector, to remove the impurity in aqueous eluent.
- Protect analytical LC columns, and prolong analytical columns lifetime.
- Easy-to-replace.
- Also can be used as an in-line filter, semimicro columns are most appropriate for column clog.
- 2 types for two different flow rates.

Item	I.D.(mm)	Length(mm)	Recommend flow rate (mL/min)	Cat.No.
Pre-clean ORG replacement cartridge 2ea	7.6	30	1.0~20 mL/min	5020-12755
Pre-clean ORG holder and cartridgex2ea	7.6	30	1.0~20 mL/min	5020-12760
Pre-clean ORG holder	–	–	–	5020-12750
Pre-clean ORG semi replacement cartridge 2ea	4.0	10	0.1~2.0 mL/min	5020-12780
Pre-clean ORG semi holder and cartridgex2ea	4.0	10	0.1~2.0 mL/min	5020-12790
Pre-clean ORG semi holder	–	–	–	5020-12770

Inertsil
ODS-3 5 µ

Preparative Columns

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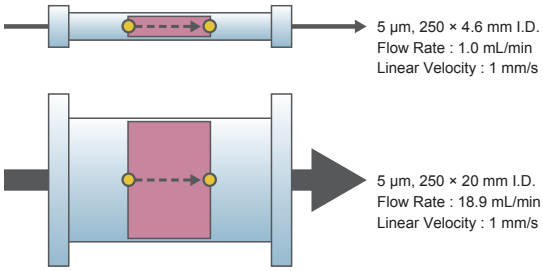
- JET Columns 117
- Other Preparative Columns 117

Choosing Preparative Columns

Relationship between Column I.D. , Sample Loading Volume and Flow Rate

In preparative operations, column internal diameter sizes from 6.0 to 100 mm are widely used. When the analytical conditions along with the column packing material and length were the same between the analytical and preparative run, nearly the same chromatograms can be achieved by simply adjusting the flow rate and sample loading volume in proportion to the column cross-section area.
The following table illustrates the appropriate flow rate against each column internal diameter sizes.

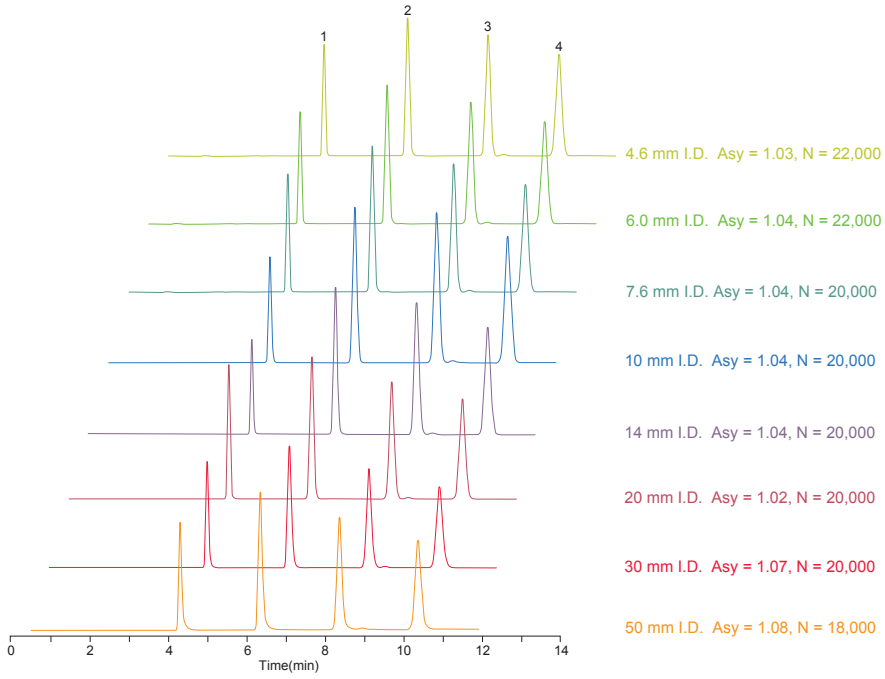


Column I.D. (mm)	Scale-Up Factor	Appropriate Flow Rate (mL/min)*1				Remarks
		Reversed/Normal Phases	SEC	HILIC	Chiral	
4.6	1	1	0.2~0.3	0.5	1	Determine and optimize the analytical separation using 4.6 mm I.D. analytical columns.
6.0	1.7	1.7	0.3~0.5	0.8	1.7	Semi-preparative HPLC columns can be used in standard HPLC systems. Column I.D. sizes from 7.6-8.0 mm are generallyused when scaling-up in SEC.
7.6~8.0	2.7	2.7	0.5~1.0	1.4	2.7	
10	5	5	1.0~1.5	2.4	5	
14	9	9	1.8~2.5	4.6	–	
20	19	19	3.8~5.4	9.5	19	Column I.D. sizes dominantly used in preparative HPLCresearches. Dedicated preparative HPLC systems are requiredas a wide flow rate range is required.
30	43	43	9.0~14	21	45	
50	120	120	24~36	60	50*3	
100	470	235*2	47~71*2	120*2	200*3	

* 1 : When the particle size of the packing material is a 5 µm.
* 2 : When the particle size of the packing material is a 10 µm.
* 3 : When the particle size of the packing material is a 20 µm.

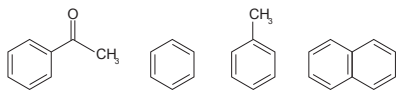
Smooth and Easy Scale-Up from Analytical to Preparative Dimensions

Generally, analytical scale columns are used initially to determine and optimize separation conditions between the target peak and unwanted contaminants with various bonded phases. Efficient scale-up of methods from analytical to preparative dimensions requires the use of a packing material offering identical selectivity, otherwise methods would not scale as expected.
InertSustain and Inertsil preparative HPLC columns offer asymmetry factor of nearly 1.0 delivering symmetric peaks maintaining efficiency of approximately 20,000 (N) when the column length is a 250 mm. As shown below, the scalability of InertSustain and Inertsil preparative HPLC columns provides smooth, easy and highly efficient purification and isolation results.



Conditions

System : PLC 761 System
Column : Inertsil ODS-3 (5 µm, 250 mm)
Eluent : A) CH_3CN
B) H_2O
A/B = 65/35, v/v
Flow Rate : Linear Velocityat 1 mm/s
Col. Temp. : 40 °C
Col. Pres. : Approx. 5.0 MPa
Detection : UV 254 nm
Sample : 1. Acetophenone
2. Benzene
3. Toluene
4. Naphthalene



Preparative Columns

Preparative Columns

InertSustain and Inertsil preparative columns are available in a broad range of column sizes to answer and meet all demands in preparative chromatography.

Phase	Length(mm)	50	100	150	250
	I.D.(mm)	Cat.No.	Cat.No.	Cat.No.	Cat.No.
InertSustain C18 5 µm	6.0	5020-07352	5020-07354	5020-07355	5020-07356
	7.6	5020-07362	5020-07364	5020-07365	5020-07366
	10	5020-14252	5020-14254	5020-14255	5020-14256
	14	5020-14262	5020-14264	5020-14265	5020-14266
	20	5020-14272	5020-14274	5020-14275	5020-14276
	30	5020-	5020-	5020-	5020-
	50	5020-	5020-	5020-	5020-
	100	5020-	5020-	5020-	5020-
Inertsil ODS-4 5 µm	6.0	5020-03953	5020-03954	5020-03955	5020-03956
	7.6	5020-03963	5020-03964	5020-03965	5020-03966
	10	5020-81053	5020-81054	5020-81055	5020-81056
	14	5020-79001	5020-79002	5020-79003	5020-79004
	20	5020-81063	5020-81064	5020-81065	5020-81066
	30	5020-	5020-	5020-	5020-
	50	5020-	5020-	5020-	5020-
	100	5020-	5020-	5020-	5020-
Inertsil ODS-3 5 µm	6.0	5020-07011	5020-04554	5020-01733	5020-01734
	7.6	5020-07012	5020-06803	5020-06804	5020-06802
	10	5020-07013	5020-06813	5020-06814	5020-06812
	14	5020-79011	5020-79012	5020-79013	5020-79014
	20	5020-07014	5020-06823	5020-06824	5020-06822
	30	5020-07015	5020-06833	5020-06834	5020-06832
	50	5020-	5020-	5020-	5020-06852
	100	5020-	5020-	5020-	5020-
Inertsil ODS-3 10 µm	10	5020-79100	5020-79101	5020-79102	5020-79103
	14	5020-79105	5020-79106	5020-79107	5020-79108
	20	5020-79110	5020-79111	5020-79112	5020-79113
	30	5020-79115	5020-79116	5020-79117	5020-79118
	50	5020-	5020-	5020-	5020-79120
	100	5020-	5020-	5020-	5020-
Inertsil ODS-SP 5 µm	6.0	5020-02752	5020-02754	5020-02755	5020-02756
	7.6	5020-02762	5020-02764	5020-02765	5020-02766
	10	5020-85252	5020-85254	5020-85255	5020-85256
	14	5020-79016	5020-79017	5020-79018	5020-79019
	20	5020-85262	5020-85264	5020-85265	5020-85266
Inertsil ODS-P 5 µm	6.0	5020-04752	5020-04754	5020-04755	5020-04756
	7.6	5020-04762	5020-04764	5020-04765	5020-04766
	10	5020-84752	5020-84754	5020-84755	5020-84756
	14	5020-79026	5020-79027	5020-79028	5020-79029
	20	5020-84762	5020-84764	5020-84765	5020-84766
	30	5020-84772	5020-	5020-	5020-84776
	50	5020-	5020-	5020-	5020-84786
Inertsil ODS-EP 5 µm	6.0	5020-02652	5020-02654	5020-02655	5020-02656
	7.6	5020-02662	5020-02664	5020-02665	5020-02666
	10	5020-18252	5020-18254	5020-18255	5020-18256
	14	5020-79021	5020-79022	5020-79023	5020-79024
	20	5020-18262	5020-18264	5020-18265	5020-18266
	30	5020-18272	5020-	5020-	5020-18276
	50	5020-	5020-	5020-	5020-18286

* End-fittings are 1/16" Waters-compatible.
* The maximum operating pressure of 6.0 to 50 mm I.D. columns are 20 MPa, 200 Bar.
* The maximum operating pressure of 100 mm I.D. column is 10 MPa, 100 Bar.

Preparative Columns

Phase	Length(mm)	50	100	150	250
	I.D.(mm)	Cat.No.	Cat.No.	Cat.No.	Cat.No.
Inertsil ODS-80A 5 µm	6.0	5020-	5020-	5020-01603	5020-01604
	7.6	5020-	5020-	5020-	5020-06146
	10	5020-	5020-	5020-	5020-15616
	20	5020-	5020-	5020-	5020-15646
Inertsil ODS-2 5 µm	6.0	5020-	5020-	5020-01103	5020-01104
	7.6	5020-	5020-	5020-	5020-06142
	10	5020-	5020-	5020-	5020-15612
	20	5020-	5020-	5020-	5020-15642
Inertsil ODS 5 µm	6.0	5020-	5020-	5020-02103	5020-02104
	7.6	5020-	5020-	5020-	5020-31503
	10	5020-	5020-	5020-	5020-31513
	20	5020-	5020-	5020-	5020-31523
Inertsil ODS 10 µm	6.0	5020-	5020-	5020-02203	5020-02204
	7.6	5020-	5020-	5020-	5020-31603
	10	5020-	5020-	5020-	5020-31613
	20	5020-	5020-	5020-	5020-31623
InertSustain C8 5 µm	6.0	5020-16055	5020-16056	5020-16057	5020-16058
	7.6	5020-16059	5020-16060	5020-16061	5020-16062
	10	5020-16063	5020-16064	5020-16065	5020-16066
	14	5020-16067	5020-16068	5020-16069	5020-16070
	20	5020-16071	5020-16072	5020-16073	5020-16074
	30	5020-	5020-	5020-	5020-
	50	5020-	5020-	5020-	5020-
	100	5020-	5020-	5020-	5020-
Inertsil C8-4 5 µm	6.0	5020-04087	5020-04088	5020-04089	5020-04090
	7.6	5020-04092	5020-04093	5020-04094	5020-04095
	10	5020-81243	5020-81244	5020-81245	5020-81246
	14	5020-79006	5020-79007	5020-79008	5020-79009
	20	5020-81253	5020-81254	5020-81255	5020-81256
	30	5020-	5020-	5020-	5020-
	50	5020-	5020-	5020-	5020-
	100	5020-	5020-	5020-	5020-
Inertsil C8-3 5 µm	6.0	5020-04952	5020-04954	5020-04955	5020-04956
	7.6	5020-04962	5020-04964	5020-04965	5020-04966
	10	5020-84952	5020-84954	5020-84955	5020-84956
	14	5020-79031	5020-79032	5020-79033	5020-79034
	20	5020-84962	5020-84964	5020-84965	5020-84966
	30	5020-84972	5020-	5020-	5020-84976
	50	5020-	5020-	5020-	5020-84986
	100	5020-	5020-	5020-	5020-
Inertsil C8-3 10 µm	10	5020-79300	5020-79301	5020-79302	5020-79303
	14	5020-79305	5020-79306	5020-79307	5020-79308
	20	5020-79310	5020-79311	5020-79312	5020-79313
	30	5020-79315	5020-79316	5020-79317	5020-79318
	50	5020-	5020-	5020-	5020-79320
	100	5020-	5020-	5020-	5020-
Inertsil C8 5 µm	6.0	5020-	5020-	5020-01203	5020-01204
	7.6	5020-	5020-	5020-	5020-06143
	10	5020-	5020-	5020-	5020-15613
	20	5020-	5020-	5020-	5020-15643

* End-fittings are 1/16” Waters-compatible.
* The maximum operating pressure of 6.0 to 50 mm I.D. columns are 20 MPa, 200 Bar.
* The maximum operating pressure of 100 mm I.D. column is 10 MPa, 100 Bar.

Phase	Length(mm)	50	100	150	250
	I.D.(mm)	Cat.No.	Cat.No.	Cat.No.	Cat.No.
InertSustain Phenyl 5 µm	6.0	5020-16355	5020-16356	5020-16357	5020-16358
	7.6	5020-16359	5020-16360	5020-16361	5020-16362
	10	5020-16363	5020-16364	5020-16365	5020-16366
	14	5020-16367	5020-16368	5020-16369	5020-16370
	20	5020-16371	5020-16372	5020-16373	5020-16374
	30	5020-	5020-	5020-	5020-
	50	5020-	5020-	5020-	5020-
	100	5020-	5020-	5020-	5020-
Inertsil Ph-3 5 µm	6.0	5020-05152	5020-05154	5020-05155	5020-05156
	7.6	5020-05162	5020-05164	5020-05165	5020-05166
	10	5020-85152	5020-85154	5020-85155	5020-85156
	14	5020-79036	5020-79037	5020-79038	5020-79039
	20	5020-85162	5020-85164	5020-85165	5020-85166
	30	5020-85172	5020-	5020-	5020-85176
	50	5020-	5020-	5020-	5020-85186
	100	5020-	5020-	5020-	5020-
Inertsil Ph 5 µm	6.0	5020-	5020-	5020-01303	5020-01304
	7.6	5020-	5020-	5020-	5020-06144
	10	5020-	5020-	5020-	5020-15614
	20	5020-	5020-	5020-	5020-15644
Inertsil CN-3 5 µm	6.0	5020-05352	5020-05354	5020-05355	5020-05356
	7.6	5020-05362	5020-05364	5020-05365	5020-05366
	10	5020-85352	5020-85354	5020-85355	5020-85356
	14	5020-79041	5020-79042	5020-79043	5020-79044
	20	5020-85362	5020-85364	5020-85365	5020-85366
	30	5020-85372	5020-	5020-	5020-85376
	50	5020-	5020-	5020-	5020-85386
	100	5020-	5020-	5020-	5020-
Inertsil WP300 C18 5 µm	6.0	5020-05950	5020-05951	5020-05952	5020-05953
	7.6	5020-05955	5020-05956	5020-05957	5020-05958
	10	5020-85832	5020-85834	5020-85835	5020-85836
	14	5020-79071	5020-79072	5020-79073	5020-79074
	20	5020-85842	5020-85844	5020-85845	5020-85846
	30	5020-85852	5020-	5020-	5020-85856
	50	5020-	5020-	5020-	5020-85866
	100	5020-	5020-	5020-	5020-
Inertsil WP300 C8 5 µm	6.0	5020-05960	5020-05961	5020-05962	5020-05963
	7.6	5020-05965	5020-05966	5020-05967	5020-05968
	10	5020-85732	5020-85734	5020-85735	5020-85736
	14	5020-79076	5020-79077	5020-79078	5020-79079
	20	5020-85742	5020-85744	5020-85745	5020-85746
	30	5020-85752	5020-	5020-	5020-85756
	50	5020-	5020-	5020-	5020-85766
	100	5020-	5020-	5020-	5020-
Inertsil WP300 C4 5 µm	6.0	5020-05970	5020-05971	5020-05972	5020-05973
	7.6	5020-05975	5020-05976	5020-05977	5020-05978
	10	5020-86132	5020-86134	5020-86135	5020-86136
	14	5020-79081	5020-79082	5020-79083	5020-79084
	20	5020-86142	5020-86144	5020-86145	5020-86146
	30	5020-86152	5020-	5020-	5020-86156
	50	5020-	5020-	5020-	5020-86166
	100	5020-	5020-	5020-	5020-

* End-fittings are 1/16" Waters-compatible.
* The maximum operating pressure of 6.0 to 50 mm I.D. columns are 20 MPa, 200 Bar.
* The maximum operating pressure of 100 mm I.D. column is 10 MPa, 100 Bar.

Preparative Columns

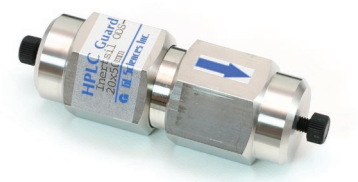
Phase	Length(mm)	50	100	150	250
	I.D.(mm)	Cat.No.	Cat.No.	Cat.No.	Cat.No.
Inertsil Amide 5 µm	6.0	5020-07842	5020-07844	5020-07845	5020-07846
	7.6	5020-07852	5020-07854	5020-07855	5020-07856
	10	5020-86852	5020-86854	5020-86855	5020-86856
	14	5020-79066	5020-79067	5020-79068	5020-79069
	20	5020-86862	5020-86864	5020-86865	5020-86866
	30	5020-86872	5020-	5020-	5020-86876
	50	5020-	5020-	5020-	5020-86886
	100	5020-	5020-	5020-	5020-
Inertsil HILIC 5 µm	6.0	5020-07742	5020-07744	5020-07745	5020-07746
	7.6	5020-07752	5020-07754	5020-07755	5020-07756
	10	5020-86752	5020-86754	5020-86755	5020-86756
	14	5020-79061	5020-79062	5020-79063	5020-79064
	20	5020-86762	5020-86764	5020-86765	5020-86766
	30	5020-86772	5020-	5020-	5020-86776
	50	5020-	5020-	5020-	5020-86786
	100	5020-	5020-	5020-	5020-
InertSustain NH2 5 µm	6.0	5020-16655	5020-16656	5020-16657	5020-16658
	7.6	5020-16659	5020-16660	5020-16661	5020-16662
	10	5020-16663	5020-16664	5020-16665	5020-16666
	14	5020-16667	5020-16668	5020-16669	5020-16670
	20	5020-16671	5020-16672	5020-16673	5020-16674
	30	5020-	5020-	5020-	5020-
	50	5020-	5020-	5020-	5020-
	100	5020-	5020-	5020-	5020-
Inertsil NH2 5 µm	6.0	5020-05552	5020-05554	5020-05555	5020-05556
	7.6	5020-05562	5020-05564	5020-05565	5020-05566
	10	5020-85552	5020-85554	5020-85555	5020-85556
	14	5020-79046	5020-79047	5020-79048	5020-79049
	20	5020-85562	5020-85564	5020-85565	5020-85566
	30	5020-85572	5020-	5020-	5020-85576
	50	5020-	5020-	5020-	5020-85586
	100	5020-	5020-	5020-	5020-
Inertsil Diol 5 µm	6.0	5020-05652	5020-05654	5020-05655	5020-05656
	7.6	5020-05662	5020-05664	5020-05665	5020-05666
	10	5020-86552	5020-86554	5020-86555	5020-86556
	14	5020-79051	5020-79052	5020-79053	5020-79054
	20	5020-86562	5020-86564	5020-86565	5020-86566
	30	5020-86572	5020-	5020-	5020-86576
	50	5020-	5020-	5020-	5020-86586
	100	5020-	5020-	5020-	5020-
Inertsil SIL-100A 5 µm	6.0	5020-04352	5020-04354	5020-01713	5020-01714
	7.6	5020-04362	5020-04364	5020-04365	5020-04366
	10	5020-84352	5020-84354	5020-84355	5020-84356
	14	5020-79056	5020-79057	5020-79058	5020-79059
	20	5020-84362	5020-84364	5020-84365	5020-84366
	30	5020-84372	5020-	5020-	5020-84376
	50	5020-	5020-	5020-	5020-84386
	100	5020-	5020-	5020-	5020-

* End-fittings are 1/16” Waters-compatible.
* The maximum operating pressure of 6.0 to 50 mm I.D. columns are 20 MPa, 200 Bar.
* The maximum operating pressure of 100 mm I.D. column is 10 MPa, 100 Bar.

Phase	Length(mm)	50	100	150	250
	I.D.(mm)	Cat.No.	Cat.No.	Cat.No.	Cat.No.
Inertsil SIL-150A 5 µm	6.0	5020-	5020-	5020-01013	5020-01014
	7.6	5020-	5020-	5020-	5020-06141
	10	5020-	5020-	5020-	5020-15611
	20	5020-	5020-	5020-	5020-15641
Inertsil WP300 SIL 5 µm	6.0	5020-05990	5020-05991	5020-05992	5020-05993
	7.6	5020-05995	5020-05996	5020-05997	5020-05998
	10	5020-86032	5020-86034	5020-86035	5020-86036
	14	5020-79091	5020-79092	5020-79093	5020-79094
	20	5020-86042	5020-86044	5020-86045	5020-86046
	30	5020-86052	5020-	5020-	5020-86056
	50	5020-	5020-	5020-	5020-86066
	100	5020-	5020-	5020-	5020-
Inertsil WP300 Diol 5 µm	6.0	5020-05980	5020-05981	5020-05982	5020-05983
	7.6	5020-05985	5020-05986	5020-05987	5020-05988
	10	5020-85932	5020-85934	5020-85935	5020-85936
	14	5020-79086	5020-79087	5020-79088	5020-79089
	20	5020-85942	5020-85944	5020-85945	5020-85946
	30	5020-85952	5020-	5020-	5020-85956
	50	5020-	5020-	5020-	5020-85966
	100	5020-	5020-	5020-	5020-
Inertsil Peptides C18 4 µm	6.0	5020-08062	5020-08064	5020-08065	5020-08066
	7.6	5020-08081	5020-	5020-	5020-08082
	10	5020-08083	5020-	5020-	5020-08084
	20	5020-08085	5020-	5020-	5020-08086
	30	5020-08087	5020-	5020-	5020-08088
	50	5020-	5020-	5020-	5020-08089

* End-fittings are 1/16" Waters-compatible.
* The maximum operating pressure of 6.0 to 50 mm I.D. columns are 20 MPa, 200 Bar.
* The maximum operating pressure of 100 mm I.D. column is 10 MPa, 100 Bar.

Guard Columns for Preparative Columns



Guard Columns for Preparative Columns

GL Sciences highly recommends the use of guard columns to protect and maximize the lifetime of your InertSustain or Inertsil preparative columns.

Phase	Particle Size	I.D.×Length (mm)	Cat.No.
InertSustain C18	5 µm	6.0 × 50	5020-07357
		7.6 × 50	5020-07367
		10 × 50	5020-14257
		14 × 50	5020-14267
		20 × 50	5020-14277
		30 × 50	5020-
		50 × 75	5020-
		100 × 100	5020-
Inertsil ODS-4	5 µm	6.0 × 50	5020-03957
		7.6 × 50	5020-03967
		10 × 50	5020-81057
		14 × 50	5020-79005
		20 × 50	5020-81067
		30 × 50	5020-
		50 × 75	5020-
		100 × 100	5020-
Inertsil ODS-3	5 µm	6.0 × 50	5020-04557
		7.6 × 50	5020-06801
		10 × 50	5020-06811
		14 × 50	5020-79015
		20 × 50	5020-06821
		30 × 50	5020-06831
		50 × 75	5020-06851
		100 × 100	5020-
	10 µm	10 × 50	5020-79104
		14 × 50	5020-79109
		20 × 50	5020-79114
		30 × 50	5020-79119
		50 × 75	5020-79121
Inertsil ODS-SP	5 µm	6.0 × 50	5020-02757
		7.6 × 50	5020-02767
		10 × 50	5020-85257
		14 × 50	5020-79020
		20 × 50	5020-85267
Inertsil ODS-P	5 µm	6.0 × 50	5020-04757
		7.6 × 50	5020-04767
		10 × 50	5020-84757
		14 × 50	5020-79030
		20 × 50	5020-84767
		30 × 50	5020-84777
		50 × 75	5020-84787
		100 × 100	5020-
Inertsil ODS-EP	5 µm	6.0 × 50	5020-02657
		7.6 × 50	5020-02667
		10 × 50	5020-18257
		14 × 50	5020-79025
		20 × 50	5020-18267
		30 × 50	5020-18277
		50 × 75	5020-18287
		100 × 100	5020-
Inertsil ODS-80A	5 µm	7.6 × 50	5020-06136
		10 × 50	5020-15606
		20 × 50	5020-15636
Inertsil ODS-2	5 µm	7.6 × 50	5020-06132
		10 × 50	5020-15602
		20 × 50	5020-15632

Phase	Particle Size	I.D.×Length (mm)	Cat.No.
Inertsil ODS	5 µm	7.6 × 50	5020-31501
		10 × 50	5020-31511
		20 × 50	5020-31521
	10 µm	7.6 × 50	5020-31601
		10 × 50	5020-31611
		20 × 50	5020-31621
InertSustain C8	5 µm	6.0 × 50	5020-16075
		7.6 × 50	5020-16076
		10 × 50	5020-16077
		14 × 50	5020-16078
		20 × 50	5020-16079
		30 × 50	5020-84977
		50 × 75	5020-84987
		100 × 100	5020-
Inertsil C8-4	5 µm	6.0 × 50	5020-04091
		7.6 × 50	5020-04096
		10 × 50	5020-81247
		14 × 50	5020-79010
		20 × 50	5020-81257
		30 × 50	5020-84977
		50 × 75	5020-84987
		100 × 100	5020-
Inertsil C8-3	5 µm	6.0 × 50	5020-04957
		7.6 × 50	5020-04967
		10 × 50	5020-84957
		14 × 50	5020-79035
		20 × 50	5020-84967
		30 × 50	5020-84977
		50 × 75	5020-84987
		100 × 100	5020-
	10 µm	10 × 50	5020-79304
		14 × 50	5020-79309
		20 × 50	5020-79314
		30 × 50	5020-79319
		50 × 75	5020-79321
Inertsil C8	5 µm	7.6	5020-06133
		10	5020-15603
		20	5020-15633
InertSustain Phenyl	5 µm	6.0 × 50	5020-16375
		7.6 × 50	5020-16376
		10 × 50	5020-16377
		14 × 50	5020-16378
		20 × 50	5020-16379
		30 × 50	5020-
		50 × 75	5020-
		100 × 100	5020-
Inertsil Ph-3	5 µm	6.0 × 50	5020-05157
		7.6 × 50	5020-05167
		10 × 50	5020-85157
		14 × 50	5020-79040
		20 × 50	5020-85167
		30 × 50	5020-85177
		50 × 75	5020-85187
		100 × 100	5020-
Inertsil Ph	5 µm	7.6 × 50	5020-06134
		10 × 50	5020-15604
		20 × 50	5020-15634

* End-fittings are 1/16" Waters-compatible.
* The maximum operating pressure of 6.0 to 50 mm I.D. columns are 20 MPa, 200 Bar.
* The maximum operating pressure of 100 mm I.D. column is 10 MPa, 100 Bar.

Phase	Particle Size	I.D.×Length (mm)	Cat.No.
Inertsil CN-3	5 µm	6.0 × 50	5020-05357
		7.6 × 50	5020-05367
		10 × 50	5020-85357
		14 × 50	5020-79045
		20 × 50	5020-85367
		30 × 50	5020-85377
		50 × 75	5020-85387
		100 × 100	5020-
Inertsil WP300 C18	5 µm	6.0 × 50	5020-05954
		7.6 × 50	5020-05959
		10 × 50	5020-85837
		14 × 50	5020-79075
		20 × 50	5020-85847
		30 × 50	5020-85857
		50 × 75	5020-85867
		100 × 100	5020-
Inertsil WP300 C8	5 µm	6.0 × 50	5020-05964
		7.6 × 50	5020-05969
		10 × 50	5020-85737
		14 × 50	5020-79080
		20 × 50	5020-85747
		30 × 50	5020-85757
		50 × 75	5020-85767
		100 × 100	5020-
Inertsil WP300 C4	5 µm	6.0 × 50	5020-05974
		7.6 × 50	5020-05979
		10 × 50	5020-86137
		14 × 50	5020-79085
		20 × 50	5020-86147
		30 × 50	5020-86157
		50 × 75	5020-86167
		100 × 100	5020-
Inertsil Amide	5 µm	6.0 × 50	5020-07847
		7.6 × 50	5020-07857
		10 × 50	5020-86857
		14 × 50	5020-79070
		20 × 50	5020-86867
		30 × 50	5020-86877
		50 × 75	5020-
		100 × 100	5020-
Inertsil HILIC	5 µm	6.0 × 50	5020-07747
		7.6 × 50	5020-07757
		10 × 50	5020-86757
		14 × 50	5020-79065
		20 × 50	5020-86767
		30 × 50	5020-86777
		50 × 75	5020-86787
		100 × 100	5020-
InertSustain NH2	5 µm	6.0 × 50	5020-16675
		7.6 × 50	5020-16676
		10 × 50	5020-16677
		14 × 50	5020-16678
		20 × 50	5020-16679
		30 × 50	5020-
		50 × 75	5020-
		100 × 100	5020-
Inertsil NH2	5 µm	6.0 × 50	5020-05557
		7.6 × 50	5020-05567
		10 × 50	5020-85557
		14 × 50	5020-79050
		20 × 50	5020-85567
		30 × 50	5020-85577
		50 × 75	5020-85587
		100 × 100	5020-

Phase	Particle Size	I.D.×Length (mm)	Cat.No.
Inertsil Diol	5 µm	6.0 × 50	5020-05657
		7.6 × 50	5020-05667
		10 × 50	5020-86557
		14 × 50	5020-79055
		20 × 50	5020-86567
		30 × 50	5020-86577
		50 × 75	5020-86587
		100 × 100	5020-
Inertsil SIL-100A	5 µm	6.0 × 50	5020-04357
		7.6 × 50	5020-04367
		10 × 50	5020-84357
		14 × 50	5020-79060
		20 × 50	5020-84367
		30 × 50	5020-84377
		50 × 75	5020-84387
		100 × 100	5020-
Inertsil SIL-150A	5 µm	7.6 × 50	5020-06131
		10 × 50	5020-15601
		20 × 50	5020-15631
Inertsil WP300 SIL	5 µm	6.0 × 50	5020-05994
		7.6 × 50	5020-05999
		10 × 50	5020-86037
		14 × 50	5020-79095
		20 × 50	5020-86047
		30 × 50	5020-86057
		50 × 75	5020-86067
		100 × 100	5020-
Inertsil WP300 Diol	5 µm	6.0 × 50	5020-05984
		7.6 × 50	5020-05989
		10 × 50	5020-85937
		14 × 50	5020-79090
		20 × 50	5020-85947
		30 × 50	5020-85957
		50 × 75	5020-85967
		100 × 100	5020-
Inertsil Peptides C18	4 µm	6.0 × 50	5020-08071
		7.6 × 50	5020-08072
		10 × 50	5020-08073
		20 × 50	5020-08074
		30 × 50	5020-08075
		50 × 75	5020-08076

* End-fittings are 1/16" Waters-compatible.
* The maximum operating pressure of 6.0 to 50 mm I.D. columns are 20 MPa, 200 Bar.
* The maximum operating pressure of 100 mm I.D. column is 10 MPa, 100 Bar.

PREP Guard Cartridges

PREP Guard Cartridges

PREP guard cartridges offer economic and effective protection for extending the lifetime of your InertSustain or Inertsil preparative columns. Protection available for 7.6, 10 and 20 mm I.D. preparative columns.

Phese	Length (mm)	I.D. (mm)	Replacement Cartridge (2 EA.)	Holder/Replacement Cartridge Set (2 Cartridges & 1 Holder)
			Cat. No.	Cat. No.
InertSustain C18	30	7.6	5020-15744	5020-15794
Inertsil ODS-4	30	7.6	5020-15701	5020-15751
Inertsil ODS-3	30	7.6	5020-15703	5020-15753
Inertsil ODS-SP	30	7.6	5020-15706	5020-15756
Inertsil ODS-P	30	7.6	5020-15708	5020-15758
Inertsil ODS-EP	30	7.6	5020-15710	5020-15760
Inertsil ODS-80A	30	7.6	5020-15740	5020-15790
Inertsil ODS-2	30	7.6	5020-15735	5020-15785
Inertsil ODS	30	7.6	5020-15741	5020-15791
InertSustain C8	30	7.6	5020-16080	5020-16081
Inertsil C8-4	30	7.6	5020-15702	5020-15752
Inertsil C8-3	30	7.6	5020-15714	5020-15764
Inertsil C8	30	7.6	5020-15736	5020-15786
Inertsil C4	30	7.6	5020-15738	5020-15788
InertSustain Phenyl	30	7.6	5020-16380	5020-16381
Inertsil Ph-3	30	7.6	5020-15716	5020-15766
Inertsil Ph	30	7.6	5020-15737	5020-15787
Inertsil CN-3	30	7.6	5020-15718	5020-15768
Inertsil WP300 C18	30	7.6	5020-15728	5020-15778
Inertsil WP300 C8	30	7.6	5020-15729	5020-15779
Inertsil WP300 C4	30	7.6	5020-15730	5020-15780
Inertsil Amide	30	7.6	5020-15745	5020-15795
Inertsil HILIC	30	7.6	5020-15724	5020-15774
InertSustain NH2	30	7.6	5020-16680	5020-16681
Inertsil NH2	30	7.6	5020-15720	5020-15770
Inertsil Diol	30	7.6	5020-15722	5020-15772
Inertsil SIL-100A	30	7.6	5020-15726	5020-15776
Inertsil SIL-150A	30	7.6	5020-15739	5020-15789
Inertsil WP300 Diol	30	7.6	5020-15731	5020-15781
Inertsil WP300 SIL	30	7.6	5020-15732	5020-15782
Inertsil Peptides C18	30	7.6	5020-15711	5020-15761

Holder for PREP Guard Cartridges

Description	Cat. No.
Holder for PREP Guard Cartridges	5020-06920

*End-fittings are 1/16" Waters-compatible.
*The above dedicated holder must be purchased once to use the PREP Guard Cartridges.

Other Preparative Columns

JET Columns

JET Columns

JET columns have been designed specifically to work with rapid purification and isolation for preparative HPLC offering 20 % higher efficiency compared to general preparative columns.

Phese	Length(mm)	50
	I.D.(mm)	Cat.No.
Inertsil ODS-3	6.0	5020-07021
	7.6	5020-07022
	10	5020-07023
	20	5020-07024
	30	5020-07025
	50	5020-

* End-fittings are 1/16" Waters-compatible.
* The maximum operating pressure is 20 MPa, 200 Bar.

Other Preparative Columns

Inertsil PREP

Econo Prep

Other preparative HPLC columns such as Inertsil Prep using a 10 µm packing material and cost-effective Econo Prep series preparative columns are available using 40 µm particle size packing materials.

Capillary Columns

- Capillary HPLC Columns 120
- Totally Porous Particle type Capillary HPLC Columns 121
- Connection Kits for Totally Porous Particle type Capillary Columns 126
- Totally Porous Particle type Capillary Micro Guard Columns 127
- Monolithic Capillary HPLC Columns
  (Available in South Asia, Middle East and Africa only) 128
- MonoSpray™ 133

Capillary HPLC Columns

Capillary EX and Capillary EX-Nano HPLC columns are excellent in analyzing trace amounts of samples in proteomic and bioanalytical analysis with high sensitivity and high resolution. Capillary EX and Capillary EX-Nano columns are totally porous particle type columns, which the flow rate is generally set under 100 µLmin.

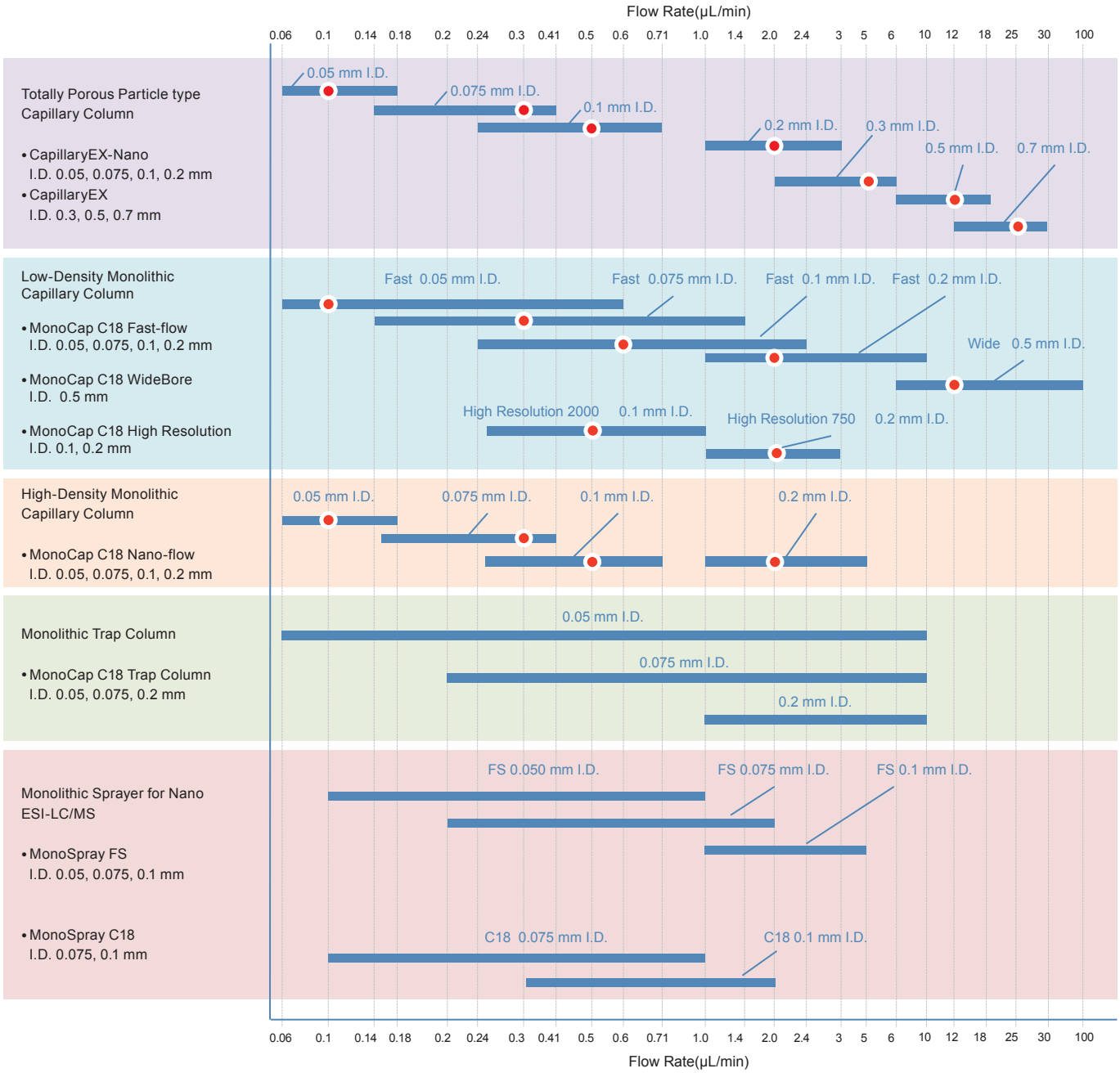
MonoCap is another capillary column, however, uses the monolithic silica technology offering high throughput, high sensitivity and high resolution separation of peptides and protein digests.

MonoCap Fast-Flow provides high throughput analysis at half of the operating pressure compared to totally porous particle type columns. MonoCap Nano-flow deliver extremely high sensitivity in LC/MS due to the optimization of mesopore and throughpore sizes. Electrospray emitter for ESI-LC/MS, MonoSpray offer minimized sample diffusion resulting in high sensitivity. MonoCap Trap columns are also available for on-line preconcentration or desalting of protein and peptide samples prior to HPLC separation with mass spectrometry detection.

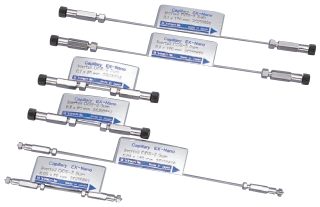
The chart below illustrates the recommended use and flow rate ranges when using a 150 mm length column. The red circle indicates the linear velocity at 1 mm/s.

MonoCap High Resolution 2000

Figure 1 : Recommended Use and Flow Rate Ranges



Totally Porous Particle type Capillary HPLC Columns



Capillary EX-Nano

Capillary EX

Columns with I.D. sizes of 0.05, 0.075, 0.1 and 0.2 mm are Capillary EX-Nano columns. I.D. sizes of 0.3, 0.5 and 0.7 mm are Capillary EX columns. Capillary EX-Nano columns introduces a fused silica capillary tube having a very smooth and clean inner surface resulting in high theoretical plates.
Capillary EX columns employs the same column hardware used in analytical columns, which is very easy to use.

Phase	I.D. (mm)	Particle Size (μm)	Length50 mm Cat.No.	Length150 mm Cat.No.	Length250 mm Cat.No.
InertSustain C18	0.05	3	5020-15038	5020-15088	5020-15138
		5	5020-15037	5020-15087	5020-15137
	0.075	3	5020-15188	5020-15238	5020-15288
		5	5020-15187	5020-15237	5020-15287
	0.1	3	5020-15338	5020-15388	5020-15438
		5	5020-15337	5020-15387	5020-15437
	0.2	3	5020-15488	5020-15538	5020-15588
		5	5020-15487	5020-15537	5020-15587
	0.3	3	5020-11539	5020-11589	–
		5	5020-11538	5020-11588	–
	0.5	3	5020-11639	5020-11689	–
		5	5020-11638	5020-11688	–
	0.7	3	5020-11739	5020-11789	–
		5	5020-11738	5020-11788	–
Inertsil ODS-4	0.05	3	5020-15002	5020-15052	5020-15102
		5	5020-15001	5020-15051	5020-15101
	0.075	3	5020-15152	5020-15202	5020-15252
		5	5020-15151	5020-15201	5020-15251
	0.1	3	5020-15302	5020-15352	5020-15402
		5	5020-15301	5020-15351	5020-15401
	0.2	3	5020-15452	5020-15502	5020-15552
		5	5020-15451	5020-15501	5020-15551
	0.3	3	5020-11502	5020-11552	–
		5	5020-11501	5020-11551	–
	0.5	3	5020-11602	5020-11652	–
		5	5020-11601	5020-11651	–
	0.7	3	5020-11702	5020-11752	–
		5	5020-11701	5020-11751	–
Inertsil ODS-3	0.05	3	5020-15005	5020-15055	5020-15105
		4	5020-15004	5020-15054	5020-15104
		5	5020-15003	5020-15053	5020-15103
	0.075	3	5020-15155	5020-15205	5020-15255
		4	5020-15154	5020-15204	5020-15254
		5	5020-15153	5020-15203	5020-15253
	0.1	3	5020-15305	5020-15355	5020-15405
		4	5020-15304	5020-15354	5020-15404
		5	5020-15303	5020-15353	5020-15403
	0.2	3	5020-15455	5020-15505	5020-15555
		4	5020-15454	5020-15504	5020-15554
		5	5020-15453	5020-15503	5020-15553
	0.3	3	5020-11505	5020-11555	–
		4	5020-11504	5020-11554	–
		5	5020-11503	5020-11553	–
	0.5	3	5020-11605	5020-11655	–
		4	5020-11604	5020-11654	–
		5	5020-11603	5020-11653	–
	0.7	3	5020-11705	5020-11755	–
		4	5020-11704	5020-11754	–
		5	5020-11703	5020-11753	–

* End-fittings are Valco 1/16" (10-32 UNF).
* Valco 1/32" (6-40 UNF) end-fittings can also be arranged upon request, indicate "1/32" when ordering.
* The maximum operating pressure of 0.05 to 0.2 mm I.D. columns are 15 MPa, 150 Bar.
* The maximum operating pressure of 0.3 to 0.7 mm I.D. columns are 20 MPa, 200 Bar.

Totally Porous Particle type Capillary HPLC Columns

Phase	I.D. (mm)	Particle Size (μm)	Length 50 mm	Length 150 mm	Length 250 mm
			Cat.No.	Cat.No.	Cat.No.
Inertsil ODS-SP	0.05	3	5020-15007	5020-15057	5020-15107
		5	5020-15006	5020-15056	5020-15106
	0.075	3	5020-15157	5020-15207	5020-15257
		5	5020-15156	5020-15206	5020-15256
	0.1	3	5020-15307	5020-15357	5020-15407
		5	5020-15306	5020-15356	5020-15406
	0.2	3	5020-15457	5020-15507	5020-15557
		5	5020-15456	5020-15506	5020-15556
	0.3	3	5020-11507	5020-11557	–
		5	5020-11506	5020-11556	–
	0.5	3	5020-11607	5020-11657	–
		5	5020-11606	5020-11656	–
	0.7	3	5020-11707	5020-11757	–
		5	5020-11706	5020-11756	–
Inertsil ODS-P	0.05	3	5020-15009	5020-15059	5020-15109
		5	5020-15008	5020-15058	5020-15108
	0.075	3	5020-15159	5020-15209	5020-15259
		5	5020-15158	5020-15208	5020-15258
	0.1	3	5020-15309	5020-15359	5020-15409
		5	5020-15308	5020-15358	5020-15408
	0.2	3	5020-15459	5020-15509	5020-15559
		5	5020-15458	5020-15508	5020-15558
	0.3	3	5020-11509	5020-11559	–
		5	5020-11508	5020-11558	–
	0.5	3	5020-11609	5020-11659	–
		5	5020-11608	5020-11658	–
	0.7	3	5020-11709	5020-11759	–
		5	5020-11708	5020-11758	–
Inertsil ODS-EP	0.05	5	5020-15010	5020-15060	5020-15110
	0.075	5	5020-15160	5020-15210	5020-15260
	0.1	5	5020-15310	5020-15360	5020-15410
	0.2	5	5020-15460	5020-15510	5020-15560
	0.3	5	5020-11510	5020-11560	–
	0.5	5	5020-11610	5020-11660	–
	0.7	5	5020-11710	5020-11760	–
InertSustain C8	0.05	3	5020-16191	5020-16192	5020-16193
		5	5020-16090	5020-16091	5020-16092
	0.075	3	5020-16194	5020-16195	5020-16196
		5	5020-16093	5020-16094	5020-16095
	0.1	3	5020-16197	5020-16198	5020-16199
		5	5020-16096	5020-16097	5020-16098
	0.2	3	5020-16200	5020-16201	5020-16202
		5	5020-16099	5020-16100	5020-16101
	0.3	3	5020-16184	5020-16185	–
		5	5020-16082	5020-16083	–
	0.5	3	5020-16186	5020-16187	–
		5	5020-16084	5020-16085	–
	0.7	3	5020-16188	5020-16189	–
		5	5020-16086	5020-16087	–
Inertsil C8-4	0.05	3	5020-15036	5020-15086	5020-15136
		5	5020-15035	5020-15085	5020-15135
	0.075	3	5020-15186	5020-15236	5020-15286
		5	5020-15185	5020-15235	5020-15285
	0.1	3	5020-15336	5020-15386	5020-15436
		5	5020-15335	5020-15385	5020-15435
	0.2	3	5020-15486	5020-15536	5020-15586
		5	5020-15485	5020-15535	5020-15585
	0.3	3	5020-11536	5020-11586	–
		5	5020-11535	5020-11585	–
	0.5	3	5020-11636	5020-11686	–
		5	5020-11635	5020-11685	–
	0.7	3	5020-11736	5020-11786	–
		5	5020-11735	5020-11785	–

* End-fittings are Valco 1/16" (10-32 UNF).
* Valco 1/32" (6-40 UNF) end-fittings can also be arranged upon request, indicate "1/32" when ordering.
* The maximum operating pressure of 0.05 to 0.2 mm I.D. columns are 15 MPa, 150 Bar.
* The maximum operating pressure of 0.3 to 0.7 mm I.D. columns are 20 MPa, 200 Bar.

Phase	I.D. (mm)	Particle Size (μm)	Length 50 mm	Length 150 mm	Length 250 mm
			Cat.No.	Cat.No.	Cat.No.
Inertsil C8-3	0.05	3	5020-15015	5020-15065	5020-15115
		5	5020-15014	5020-15064	5020-15114
	0.075	3	5020-15165	5020-15215	5020-15265
		5	5020-15164	5020-15214	5020-15264
	0.1	3	5020-15315	5020-15365	5020-15415
		5	5020-15314	5020-15364	5020-15414
	0.2	3	5020-15465	5020-15515	5020-15565
		5	5020-15464	5020-15514	5020-15564
	0.3	3	5020-11515	5020-11565	–
		5	5020-11514	5020-11564	–
	0.5	3	5020-11615	5020-11665	–
		5	5020-11614	5020-11664	–
	0.7	3	5020-11715	5020-11765	–
		5	5020-11714	5020-11764	–
Inertsil WP300 C18	0.05	5	5020-15028	5020-15078	5020-15128
	0.075	5	5020-15178	5020-15228	5020-15278
	0.1	5	5020-15328	5020-15378	5020-15428
	0.2	5	5020-15478	5020-15528	5020-15578
	0.3	5	5020-11528	5020-11578	–
	0.5	5	5020-11628	5020-11678	–
	0.7	5	5020-11728	5020-11778	–
Inertsil WP300 C8	0.05	5	5020-15029	5020-15079	5020-15129
	0.075	5	5020-15179	5020-15229	5020-15279
	0.1	5	5020-15329	5020-15379	5020-15429
	0.2	5	5020-15479	5020-15529	5020-15579
	0.3	5	5020-11529	5020-11579	–
	0.5	5	5020-11629	5020-11679	–
	0.7	5	5020-11729	5020-11779	–
Inertsil WP300 C4	0.05	5	5020-15030	5020-15080	5020-15130
	0.075	5	5020-15180	5020-15230	5020-15280
	0.1	5	5020-15330	5020-15380	5020-15430
	0.2	5	5020-15480	5020-15530	5020-15580
	0.3	5	5020-11530	5020-11580	–
	0.5	5	5020-11630	5020-11680	–
	0.7	5	5020-11730	5020-11780	–
InertSustain Phenyl	0.05	3	5020-16491	5020-16492	5020-16493
		5	5020-16390	5020-16391	5020-16392
	0.075	3	5020-16494	5020-16495	5020-16496
		5	5020-16393	5020-16394	5020-16395
	0.1	3	5020-16497	5020-16498	5020-16499
		5	5020-16396	5020-16397	5020-16398
	0.2	3	5020-16500	5020-16501	5020-16502
		5	5020-16399	5020-16400	5020-16401
	0.3	3	5020-16484	5020-16485	–
		5	5020-16382	5020-16383	–
	0.5	3	5020-16486	5020-16487	–
		5	5020-16384	5020-16385	–
	0.7	3	5020-16488	5020-16489	–
		5	5020-16386	5020-16387	–
Inertsil Ph-3	0.05	3	5020-15017	5020-15067	5020-15117
		5	5020-15016	5020-15066	5020-15116
	0.075	3	5020-15167	5020-15217	5020-15267
		5	5020-15166	5020-15216	5020-15266
	0.1	3	5020-15317	5020-15367	5020-15417
		5	5020-15316	5020-15366	5020-15416
	0.2	3	5020-15467	5020-15517	5020-15567
		5	5020-15466	5020-15516	5020-15566
	0.3	3	5020-11517	5020-11567	–
		5	5020-11516	5020-11566	–
	0.5	3	5020-11617	5020-11667	–
		5	5020-11616	5020-11666	–
	0.7	3	5020-11717	5020-11767	–
		5	5020-11716	5020-11766	–

* End-fittings are Valco 1/16" (10-32 UNF).
* Valco 1/32" (6-40 UNF) end-fittings can also be arranged upon request, indicate "1/32" when ordering.
* The maximum operating pressure of 0.05 to 0.2 mm I.D. columns are 15 MPa, 150 Bar.
* The maximum operating pressure of 0.3 to 0.7 mm I.D. columns are 20 MPa, 200 Bar.

Totally Porous Particle type Capillary HPLC Columns

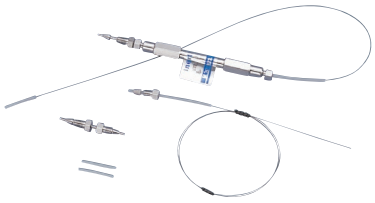
Phase	I.D. (mm)	Particle Size (μm)	Length 50 mm	Length 150 mm	Length 250 mm
			Cat.No.	Cat.No.	Cat.No.
Inertsil Amide	0.05	3	5020-15040	5020-15090	5020-15140
		5	5020-15039	5020-15089	5020-15139
	0.075	3	5020-15190	5020-15240	5020-15290
		5	5020-15189	5020-15239	5020-15289
	0.1	3	5020-15340	5020-15390	5020-15440
		5	5020-15339	5020-15389	5020-15439
	0.2	3	5020-15490	5020-15540	5020-15590
		5	5020-15489	5020-15539	5020-15589
	0.3	3	5020-11541	5020-11591	–
		5	5020-11540	5020-11590	–
	0.5	3	5020-11641	5020-11691	–
		5	5020-11640	5020-11690	–
	0.7	3	5020-11741	5020-11791	–
		5	5020-11740	5020-11790	–
Inertsil HILIC	0.05	3	5020-15025	5020-15075	5020-15125
		5	5020-15024	5020-15074	5020-15124
	0.075	3	5020-15175	5020-15225	5020-15275
		5	5020-15174	5020-15224	5020-15274
	0.1	3	5020-15325	5020-15375	5020-15425
		5	5020-15324	5020-15374	5020-15424
	0.2	3	5020-15475	5020-15525	5020-15575
		5	5020-15474	5020-15524	5020-15574
	0.3	3	5020-11525	5020-11575	–
		5	5020-11524	5020-11574	–
	0.5	3	5020-11625	5020-11675	–
		5	5020-11624	5020-11674	–
	0.7	3	5020-11725	5020-11775	–
		5	5020-11724	5020-11774	–
InertSustain NH2	0.05	3	5020-16791	5020-16792	5020-16793
		5	5020-16690	5020-16691	5020-16692
	0.075	3	5020-16794	5020-16795	5020-16796
		5	5020-16693	5020-16694	5020-16695
	0.1	3	5020-16797	5020-16798	5020-16799
		5	5020-16696	5020-16697	5020-16698
	0.2	3	5020-16800	5020-16801	5020-16802
		5	5020-16699	5020-16700	5020-16701
	0.3	3	5020-16784	5020-16785	–
		5	5020-16682	5020-16683	–
	0.5	3	5020-16786	5020-16787	–
		5	5020-16684	5020-16685	–
	0.7	3	5020-16788	5020-16789	–
		5	5020-16686	5020-16687	–
Inertsil NH2	0.05	3	5020-15021	5020-15071	5020-15121
		5	5020-15020	5020-15070	5020-15120
	0.075	3	5020-15171	5020-15221	5020-15271
		5	5020-15170	5020-15220	5020-15270
	0.1	3	5020-15321	5020-15371	5020-15421
		5	5020-15320	5020-15370	5020-15420
	0.2	3	5020-15471	5020-15521	5020-15571
		5	5020-15470	5020-15520	5020-15570
	0.3	3	5020-11521	5020-11571	–
		5	5020-11520	5020-11570	–
	0.5	3	5020-11621	5020-11671	–
		5	5020-11620	5020-11670	–
	0.7	3	5020-11721	5020-11771	–
		5	5020-11720	5020-11770	–

* End-fittings are Valco 1/16" (10-32 UNF).
* Valco 1/32" (6-40 UNF) end-fittings can also be arranged upon request, indicate "1/32" when ordering.
* The maximum operating pressure of 0.05 to 0.2 mm I.D. columns are 15 MPa, 150 Bar.
* The maximum operating pressure of 0.3 to 0.7 mm I.D. columns are 20 MPa, 200 Bar.

Phase	I.D. (mm)	Particle Size (μm)	Length 50 mm	Length 150 mm	Length 250 mm
			Cat.No.	Cat.No.	Cat.No.
Inertsil CN-3	0.05	3	5020-15019	5020-15069	5020-15119
		5	5020-15018	5020-15068	5020-15118
	0.075	3	5020-15169	5020-15219	5020-15269
		5	5020-15168	5020-15218	5020-15268
	0.1	3	5020-15319	5020-15369	5020-15419
		5	5020-15318	5020-15368	5020-15418
	0.2	3	5020-15469	5020-15519	5020-15569
		5	5020-15468	5020-15518	5020-15568
	0.3	3	5020-11519	5020-11569	–
		5	5020-11518	5020-11568	–
	0.5	3	5020-11619	5020-11669	–
		5	5020-11618	5020-11668	–
	0.7	3	5020-11719	5020-11769	–
		5	5020-11718	5020-11768	–
Inertsil Diol	0.05	3	5020-15023	5020-15073	5020-15123
		5	5020-15022	5020-15072	5020-15122
	0.075	3	5020-15173	5020-15223	5020-15273
		5	5020-15172	5020-15222	5020-15272
	0.1	3	5020-15323	5020-15373	5020-15423
		5	5020-15322	5020-15372	5020-15422
	0.2	3	5020-15473	5020-15523	5020-15573
		5	5020-15472	5020-15522	5020-15572
	0.3	3	5020-11523	5020-11573	–
		5	5020-11522	5020-11572	–
	0.5	3	5020-11623	5020-11673	–
		5	5020-11622	5020-11672	–
	0.7	3	5020-11723	5020-11773	–
		5	5020-11722	5020-11772	–
Inertsil SIL-100A	0.05	3	5020-15027	5020-15077	5020-15127
		5	5020-15026	5020-15076	5020-15126
	0.075	3	5020-15177	5020-15227	5020-15277
		5	5020-15176	5020-15226	5020-15276
	0.1	3	5020-15327	5020-15377	5020-15427
		5	5020-15326	5020-15376	5020-15426
	0.2	3	5020-15477	5020-15527	5020-15577
		5	5020-15476	5020-15526	5020-15576
	0.3	3	5020-11527	5020-11577	–
		5	5020-11526	5020-11576	–
	0.5	3	5020-11627	5020-11677	–
		5	5020-11626	5020-11676	–
	0.7	3	5020-11727	5020-11777	–
		5	5020-11726	5020-11776	–
Inertsil AX	0.05	5	5020-15033	5020-15083	5020-15133
	0.075	5	5020-15183	5020-15233	5020-15283
	0.1	5	5020-15333	5020-15383	5020-15433
	0.2	5	5020-15483	5020-15533	5020-15583
	0.3	5	5020-11533	5020-11583	–
	0.5	5	5020-11633	5020-11683	–
	0.7	5	5020-11733	5020-11783	–
Inertsil CX	0.05	5	5020-15034	5020-15084	5020-15134
	0.075	5	5020-15184	5020-15234	5020-15284
	0.1	5	5020-15334	5020-15384	5020-15434
	0.2	5	5020-15484	5020-15534	5020-15584
	0.3	5	5020-11534	5020-11584	–
	0.5	5	5020-11634	5020-11684	–
	0.7	5	5020-11734	5020-11784	–
Titansphere TiO	0.3	5	5020-11537	5020-11587	–
	0.5	5	5020-11637	5020-11687	–
	0.7	5	5020-11737	5020-11787	–

* End-fittings are Valco 1/16" (10-32 UNF).
* Valco 1/32" (6-40 UNF) end-fittings can also be arranged upon request, indicate "1/32" when ordering.
* The maximum operating pressure of 0.05 to 0.2 mm I.D. columns are 15 MPa, 150 Bar.
* The maximum operating pressure of 0.3 to 0.7 mm I.D. columns are 20 MPa, 200 Bar.

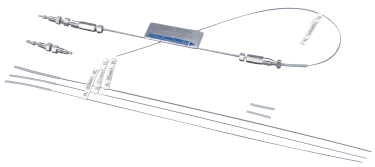
Connection Kits for Totally Porous Particle type Capillary Columns



Connection Kit for Capillary EX Columns
(Top Image: Installed view, Bottom Image: Contents of Kit)

Connection Kit for Capillary EX Columns (0.3, 0.5, 0.7 I.D. mm)

Contents of Kit	Cat.No.
·Column Coupler ·40 × 0.1 mm I.D. 1/16" O.D.Tubing (Both ends with male nuts including PEEK ferrules)	5020-01880
·Capillary Tubing Connector ·500 × 0.075 mm I.D. 0.375 mm O.D. Tubing (Male nut, PEEK ferrule, 1/16" O.D. PTFE with sleeve)	
·PTFE Tubing 20 mm 2 pcs 1/16" O.D. (O.D. 0.375 mm Connection for Capillary Tubing)	

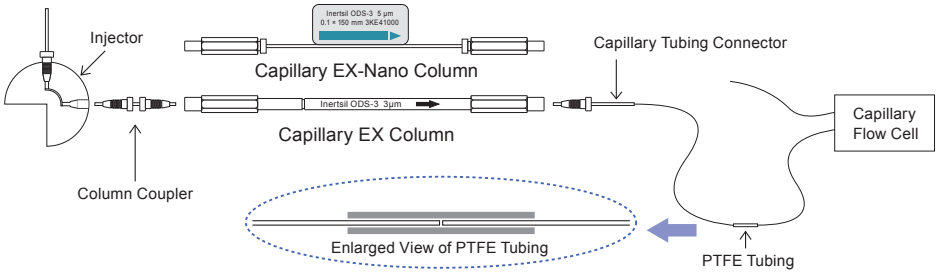


Connection Kit for Capillary EX-Nano Columns
(Top Image: Installed view, Bottom Image: Contents of Kit)

Connection Kit for Capillary EX-Nano Columns (0.05, 0.075, 0.1, 0.2 I.D. mm)

Contents of Kit	Cat.No.
·Column Coupler ·40 × 0.05 mm I.D. 1/16" O.D. Tubing (Both ends with male nuts including PEEK ferrules)	5020-01881
·Capillary Tubing Connector ·300 × 0.05 mm I.D. 0.375 mm O.D. Tubing ·300 × 0.03 mm I.D. 0.375 mm O.D. Tubing ·300 × 0.02 mm I.D. 0.375 mm O.D. Tubing (Male nut, PEEK ferrule, 1/16" O.D. PTFE with sleeve)	
·PTFE Tubing 20 mm 2 pcs 1/16" O.D. (O.D. 0.375 mm Connection for Capillary Tubing)	

How To Connect



Totally Porous Particle type Capillary Micro Guard Columns

Capillary EX Micro Guard Columns

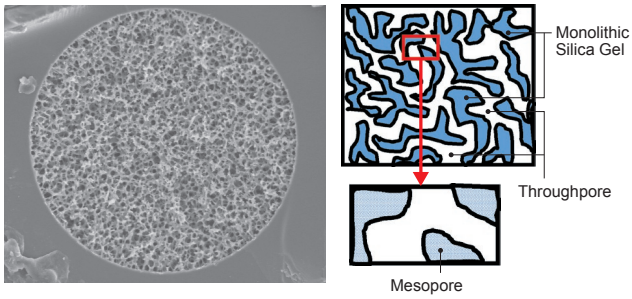
Capillary EX Micro Guard columns are available in 2 mm length which are ideal for the use of sample preconcentration and sample cleanup. Non-metal hardwares are also available to eliminate metal contamination from the column hardware.

Phase	I.D. (mm)	Particle Size (µm)	Length (mm)	Wetted Part	
				Metal	Non-Metal
				Cat.No.	Cat.No.
InertSustain C18	0.3	3	2	5020-11847	–
		5	2	5020-11846	5020-11896
Inertsil ODS-4	0.3	3	2	5020-11802	–
		5	2	5020-11801	5020-11851
Inertsil ODS-3	0.3	3	2	5020-11805	–
		5	2	5020-11803	5020-11853
Inertsil ODS-SP	0.3	3	2	5020-11807	–
		5	2	5020-11806	5020-11856
Inertsil ODS-P	0.3	3	2	5020-11809	–
		5	2	5020-11808	5020-11858
Inertsil ODS-EP	0.3	5	2	5020-11810	5020-11860
InertSustain C8	0.3	3	2	5020-16190	–
		5	2	5020-16088	5020-16089
Inertsil C8-4	0.3	3	2	5020-11836	–
		5	2	5020-11835	5020-11885
Inertsil C8-3	0.3	3	2	5020-11815	–
		5	2	5020-11814	5020-11864
Inertsil WP300 C18	0.3	5	2	5020-11828	5020-11878
Inertsil WP300 C8	0.3	5	2	5020-11829	5020-11879
Inertsil WP300 C4	0.3	5	2	5020-11830	5020-11880
InertSustain Phenyl	0.3	3	2	5020-16490	–
		5	2	5020-16388	5020-16389
Inertsil Ph-3	0.3	3	2	5020-11817	–
		5	2	5020-11816	5020-11866
Inertsil WP300 C18	0.3	5	2	5020-11828	5020-11878
Inertsil WP300 C8	0.3	5	2	5020-11829	5020-11879
Inertsil WP300 C4	0.3	5	2	5020-11830	5020-11880
Inertsil Amide	0.3	3	2	5020-11849	–
		5	2	5020-11848	5020-11897
Inertsil HILIC	0.3	3	2	5020-11825	–
		5	2	5020-11824	5020-11874
InertSustain NH2	0.3	3	2	5020-16790	–
		5	2	5020-16688	5020-16689
Inertsil NH2	0.3	3	2	5020-11821	–
		5	2	5020-11820	5020-11870
Inertsil CN-3	0.3	3	2	5020-11819	–
		5	2	5020-11818	5020-11868
Inertsil Diol	0.3	3	2	5020-11823	–
		5	2	5020-11822	5020-11872
Inertsil SIL 100A	0.3	3	2	5020-11827	–
		5	2	5020-11826	5020-11876
Inertsil AX	0.3	5	2	5020-11833	5020-11883
Inertsil CX	0.3	5	2	5020-11834	5020-11884
Titanspher TiO	0.3	5	2	5020-11845	5020-11895

* End-fittings are 1/16" Waters-compatible.
* The maximum operating pressure is 20 MPa, 200 Bar.

Monolithic Capillary HPLC Columns
(Available in South Asia, Middle East and Africa only)

MonoCap Series



Structure of Monolithic Silica

GL Sciences' MonoCap series, created synthetically via sol-gel method, and an octadecyl silane chemically bonded, has a very uniform three dimensional structure that shows excellent reproducibility from batch-to-batch. The solid structure of GL Sciences' monolithic silica eliminates the need for frits or filters at the ends of the column, thereby reducing dead volume that might otherwise lead to band broadening or sample recovery. The high porosity of our monolithic silica allows high flow rates to be used without loss of resolutionor creation of high operating pressure. An optimized balance of throughpores and mesopores provides the critically importantcombination of efficiency, separation speed, large volume sample-loading, and small volume sample-recovery.

MonoCap High Resolution provide extremely high efficiency, delivering over 200,000 plates for a 2,000 mm length column. The High Resolution Ultra type deliver over 300,000 plates.
The Fast-flow type is compatible with high flow rate analysis due to its' low flow resistance. In addition, the equilibration time can be minimized further by setting the flow rate high.
MonoCap Nano-flow is a high-density monolithic capillary column offering extremely high sensitivity in LC/MS due to the optimization of mesopore and throughpore sizes.
MonoCap Trap columns have a relatively big throughpore, which are available for on-line preconcentration or desalting of protein and peptide samples prior to HPLC separation with mass spectrometry detection.

Physical Properties of MonoCap Series

Description	Monolithic Silica	Skeleton	Throughpore	Mesopore	Porosity	Bonded Phase	End-capping	Max. Operating Pressure
MonoCap C18 High Resolution 750	High Purity Silica Gel	1 µm	2 µm	15 nm	85 %	Octadecyl Groups	Yes	22 MPa
MonoCap C18 High Resolution 2000		1 µm	2 µm	15 nm	85 %	Octadecyl Groups	Yes	35 MPa
MonoCap C18 High Resolution Ultra 2000		1 µm	2 µm	11 nm	85 %	Octadecyl Groups	Yes	35 MPa
MonoCap C18 Fast-flow		1 µm	2 µm	15 nm	85 %	Octadecyl Groups	Yes	22 MPa
MonoCap C18 Nano-flow		1 µm	1 µm	11 nm	85 %	Octadecyl Groups	Yes	22 MPa
MonoCap C18 WideBore		1 µm	2 µm	11 nm	85 %	Octadecyl Groups	Yes	22 MPa
MonoCap C18 Trap Column		2 µm	5 µm	11 nm	85 %	Octadecyl Groups	Yes	20 MPa
MonoCap Amide		1 µm	2 µm	15 nm	85 %	Carbamoyl Groups	None	22 MPa
MonoCap SCX		2 µm	5 µm	11 nm	85 %	Benzenesulfonyl Groups	None	20 MPa

* Based on monolithic technology, Merck KGaA, Darmstadt, Germany.

End-fittings of MonoCap Monolithic Capillary HPLC Columns

MonoCap C18 High Resolution 750
MonoCap C18 fast-flow
MonoCap Nano-flow
MonoCap C18 WideBore
MonoCap Amide
MonoCap SCX

→

1. Metal Hardwares
   End-fittings are Valco 1/16" (10-32 UNF).
   Valco 1/32" (6-40 UNF) end-fittings can also be arranged upon request, indicate "1/32" when ordering.

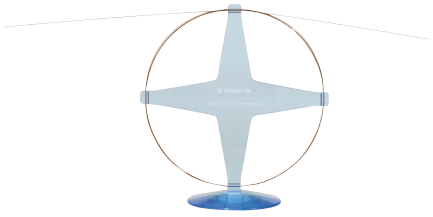
2. PEEK Hardwares
   1/16" male nut, ferrule and PTFE sleeve are included.

MonoCap C18 High Resolution 2000
MonoCap C18 High Resolution Ultra 2000

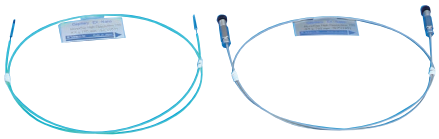
→

End-fittings are not included.
The connection kits shown at page 132 must be purchased separately once.

MonoCap™ C18 High Resolution/MonoCap™ C18 High Resolution Ultra



MonoCap High Resolution 2000

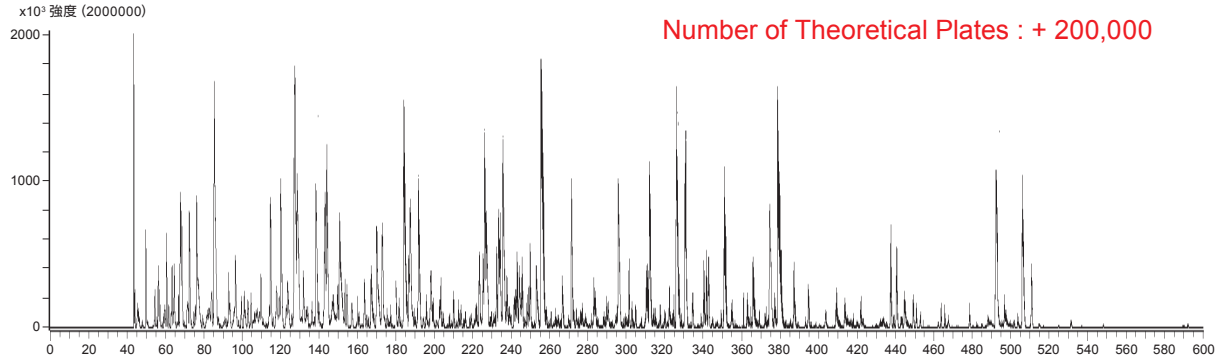


PEEK Metal

MonoCap High Resolution 750

Maximizing all the benefits and advantages of monolithic technology, MonoCap High Resolution and High Resolution Ultra are appropriate for the efficient separation of peptides and protein digests.
MonoCap High Resolution 750 deliver over 60,000 plates, while 2000 deliver over 300,000 plates.
The newly-introduced High Resolution Ultra type deliver over 300,000 plates.

Figure 1 : Analysis of Tryptic Digests



Conditions

Column : MonoCap C18 High Resolution 2000 (2000 mm × 0.1 mm I.D)
Trap column : MonoCap C18 Trap Column (50 mm × 0.075 mm I.D.)
Eluent : A) 0.1 % HCOOH in CH_3CN
B) 0.1 % HCOOH in H_2O
A/B = 10/90 - 600 min - 45/55, v/v

Flow Rate : 0.5 µL/min
Injection Vol : 5 µL
Detection : MS (TIC m/z 500 - 1500)
Sample : Tryptic digest of proteins

MonoCap™ C18 High Resolution Ultra 2000

I.D.(mm)	Length(mm)	Cat.No.
0.1	2000	5020-10018

* A column stand is included.
* End-fittings are not included.
* The connection kits shown at page 132 must be purchased separately once.

MonoCap™ C18 High Resolution 2000

I.D.(mm)	Length(mm)	Cat.No.
0.1	2000	5020-10015

* A column stand is included.
* End-fittings are not included.
* The connection kits shown at page 132 must be purchased separately once.

MonoCap™ C18 High Resolution 750

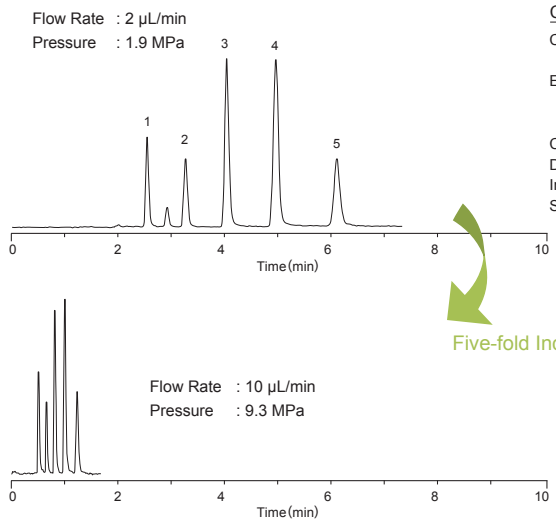
I.D.(mm)	Length(mm)	Material of Hardware	Cat.No.
0.2	750	Metal	5020-10123
		PEEK	5020-10023

* For end-fittings information, please refer to page 128.
* For maximum operating pressure information, please refer to page 128.

Monolithic Capillary HPLC Columns
(Available in South Asia, Middle East and Africa only)

MonoCap™ C18 Fast-flow

Figure 1 : Workable at High Flow Rates without Sacrificing Efficiency



Conditions

Column : MonoCap C18 for Fast-flow (150 × 0.2 mm I.D.)
Eluent : A) CH_3CN
B) H_2O
A/B = 50/50, v/v
Col. Temp. : Ambient
Detection : UV 210 nm (MU701, Cell Volume 18 nL)
Injection Vol. : 0.5 µL
Sample : 1. Thiourea
2. Acetophenone
3. Benzene
4. Toluene
5. Naphthalene

Workable at a broad range of linear velocity from 0.5 to 5 mm/s without sacrificing efficiency and separation at high speed. The number of theoretical plates produced by MonoCap C18 Fast-flow is nearly equivalent to a totally porous particle type capillary column packed with a 5 µm packing material. Columns are protected by either metal or PEEK hardwares.

PEEK

Metal

I.D.(mm)	Length(mm)	50	150	250
	Material of Hardware	Cat.No.	Cat.No.	Cat.No.
0.05	Metal	5020-10102	5020-10101	5020-10100
	PEEK*	5020-10002	5020-10001	5020-10000
0.075	Metal	5020-10211	5020-10212	5020-10213
	PEEK*	5020-10221	5020-10222	5020-10223
0.1	Metal	5020-10112	5020-10111	5020-10110
	PEEK*	5020-10012	5020-10011	5020-10010
0.2	Metal	5020-10122	5020-10121	5020-10120
	PEEK*	5020-10022	5020-10021	5020-10020

* For end-fittings information, please refer to page 128.
* For maximum operating pressure information, please refer to page 128.
* All 50 mm length PEEK columns does not come with a hardware and will be supplied with 3 pcs of columns only.

MonoCap™ C18 Nano-flow

MonoCap C18 Nano-flow produces higher number of theoretical plates compared to a totally porous particle type capillary column packed with a 3 µm packing material. It can be operated at a wide range of flow rate with low back pressure and achieve very high sensitive results in Nano-LC-ESI/MS applictions. Columns are protected by either metal or PEEK hardwares.

I.D.(mm)	Length(mm)	50	150
	Material of Hardware	Cat.No.	Cat.No.
0.05	Metal	5020-10143	5020-10141
	PEEK*	5020-10043	5020-10041
0.075	Metal	5020-10231	5020-10232
	PEEK*	5020-10241	5020-10242
0.1	Metal	5020-10153	5020-10151
	PEEK*	5020-10053	5020-10051
0.2	Metal	5020-10163	5020-10161
	PEEK*	5020-10063	5020-10061

* For end-fittings information, please refer to page 128.
* For maximum operating pressure information, please refer to page 128.
* All 50 mm length PEEK columns does not come with a hardware and will be supplied with 3 pcs of columns only.

MonoCap™ C18 WideBore

The MonoCap C18 Fast-flow is also available in 0.5 mm I.D. size, which can be used at a wide range of flow rate from 6 to 100 µL/min without sacrificing efficiency. The number of theoretical plates produced by MonoCap C18 WideBore is nearly equivalent to a totally porous particle type capillary column packed with a 5 µm packing material. Columns are protected by metal hardwares.

I.D.(mm)	Length(mm)	50	150	250
	Material of Hardware	Cat.No.	Cat.No.	Cat.No.
0.5	Metal	5020-10202	5020-10201	5020-10200

* For end-fittings information, please refer to page 128.
* For maximum operating pressure information, please refer to page 128.

MonoCap™ C18 Trap Column

MonoCap C18 Trap Column with Hardware
(Top Image: 1/16" End-fittings, Bottom Image: 1/32" End-fittings)

MonoCap Trap columns have a relatively big throughpore and workable at a high flow rate such as 10 µL/min. This benefit makes MonoCap Trap columns to be appropriate for on-line preconcentration or desalting of protein and peptide samples prior to HPLC separation with mass spectrometry detection.
End-fittings are 1/16" (10-32 UNF). 1/32" end-fittings are also available upon request.

I.D.(mm)	Length(mm)	50	100	150
	Hardware	Cat.No.	Cat.No.	Cat.No.
0.05	With Hardware	5020-10026	5020-10038	–
	Without Hardware	5020-10027	5020-10039	
0.075	With Hardware	5020-10028	5020-10036	
	Without Hardware	5020-10029	5020-10037	
0.2	With Hardware	5020-10033	–	
	Without Hardware	5020-10034		5020-10031

MonoCap™ Amide

Amide groups are chemically bonded to the monolithic silica and makes it suitable for the analysis of sugars via HILIC mode. As the back pressure is significantly low, a 500 mm length MonoCap Amide column deliver over 40,000 plates offering high efficiency. Generally, HILIC mode uses acetonitrile at a concentration between 65-95 % in an aqueous buffer such as ammonium acetate or ammonium formate, which have high solubility in organic solvents. Columns are protected by either metal or PEEK hardwares.

I.D.(mm)	Length(mm)	150	250	500
	Hardware	Cat.No.	Cat.No.	Cat.No.
0.075	Metal	5020-10191	5020-10192	5020-10193
	PEEK	5020-10091	5020-10092	5020-10093
0.1	Metal	5020-10181	5020-10182	5020-10183
	PEEK	5020-10081	5020-10082	5020-10083
0.2	Metal	5020-10171	5020-10172	5020-10173
	PEEK	5020-10071	5020-10072	5020-10073

* For end-fittings information, please refer to page 128.
* For maximum operating pressure information, please refer to page 128.

MonoCap™ SCX

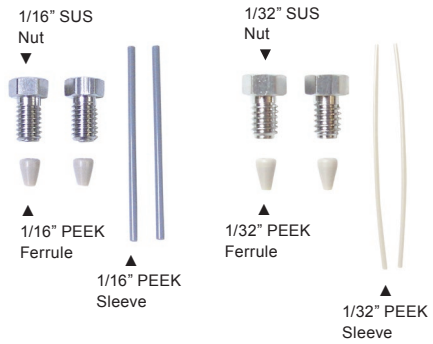
MonoCap SCX is bonded with benzene sulfonic acid groups (strong cation exchange) and appropriate for 2D LC applications for the separation of biomolecules such as peptides and proteins.

I.D.(mm)	Length(mm)	50	150	250	500
	Material of Hardware	Cat.No.	Cat.No.	Cat.No.	Cat.No.
0.2	Metal	5020-10174	5020-10175	5020-10176	5020-10177
	PEEK	5020-10074	5020-10075	5020-10076	5020-10077

* For end-fittings information, please refer to page 128.
* For maximum operating pressure information, please refer to page 128.

Consumables and Accessories for Monolithic Capillary HPLC Columns

Connection Kit for MonoCap™ C18 High Resolution



Connection Kit for MonoCap™ C18 High Resolution 2000

A dedicated connection kit for MonoCap C18 High Resolution 2000.
Use this connection kit when connecting the column directly to the system.

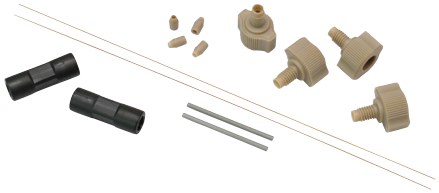
Description	Contents of Kit	Cat.No.
Connection Kit for MonoCap C18 High Resolution 2000	1/16" PEEK Ferrule, SUS Nut, Sleeve 2 pcs each 1/32" PEEK Ferrule, SUS Nut, Sleeve 2 pcs each	5020-10017

Zero Dead Volume Union

Connect the tubing from the system to this union and install the column to achieve zero dead volume.

Description	P/N	Orifice	Remarks	Cat.No.
Zero Dead Volume Union	U-435	0.25 mm	1/16"Tubing SUS Male Nut, Ferrule 2 pcs each	6010-72352
	U-411	178 µm		6010-72351

Connection Kit for MonoCap™ C18 Trap Column

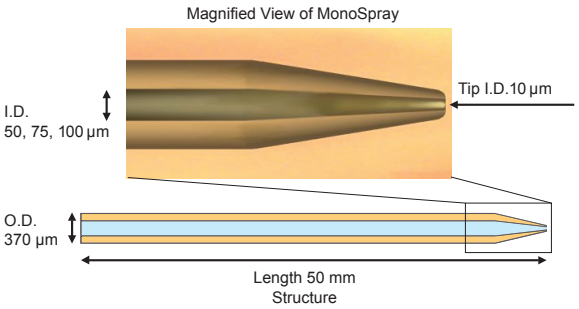


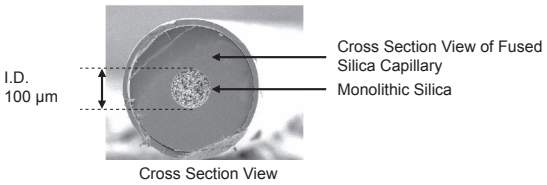
MonoCap C18 Trap Column Connection Kit 1/16"

Description	Cat.No.
MonoCap C18 Trap Column Connection Kit 1/16" (Union·Sleeve·Capillary Tubing 2 pcs each Nut·Ferrule4 pcs each)	5020-10044
MonoCap C18 Trap Column Connection Kit 1/32" (Union·Sleeve·Capillary Tubing 2 pcs each Nut·Ferrule4 pcs each)	5020-10045
MonoCap C18 Trap Column Assembly Parts 1/16" (Nut·Ferrule4 pcs each)	5020-10046
MonoCap C18 Trap Column Assembly Parts 1/32" (Nut·Ferrule4 pcs each)	5020-10047

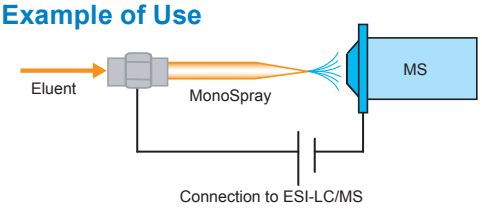
MonoSpray™

MonoSpray is an electrospray emitter for ESI-LC/MS which a monolithic packing is packed into a fused silica sprayer offering numbers of benefits compared to those traditional sprayers packed with particle based packings.





Example of Use



- **Benefits**

High Sensitivity Analysis

The introduction of a monolithic packing into the sprayer deliver minimized sample diffusion resulting in high sensitivity.

High Chemical Stability

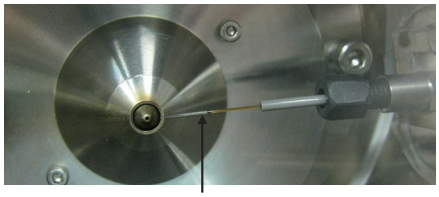
The optimized surface treatment to the silica monolith eliminates non-specific adsorption issues.

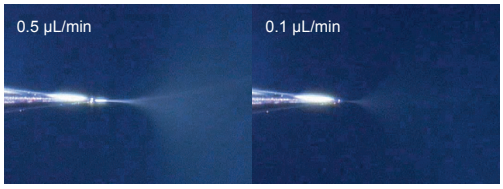
High Physical Stability

Frits are not installed in MonoSpray to keep the monolithic packing in place, which results in offering simply longer lifetime and avoiding bed splitting problems compared to those traditional sprayers packed with particle based packings.

Wide Range of Operational Flow Rates

The very high porosity of monolithic packing allows a wide range of operational flow rates, even at high flow rates.





Change in Spray Shape at Different Flow Rates

- **Ordering Information**

MonoSpray™ FS

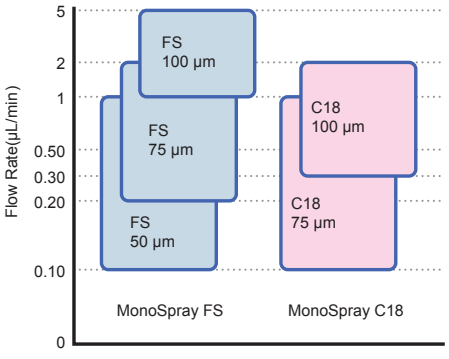
For online Nano-ESI-LC/MS.

I.D. : 50, 75, 100 µm

MonoSpray™ C18

Nano sprayer packed with octadecylated silica monolith offering reversed phased separation.

I.D. : 75 ,100 µm



Optimal Flow Rate against Each Column I.D. Size

MonoSpray™ FS

Description	Length (mm)	O.D. (µm)	I.D. (µm)	Qty (pcs)	Cat.No.
Mono Spray FS	50	370	50	5	5010-20001
				20	5010-20006
			75	5	5010-20002
				20	5010-20007
			100	5	5010-20003
				20	5010-20008

* Please inquire for other sizes.

MonoSpray™ C18

Description	Length (mm)	O.D. (µm)	I.D. (µm)	Qty (pcs)	Cat.No.
Mono Spray C18 Nano	50	370	75	1	5010-20012
				4	5010-20017
			100	1	5010-20013
				4	5010-20018

* Please inquire for other sizes.

Based on monolithic technology, Merck KGaA, Darmstadt, Germany.

Capillary EX-Nano
Inertsil ODS-3 3um
0.2 x 150 mm 6BI99042
GL Sciences Inc.
Made in Japan
Capillary EX-Nano
Inertsil ODS-3 3um
0.05 x 50 mm 5MI50251
GL Sciences Inc.
Made in Japan

Applications

- Visit our website 136
- Pharmacopeia 137
- Pharmaceuticals 138
- Biochemicals 139
- Foods 140
- Environmental 142
- Pesticides 143
- Vitamins 144
- Others 145

Applications

Visit our website

Provided a number of applications in various fields on our website.
Please visit our website.

http://www.gls.co.jp/

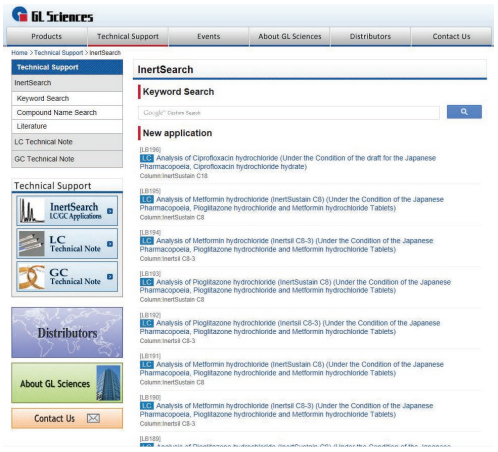
Top of our website

Click here

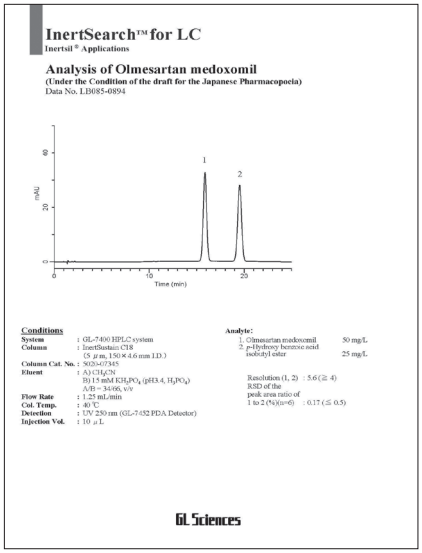
InertSearch

http://www.glsciences.com/tech/inertsearch/

Various HPLC applications are available.



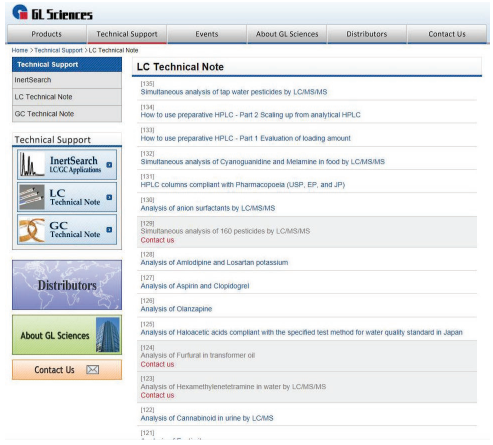
The latest application is uploaded.

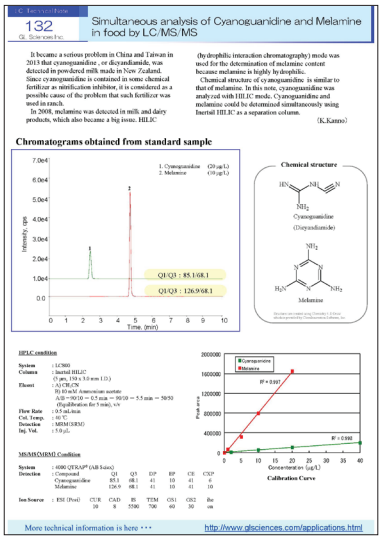


LC Technical Note

http://www.glsciences.com/tech/lc_technicalnote/

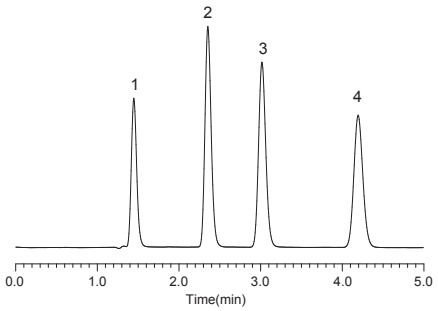
More detailed applications are available.





Pharmacopeia

Para-Hydroxybenzonate (JP)

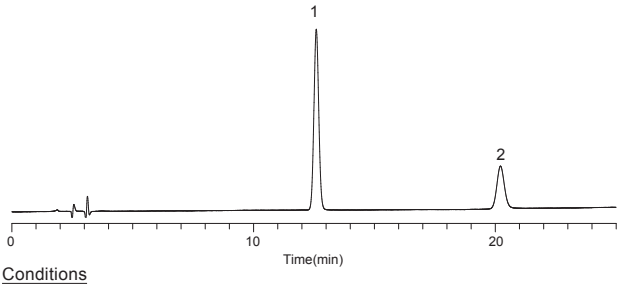


Conditions

Column	: Inertsil ODS-4(5 µm, 150 × 4.6 mm I.D.)
Eluent	: A) CH_3OH
	B) 50 mM KH_2PO_4
	A/B = 13/7, v/v
Flow Rate	: 1.3 mL/min
Col. Temp.	: 35 °C
Detection	: UV 272 nm
Injection Vol.	: 10 µL
Data Source	: LC InertSearch No. LB097, LB098

Sample :
1. *p*-Hydroxybenzoic acid
2. *p*-Hydroxybenzoic acid methyl ester
3. *p*-Hydroxybenzoic acid ethyl ester
4. *p*-Hydroxybenzoic acid *n*-propyl ester

Crospovidone (JP)

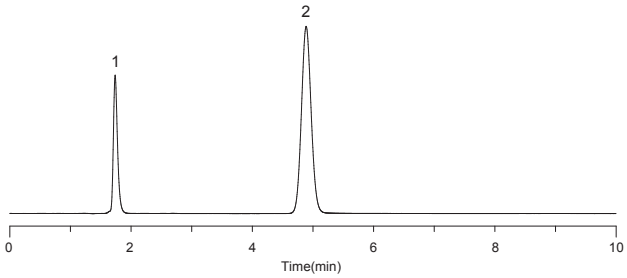


Conditions

Column	: InertSustain C18 (5 µm, 250 × 4.0 mm I.D.)
Guard Column	: InertSustain C18 (5 µm, 25 × 4.0 mm I.D.)
Eluent	: A) CH_3CN
	B) H_2O
	A/B = 1/9, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 235 nm
Injection Vol.	: 50 µL
Data Source	: LC InertSearch No. LB167

Sample :
1. 1-Vinyl-2-pyrrolidone
2. Vinyl acetate

Losartan potassium and Hydrochlorothiazide (USP)

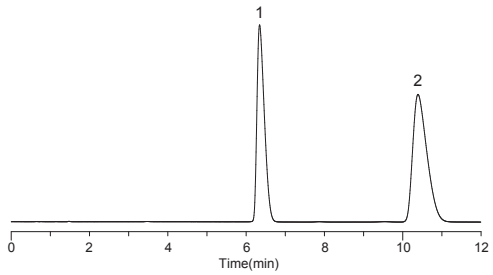


Conditions

Column	: Inertsil C8-3 (10 µm, 250 × 4.6 mm I.D.)
Eluent	: A) CH_3CN
	B) 10 mM KH_2PO_4 in H_2O (pH 2.5, H_3PO_4)
	A/B = 40/60, v/v
Flow Rate	: 2.3 mL/min
Col. Temp.	: 35 °C
Detection	: UV 230 nm
Injection Vol.	: 20 µL
Data Source	: LC InertSearch No. LB200

Sample :
1. Hydrochlorothiazide (14 mg/L)
2. Losartan potassium (55 mg/L)

Carumonam Sodium (JP)

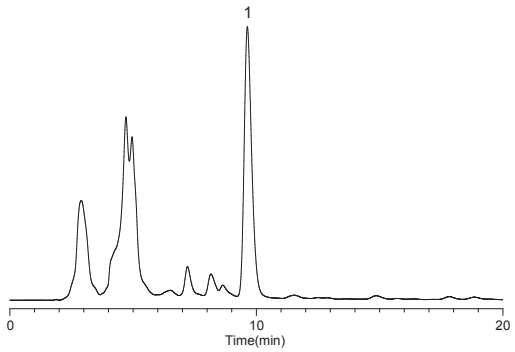


Conditions

Column	: Inertsil ODS-2 (5 µm, 150 × 4.0 mm I.D.)
Eluent	: A) 0.1 g/L $(NH_4)_2SO_4$
	B) CH_3OH
	C) CH_3COOH
	A/B = 97/2/1, v/v/v
Flow Rate	: 1.4 mL/min
Col. Temp.	: 25 °C
Detection	: UV 254 nm
Injection Vol.	: 10 µL
Data Source	: LC InertSearch No. LA994

Sample :
1. Resorcinol (1.8 mg/L)
2. Carumonam sodium (0.4 mg/L)

Glycyrrhetinic acid in Glycyrrhiza (JP)

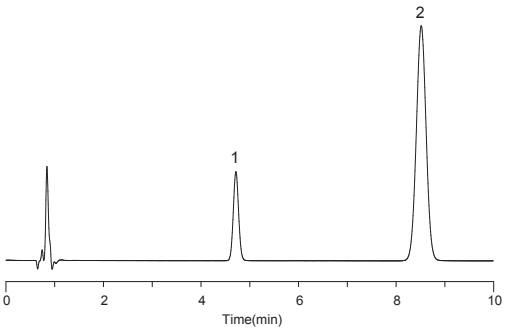


Conditions

Column	: InertSustain C18(5 µm, 150 × 4.6 mm I.D.)
Eluent	: A) CH_3CN
	B) 2.1 % CH_3COOH in H_2O
	A/B = 40/60, v/v
Flow Rate	: 0.45 mL/min
Col. Temp.	: 20 °C
Detection	: UV 254 nm
Injection Vol.	: 20 µL
Data Source	: LC InertSearch No. LB182

Sample :
1. Glycyrrhizic acid

Terbinafine Hydrochloride Cream (JP)



Conditions

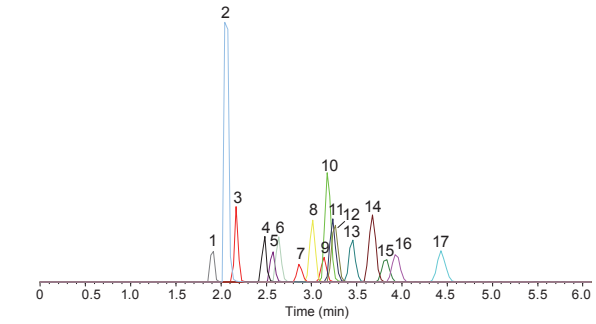
Column	: InertSustainSwift C18 (5 µm, 125 × 4.0 mm I.D.)
Eluent	: A) CH_3CN
	B) 0.45 % Tetramethylammonium hydroxide in H_2O
	(pH 8.0, 4 % H_3PO_4 in H_2O)
	C) THF
	A/B/C = 2/2/1, v/v/v
Flow Rate	: 1.46 mL/min
Col. Temp.	: 25 °C
Detection	: UV 282 nm
Injection Vol.	: 10 µL

Sample :
1. *p*-Terphenyl (17.5 mg/L)
2. Terbinafine hydrochloride (200 mg/L)

Applications

Pharmaceuticals

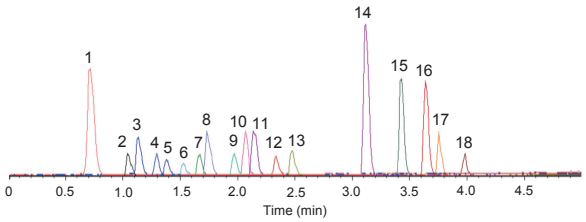
17 Anti-Depressant Drugs



Conditions

Column	: InertSustain C18 HP (3 µm,150 × 2.1 mm I.D.)	Sample :	
Eluent	: A) 0.1 % HCOOH in CH_3CN	1. Sulpiride	10. Imipramine
	B) 0.1 % HCOOH in H_2O	2. Milnacipran	11. Nortriptyline
	A/B = 2/98 - 0.5 min - 40/60	3. Trazodone	12. Maprotiline
	- 5.5 min - 40/60, v/v	4. Mianserin	13. Amitriptyline
Flow Rate	: 0.4 mL/min	5. Amoxapine	14. Trimipramine
Col. Temp.	: 40 °C	6. Doxepin	15. Fluoxetine
Detection	: LC/MS/MS (4000 QTRAP : ESI, Positive, MRM)	7. Paroxetine	16. Sertraline
		8. Desipramine	17. Clomipramine
Injection Vol.	: 5 µL	9. Fluvoxamine	(100 ng/mL each)
Data Source	: LC InertSearch No. LA908		

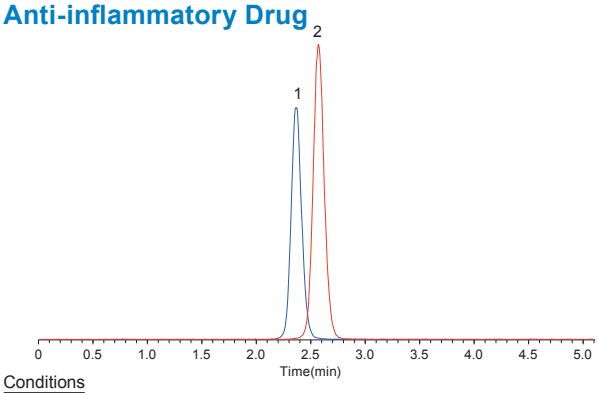
18 Drugs



Conditions

Column	: Inertsil ODS-3 (2 µm, 50 × 2.1 mm I.D)	Sample :	
Eluent	: A) CH_3CN	1. Ranitidine	10. Diphenhydramine
	B) 0.05 % HCOOH in H_2O	2. Scopolamine	11. Doxepin
	A/B = 5/95 - 5 min - 95/5, v/v	3. Naltrexone	12. Amitriptyline
Flow Rate	: 500 µL/min	4. Acetaminophen	13. Reserpine
Col. Temp.	: 40 °C	5. Theophyline	14. Isopropylantipyrine
Detection	: LC/MS/MS (4000 QTRAP : ESI, Positive, MRM)	6. Metoprolol	15. Ketoprofen
		7. Caffeine	16. Warfarin
Injection Vol.	: 10 µL	8. Chlorpheniramine	17. Capsaicin
		9. Propranolol	18. Dihydrocapsaicin

Anti-inflammatory Drug

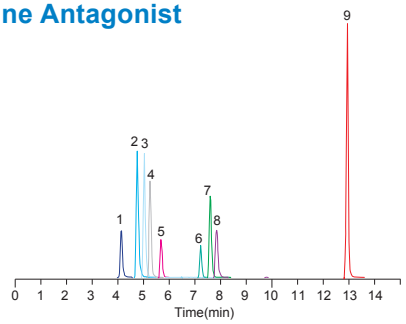


Conditions

Column	: InertSustain Phenyl (2 µm, 50 × 2.1 mm I.D.)
Eluent	: A) CH_3OH/HCOOH = 100/0.05, v/v
	B) H_2O/HCOOH = 100/0.05, v/v
	A/B = 40/60, v/v
Flow Rate	: 0.6 mL/min
Col. Temp.	: 40 °C
Detection	: LC/MS/MS (4000 QTRAP:ESI, Positive, MRM)
Injection Vol.	: 5 µL
Data Source	: LC InertSearch No. LB198

Sample :
1. Hydrocortisone
2. Prednisolone (0.1 mg/L each)

Histamine Antagonist



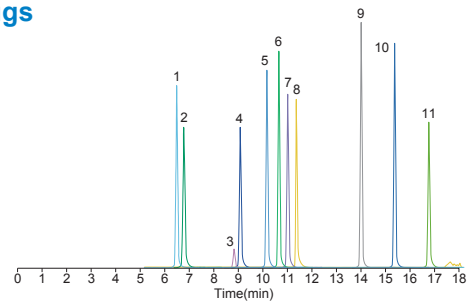
Conditions

Column	: Inertsil ODS-4 (3 µm, 150 × 2.1 mm I.D.)
Eluent	: A) CH_3OH
	B) 2 mM CH_3COONH_4
	A/B = 40/60 - 10 min - 95/5
	- 2 min - 95/5, v/v
Flow Rate	: 0.2 mL/min
Col. Temp.	: 40 °C
Detection	: LC/MS/MS (4000 QTRAP : ESI, Positive, MRM)
Injection Vol.	: 10 µL
Data Source	: LC InertSearch No. LA678

Sample :

1. Chlorpheniramine	6. Diphenylpyraline
2. Cinnarizin	7. Hydroxyzine
3. Clemastine	8. Promethazine
4. Difenidol	9. Triprolidine
5. Diphenhydramine	(0.1 mg/L each)

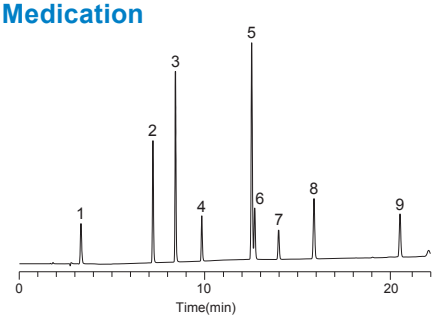
11 Drugs



Conditions

Column	: Inertsil ODS-3 (3 µm, 100 × 2.1 mm I.D.)	Sample :	
Eluent	: A) CH_3CN	1. Sulbutamol	(7.5 µg/L)
	B) 0.1 % HCOOH in H_2O	2. Ranitidine	(15.0 µg/L)
	A/B = 0/100 - 6 min - 10/90	3. Acetaminophen	(15.0 µg/L)
	- 12 min - 100/0, v/v	4. Theophylline	(20.0 µg/L)
Flow Rate	: 0.2 mL/min	5. Metoprolol	(22.5 µg/L)
Col. Temp.	: 40 °C	6. Caffeine	(15.0 µg/L)
Detection	: LC/MS/MS (4000 QTRAP : ESI, Positive, MRM)	7. Propranolol	(12.5 µg/L)
		8. Doxepin	(5.0 µg/L)
Injection Vol.	: 10 µL	9. Carbamazepine	(5.0 µg/L)
Data Source	: LC InertSearch No. LA610	10. Ketoprofen	(15.0 µg/L)
		11. Indomethacin	(20.0 µg/L)

Cold Medication



Conditions

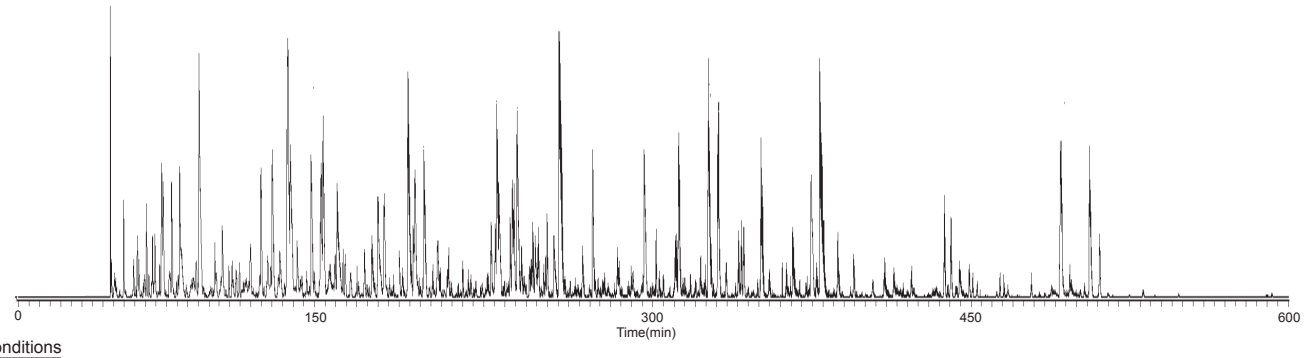
Column	: Inertsil ODS-4 (5 µm, 150 × 4.6 mm I.D.)
Eluent	: A) CH_3CN
	B) 0.1 % H_3PO_4 in H_2O
	A/B = 3/97 - 20 min
	- 75/25, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 210 nm
Injection Vol.	: 10 µL
Data Source	: LC InertSearch No. LA616

Sample :

1. Maleic acid	6. Bromovalerylurea
2. Acetaminophen	7. Apronalide
3. Caffeine	8. Isopropylantipyrine
4. Chlorpheniramine	9. Ibuprofen
5. Ethenzamide	(50 mg/L each)

Biochemicals

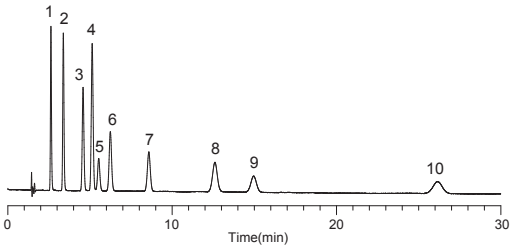
Trypsin Digest of the Protein



Conditions

Column	: MonoCap C18 High Resolution 2000 (2000 mm × 0.1 mm I.D.)	Col. Temp.	: ambient
Trap Column	: MonoCap C18 Trap Column (50 mm × 0.075 mm I.D.)	Detection	: LC/MS/MS (JMS-T100-LC, JEOL, TIC, m/z 500-1500)
Eluetnt	: A) 0.1 % HCOOH in CH_3CN , B) 0.1 % HCOOH in H_2O	Injection Vol.	: 5 µL
	A/B=10/90 - 600 min - 45/55, v/v	Sample	: tryptic digest of proteins
Flow Rate	: 0.5 µL/min		

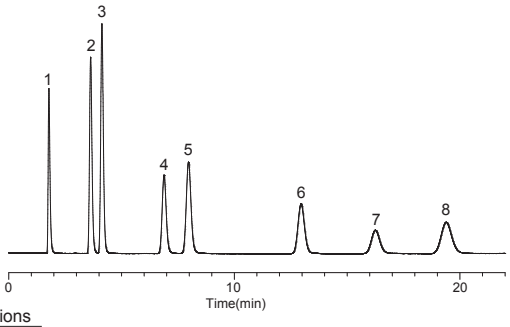
Nucleoside and Nucleic acid base



Conditions

Column	: InertSustain C18 (5 µm, 150 × 4.6 mm I.D.)	Sample :	
Eluent	: 0.1 M NH_2PO_4, 0.2 M $NaClO_4$ (pH 2.03, H_3PO_4)	1. Cytosine	6. Uridine
Flow Rate	: 1.0 mL/min	2. Uracil	7. Thymine
Col. Temp.	: 40 °C	3. Guanine	8. Adenosine
Detection	: UV 260 nm	4. Adenine	9. Guanosine
Injection Vol.	: 1 µL	5. Cytidine	10. Thymidine
Data Source	: LC InertSearch No. LA895		

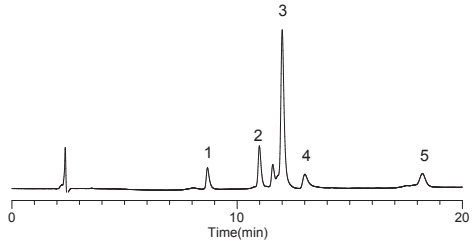
Nucleic acid base



Conditions

Column	: Inertsil Amide (5 µm, 250 × 4.6 mm I.D.)	Sample :
Eluent	: A) CH_3CN	1. Toluene
	B) 10 mM $HCOONH_4$	2. Thymine
	A/B = 90/10, v/v	3. Uracil
Flow Rate	: 0.2 mL/min	4. Uridine
Col. Temp.	: 35 °C	5. Adenosine
Detection	: UV 254 nm	6. Cytosine
Injection Vol.	: 1 µL	7. Cytidine
Data Source	: LC InertSearch No. LB001	8. Guanosine
		(10 mg/L each)

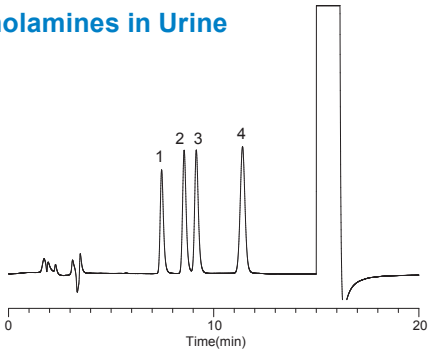
Protein



Conditions

Column	: Inertsil WP300 C18 (5 µm, 150 × 3.0 mm I.D.)	Sample :
Eluent	: A) 0.1 % TFA in CH_3CN	1. Ribonuclease B
	B) 0.1 % TFA in H_2O	2. Cytochrome c
	A/B = 20/80 - 20 min - 70/30, v/v	3. Lysozyme
Flow Rate	: 0.4 mL/min	4. BSA
Col. Temp.	: 40 °C	5. Ovalbumin
Detection	: UV 280 nm	
Injection Vol.	: 10 µL	
Data Source	: LC Technical Note No. 116	

Catecholamines in Urine



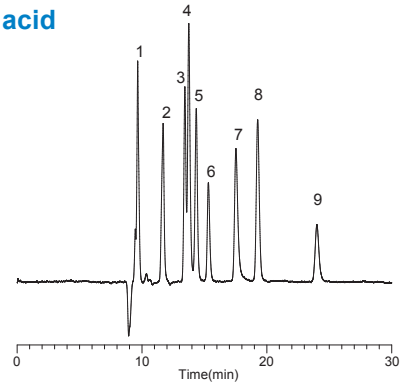
Conditions

Column	: Inertsil ODS-4	Sample :
	(5 µm, 250 × 3.0 mm I.D.)	1. Norepinephrine (NE)
Eluent	: A) Acetate-citrate buffer *	2. Epinephrine (E)
	: B) CH_3CN	3. 3,4-dihydroxybenzylamine (DHBA, I.S.)
	A/B = 100/16, v/v	4. Dopamine (DA)
Flow Rate	: 0.5 mL/min	(100 ng/mL in 0.1 % Acetic acid solution each)
Col. Temp	: 35 °C	* : Acetate-citrate buffer :
Detection	: ECD 800 mV vs. Ag/AgCl	Dissolve 0.82 g of anhydrous sodium acetate, 2.10 g of
Injection Vol.	: 20 µL	citric acid monohydrate and 0.50 g of sodium
Data Source	: LC Technical Note No. 93	1-octanesulfonate in 500mL of H_2O.

Applications

Foods

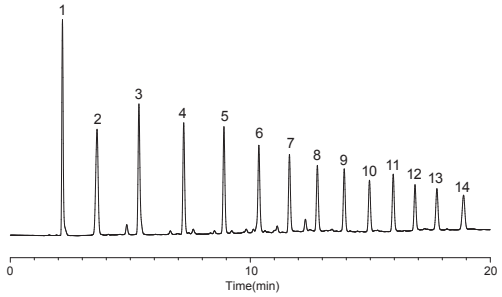
Organic acid



Conditions

Column	: Inertsil Ph-3 (5 µm, 250 × 4.6 mm I.D.) + Inertsil CX (5 µm, 250 × 4.6 mm I.D.)	Sample:	
Eluent	: 3 mM $HClO_4$ in H_2O	1. Phosphoric acid	6. Lactic acid
Reaction Reagent	: 0.1 mM BTB + 30 mM Na_2HPO_4 in H_2O	2. Tartaric acid	7. Acetic acid
Flow Rate	: 0.5 mL/min	3. Malic acid	8. Succinic acid
Col. Temp.	: 35 °C	4. Formic acid	9. Pyroglutamic acid
Detection	: VIS 440 nm	5. Citric acid	(1 mg/mL each)
Injection Vol.	: 10 µL		
Data Source	: LC Technical Note No. 24		

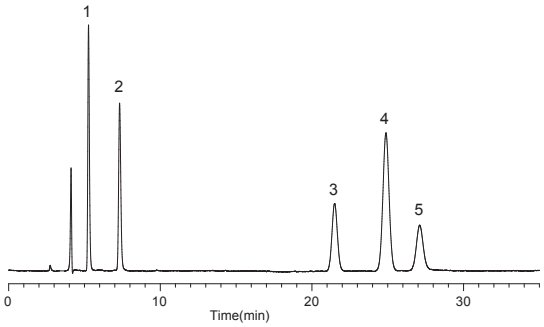
Linear Fatty acids



Conditions

Column	: InertSustain C18 (5 µm, 150 × 4.6 mm I.D)		
Eluent	: A) 0.1 % H_3PO_4 in CH_3CN B) 0.1 % H_3PO_4 in H_2O A/B = 10/90 -15 min - 90/10 -10 min - 90/10, v/v	Sample :	
Flow Rate	: 1.0 mL/min	1. Acetic acid (C2)	9. Capric acid (C10)
Col. Temp.	: 40 °C	2. Propionic acid (C3)	10. Undecanoic acid (C11)
Detection	: UV 210 nm	3. Butyric acid (C4)	11. Lauric acid (C12)
Injection Vol.	: 10 µL	4. Valeric acid (C5)	12. Tridecanoic acid (C13)
Data Source	: LC InertSearch No. LA901	5. Caproic acid (C6)	13. Myristic acid (C14)
		6. Enanthic acid (C7)	14. Pentadecanoic acid (C15)
		7. Caprylic acid (C8)	(1 mg/mL each)
		8. Pelargonic acid (C9)	

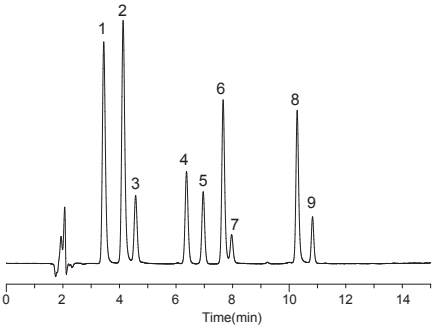
Preservatives and Sweetener



Conditions

Column	: InertSustain Phenyl (5 µm, 250 × 4.6 mm I.D.)	Sample :	
Eluent	: A)CH_3CN B)0.2 % HCOOH in H_2O A/B = 15/85, v/v	1. Acesulfame potassium	
Flow Rate	: 1.0 mL / min	2. Saccharin	
Col. Temp.	: 25 °C	3. Sorbic acid	
Detection	: UV 230 nm	4. Benzoic acid	
Injection Vol.	: 10 µL	5. Dehydroacetic acid	
Data Source	: LC InertSearch No. LB031	(10 mg/L each)	

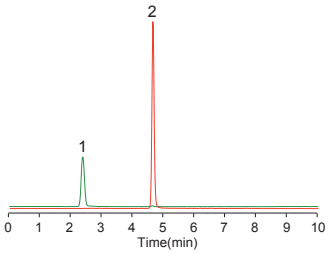
Phenolic Antioxidants



Conditions

Column	: Inertsil Ph-3 (5 µm, 150 × 4.6 mm I.D.)	Sample :	
Eluent	: A) CH_3OH B) CH_3CN C) 5 % Acetic acid A/B/C = 20/20/60 - 15 min - 50/50/0, v/v/v (Mixed by a gradient mixer)	1. Propyl gallate (PG)	
		2. 2,4,5-Trihydroxybutyrophenone (THBP)	
		3. tert-Butylhydroquinone (TBHQ)	
		4. Nordihydroguaiaretic acid (NDGA)	
Flow Rate	: 1.0 mL/min	5. Butylated Hydroxyanisole (BHA)	
Col. Temp.	: 40 °C	6. Octyl gallate (OG)	
Detection	: UV 280 nm	7. 4-Hydroxymethyl-2,6-di-tert-butylphenol (HMBP)	
Injection	: 10 µL	8. Dodecyl gallate (DG)	
Data Source	: LC Technical Note No. 65	9. Butylated hydroxytoluene (BHT) (10 mg/L each)	

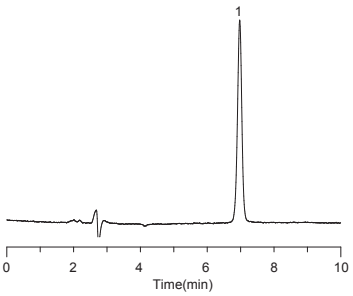
Cyanoguanidine and Melamine in Food



Conditions

Column	: Inertsil HILIC (5 µm, 150 × 3.0 mm I.D.)	Sample :
Eluent	: A) CH_3CN B) 10 mM Ammonium acetate A/B = 90/10 - 0.5 min - 90/10 - 5.5 min - 50/50 , v/v	1. Cyanoguanidine (20 µg/L)
		2. Melamine (10 µg/L)
Flow Rate	: 0.5 mL/min	
Col. Temp.	: 40 °C	
Detection	: LC/MS/MS (4000 QTRAP : ESI, Positive, MRM)	
Injection Vol.	: 5.0 µL	
Data Source	: LC Technical Note No.132	

Oxalic acid in Food

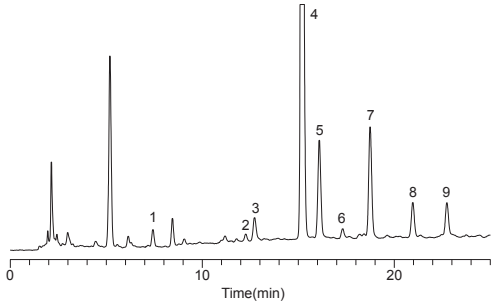


Conditions

Column	: Inertsil Amide (5 µm, 250 × 4.6 mm I.D.)	Sample :
Eluent	: A) CH_3CN B) 30 mM Na_2HPO_4 in H_2O (pH 6.8, H_3PO_4) A/B = 65/35, v/v	1. Oxalic acid (100 mg/L)
Flow Rate	: 1.0 mL/min	
Col. Temp.	: 50 °C	
Detection	: UV 220 nm	
Injection	: 5 µL	
Data Source	: LC Technical Note No.109	

Foods

Canthaxanthin in Tea

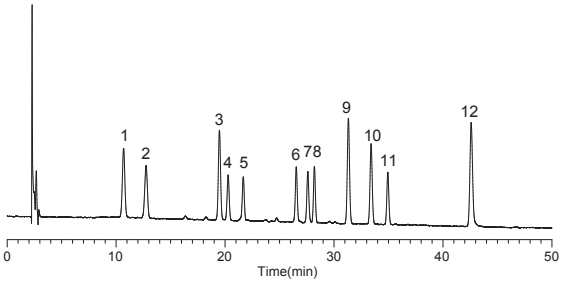


Conditions

Column	: Inertsil ODS-3(4 µm, 150 × 4.6 mm I.D.)
Eluent	: A) CH_3OH B) 10 mM NaH_2PO_4 in H_2O A/B = 10/90 - 30 min - 50/50, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 280 nm
Injection Vol.	: 10 µL
Data Source	: LC InertSearch No. LA684

Sample :
1. Gallocatechin (GC)
2. Epigallocatechin (EGC)
3. Catechin (C)
4. Caffeine
5. Epigallocatechin gallate (EGCg)
6. Epicatechin (EC)
7. Gallocatechin gallate (GCg)
8. Epicatechin gallate (ECg)
9. Catechin gallate (Cg)

Isoflavones



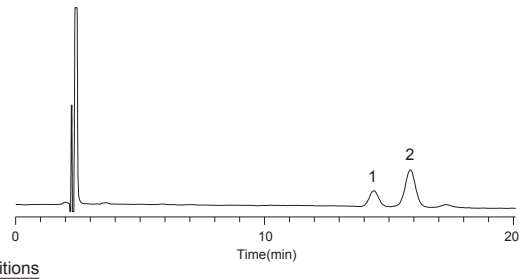
Conditions

Column	: Inertsil ODS-SP (5 µm, 250 × 4.6 mm I.D.)
Eluent	: A) 0.1 % CH_3COOH in CH_3CN B) 0.1 % CH_3COOH in H_2O A/B = 15/85 - 8 min - 15/85 - 42 min - 35/65, v/v
Flow Rate	: 1.5 mL/min
Col. Temp.	: 35 °C
Detection	: PDA 254 nm
Injection	: 10 µL
Data Source	: LC Technical Note No. 66

Sample :
1. Daidzin (D)
2. Glycitin (Gl)
3. Genistin (G)
4. 6"-O-Malonyldaidzin (MD)
5. 6"-O- Malonylglycitin (MGl)
6. 6"-O- Acetyldaidzin (AD)
7. 6"-O- Acetylglycitin (AGl)
8. 6"-O- Malonylgenistin (MG)
9. Daizein (De)
10. Glycitein (Gle)
11. 6"-O- Acetylgenistin (AG)
12. Genistein (Ge)

(10 mg/L each)

Carotene in Food

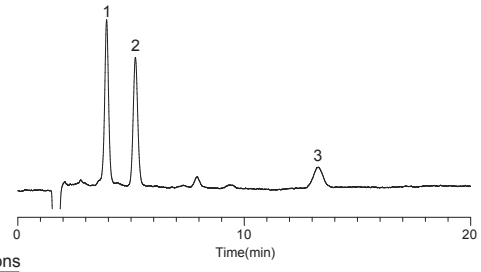


Conditions

Column	: Inertsil ODS-P (5 µm, 250 × 4.6 mm I.D.)
Eluent	: A) CH_3OH B) Ethanol A/B = 90/10, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: VIS 455 nm
Injection Vol.	: 20 µL
Data Source	: LC Technical Note No.28

Sample :
1. α-Carotene
2. β-Carotene

Tetracycline



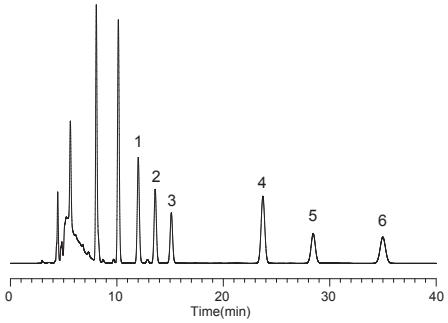
Conditions

Column	: InertSustain C18 (5 µm, 150 × 4.6 mm I.D.)
Eluent	: A) Imidazole buffer* B) CH_3OH A/B = 80/20, v/v (Premix)
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: FL Ex 380 nm Em 520 nm
Injection Vol.	: 20 µL

Sample :
1. Oxytetracycline
2. Tetracycline
3. Chlortetracycline
(1 mg/L each)

* Imidazole buffer :
Dissolve 68.08 g of imidazole, 0.37 g of disodium ethylenediaminetetraacetate and 10.72 g of magnesium acetate in 800 mL of H_2O.
Adjust to pH 7.2 with acetic acid and dilute this solution to 1,000 mL with H_2O.

Putrefactive Non-Volatile Amines in Food by Pre-column HPLC



Conditions

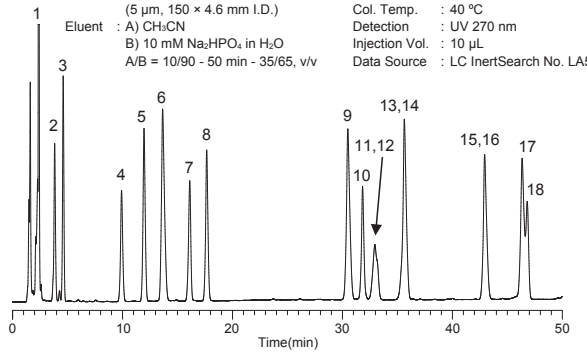
Column	: Inertsil ODS-SP (5 µm, 250 × 4.6 mm I.D.)
Guard Column	: Inertsil ODS-SP (5 µm, 10 × 4.0 mm I.D.)
Eluent	: A) CH_3CN B) H_2O A/B= 65/35, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: FL Ex 325 nm Em 525 nm
Injection	: 10 µL
Data Source	: LC Technical Note No. 48

Sample :
1. Putrescine (5 mg/L)
2. Cadaverine (5 mg/L)
3. Histamine (100 mg/L)
4. 1,8-Diaminooctane (10 mg/L)
5. Tyramine (25 mg/L)
6. Spermidine (5 mg/L)

Food Dyes

Conditions

Column	: Inertsil ODS-3 (5 µm, 150 × 4.6 mm I.D.)
Eluent	: A) CH_3CN B) 10 mM Na_2HPO_4 in H_2O A/B = 10/90 - 50 min - 35/65, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 270 nm
Injection Vol.	: 10 µL
Data Source	: LC InertSearch No. LA509

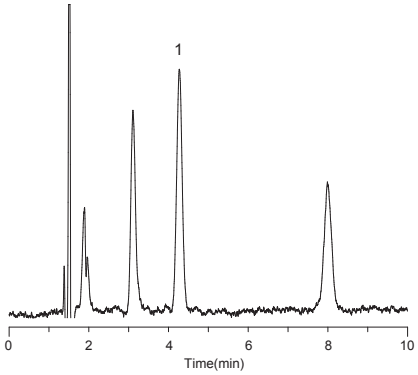


Sample :
1. Tartrazine (Food Yellow No. 4, 7.6 mg/L)
2. Amaranth (Food Red No. 2, 3.8 mg/L)
3. Ingigocarmine (Food Blue No. 2, 7.6 mg/L)
4. New coccine (Food Red No. 102, 3.8 mg/L)
5. Sunset Yellow FCF (Food Yellow No. 5, 5.3 mg/L)
6. Naphthol Yellow S (7.6 mg/L)
7. Uranine (3.8 mg/L)
8. Allura red AC (5.3 mg/L)
9. Ponceau R (7.6 mg/L)
10. Ponceau SX (5.3 mg/L)
11. Orange I (5.3 mg/L)
12. Fast green FCF (Food Green No. 3, 3.0 mg/L)
13. Brilliant blue FCF (Food Blue No. 1, 3.0 mg/L)
14. Ponceau 3R (7.6 mg/L)
15. Erythrosine (Food Red No. 3, 5.3 mg/L)
16. Azure Blue VX (Sulfan blue, 3.0 mg/L)
17. Orange II (7.6 mg/L)
18. Acid red (Food Red No. 106, 3.0 mg/L)

Applications

Environmental

Non-ionic Surfactant

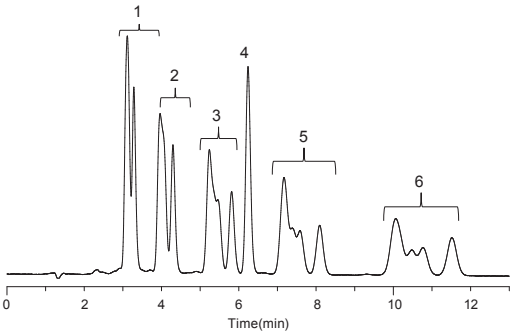


Conditions

Column	: InertSustain C18 (5 µm, 150 × 4.6 mm I.D.)
Eluent	: A) CH_3OH B) 10 mM Na_2B4O_7 in H_2O A/B = 38/62, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 510 nm
Injection Vol.	: 20 µL
Data Source	: LC InertSearch No. LA974

Sample :
1. Heptaoxyethylene dodecyl ether [Deriv.](0.002 mg/L)

Anion Surfactant (Toluene addition sample)

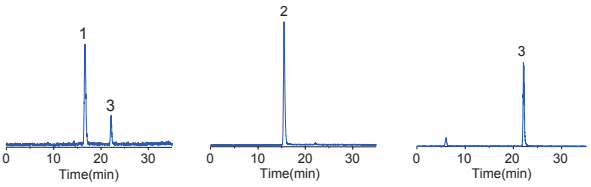


Conditions

Column	: Inertsil ODS-3 (5 µm, 150 × 4.6 mm I.D.)
Eluent	: 0.1 M $NaClO_4$ in CH_3CN/H_2O = 65/35, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: FL Ex 221 nm Em 284 nm
Injection Vol.	: 10 µL
Data Source	: LC Technical Note No. 102

Sample :
1. Sodium Decylbenzenesulfonate(C10)
2. Sodium Undecylbenzenesulfonate(C11)
3. Sodium Dodecylbenzenesulfonate(C12)
4. Toluene
5. Sodium Tridecylbenzenesulfonate(C13)
6. Sodium Tetradecylbenzenesulfonate(C14) (1 mg/L each)

Haloacetic acids

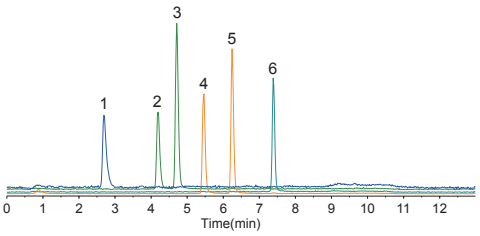


Conditions

Column	: InertSustain C18 (3 µm, 150 × 4.6 mm I.D.)
Eluent	: A) CH_3OH B) 0.2 % HCOOH in H_2O A/B = 5/95 - 38 min - 100/0 -12 min - 100/0, v/v
Flow Rate	: 0.2 mL/min
Col. Temp.	: 30 °C
Detection	: LC/MS/MS (4000 QTRAP : ESI, Negative, MRM)
Injection Vol.	: 100 µL
Data Source	: LC Technical Note No. 125

Sample :
1. Monochloroacetic acid (MCAA)(2 µg/L)
2. Dichloroacetic acid (DCAA)(4 µg/L)
3. Trichloroacetic acid (TCAA)(20 µg/L)

Chlorophenol

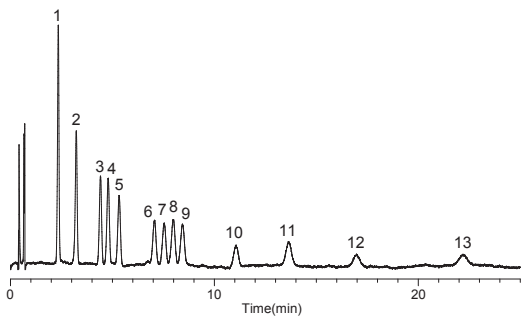


Conditions

Column	: InertSustain C18 HP (3 µm, 100 × 2.1 mm I.D.)
Eluent	: A) CH_3OH B) CH_3OH/H_2O = 10/90, v/v A/B = 40/60 - 8 min - 90/10 - 0.5 min - 90/10 - 0.1 min - 40/60 - 5 min - 40/60, v/v
Flow Rate	: 0.3 mL/min
Col. Temp.	: 40 °C
Detection	: LC/MS (4000 QTRAP : APCI, Neg, SIM)
Injection Vol.	: 25 µL

Sample :
1. Phenol
2. 2-Chlorophenol
3. 4-Chlorophenol
4. 2,6-Chlorophenol
5. 2,4-Chlorophenol
6. 2,4,6-Chlorophenol (0.83 µg/L in H_2O each)

13 Kinds of Aldehydes

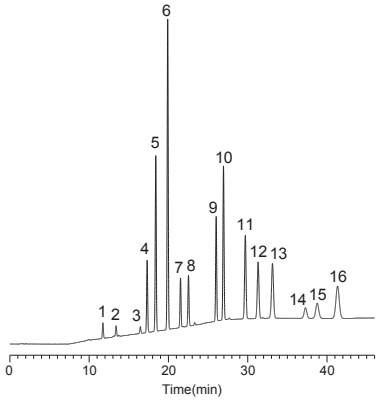


Conditions

Column	: InertSustain C18 HP (3 µm, 150 × 3.0 mm I.D.)
Eluent	: A) CH_3CN B) H_2O C) THF A/B/C = 35/55/10, v/v/v
Flow Rate	: 1.5 mL/min
Col. Temp.	: 40 °C
Detection	: UV 360 nm
Injection Vol.	: 10 µL
Data Source	: LC InertSearch No. LA962

Sample :
1. DNPH-Formaldehyde
2. DNPH-Acetaldehyde
3. DNPH-Acetone
4. DNPH-Acrolein
5. DNPH-Propionaldehyde
6. DNPH-Crotonaldehyde
7. DNPH-Methylethylketone
8. DNPH-Methacrolein
9. DNPH-n-Butyraldehyde
10. DNPH-Benzaldehyde
11. DNPH-n-Valeraldehyde
12. DNPH-m-Tolualdehyde
13. DNPH-Hexanal (150 µg/L each)

Aromatic Hydrocarbons



Conditions

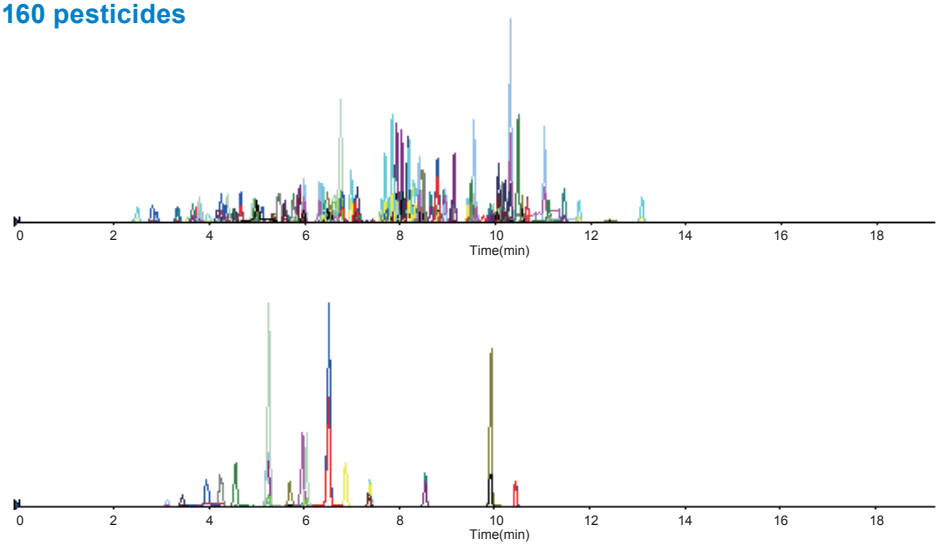
Column	: Inertsil ODS-P (5 µm, 250 × 4.6 mm I.D.)
Eluent	: A) CH_3OH B) CH_3OH/H_2O = 70/30, v/v A/B = 0/100 - 5 min - 0/100 - 20 min - 100/0, v/v
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Data Source	: InertSearch for LC No. LA336

Sample :
1. Naphthalene
2. Acenaphthylene
3. Acenaphthene
4. Fluorene
5. Phenanthrene
6. Anthracene
7. Fluorene
8. Pyrene (10 ng/mL in CH_3OH each)
9. Benzo-[a]-anthracene
10. Chrysene
11. Benzo-[b]-fluoranthene
12. Benzo-[k]-fluoranthene
13. Benzo-[a]-pyrene
14. Dibenzo-[a]-pyrene
15. Benzo-[ghi]-pyrene
16. Indeno-[1,2,3-cd]-pyrene

Pesticides

160 pesticides

Provided by AB SCIEX

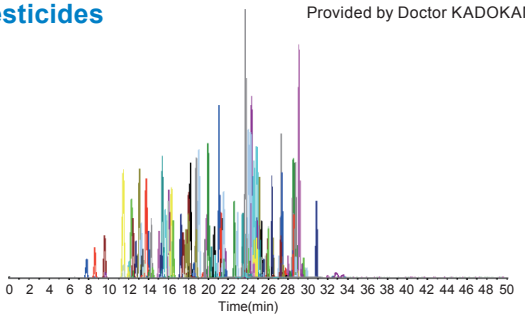


Conditions

Column	: InertSustain C18 (2 µm, 100 × 2.1 mm I.D.)
Eluent	: A) 2 mM CH_3COONH_4 B) CH_3OH A/B = 5/95 - 0.5 min - 30/70 - 9.5 min - 95/5 - 5 min - 95/5, v/v
Flow Rate	: 0.3 mL/min
Col.Temp.	: 40 °C
Detection	: LC/MS/MS (4000 QTRAP : ESI, MRM)
Injection Vol.	: 10 µL
Data Source	: LC Technical Note No. 129

118 Pesticides

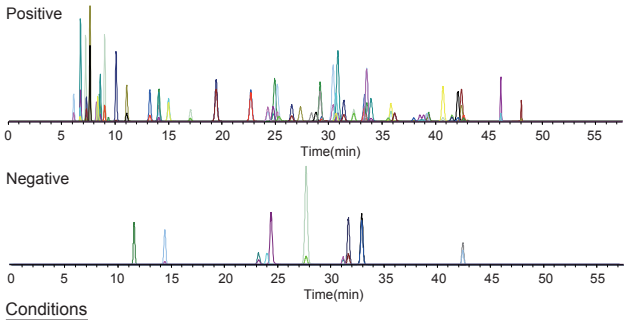
Provided by Doctor KADOKAMI



Conditions

Column	: Inertsil ODS-4 HP (3 µm, 150 × 2.1 mm I.D.)
Eluent	: A) 5 mM CH_3COONH_4 in CH_3OH B) 5 mM CH_3COONH_4 in H_2O A/B = 5/95 - 30 min - 95/5 - 20 min - 95/5 , v/v
Flow Rate	: 0.3 mL/min
Col. Temp.	: 40 °C
Detection	: LC/MS/MS (4000 QTRAP : ESI, Positive, MRM)
Injection Vol.	: 2.5 µL
Data Source	: LC InertSearch No. LA 843

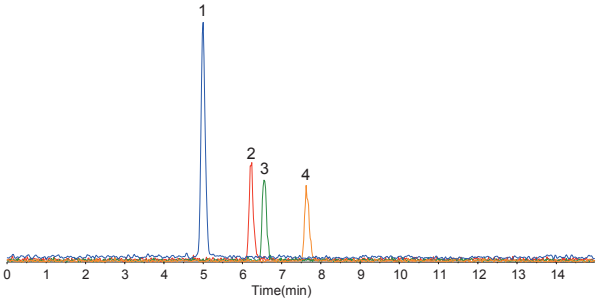
Tap Water Pesticides



Conditions

Column	: InertSustain C18 (3 µm, 75 × 2.1 mm I.D.)
Eluent	: A) 5 mM $CH_3COONH4$ in H_2O B) 5 mM $CH_3COONH4$ in CH_3OH A/B = 95/5 - 4 min - 60/40 - 35 min - 25/75 - 5 min - 0/100 - 6 min - 0/100, v/v
Flow Rate	: 0.15 mL/min
Col.Temp	: 40 °C
Sample.Temp.	: 5 °C
Detection	: LC/MS/MS (4000 QTRAP : ESI, MRM)
Injection Vol.	: 100 µL
Data Source	: LC Technical Note No.135

4 Pesticides

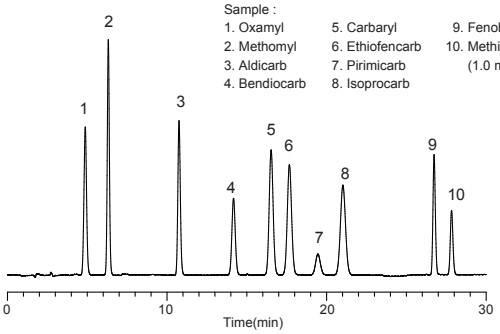


Conditions

Column	: InertSustain Phenyl (3 µm, 150 × 2.1 mm I.D)
Eluent	: A) 0.1 % HCOOH in CH_3CN B) 0.1 % HCOOH in H_2O A/B = 40/60 - 10 min - 70/30 - 0.01 min - 40/60 - 5 min - 40/60, v/v
Flow Rate	: 0.3 mL/min
Col. Temp.	: 40 °C
Detection	: LC/MS/MS (4000 QTRAP : ESI, Positive, MRM)
Injection Vol.	: 5 µL
Data Source	: LC InertSearch No. LB077

Sample :
1. Paclobutrazole
2. Diniconazole
3. Propiconazole
4. Difenconazole
(1 µg/L each)

Carbamate Insecticides



Sample :
1. Oxamyl
2. Methomyl
3. Aldicarb
4. Bendiocarb
5. Carbaryl
6. Ethiofencarb
7. Pirimicarb
8. Isoprocarb
9. Fenobucarb
10. Methiocarb
(1.0 mg/L each)

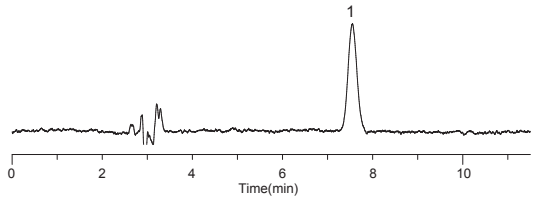
Conditions

Column	: InertSustain C18 (5 µm, 250 × 4.6 mm I.D.)
Eluent	: A) CH_3OH B) H_2O A/B = 35/65 - 2 min - 35/65 - 0.1 min - 53/47- 18.4 min - 53/47 - 0.1 min - 70/30 - 9.4 min - 70/30 - 0.1 min - 35/65 - 9.9 min - 35/65, v/v
Reaction Reagent	: OPA reagent
Flow Rate	: 1.0 mL/min
Col. Temp.	: 40 °C
Detection	: FL Ex 339 nm Em 455 nm(0 - 18.5 min), Ex 312 nm Em 382 nm(18.6 - 20.1 min), Ex 339 nm Em 455 nm(20.2 - 30 min)
Injection Vol.	: 10 µL
Data Source	: LC InertSearch No. LA916

Applications

Vitamins

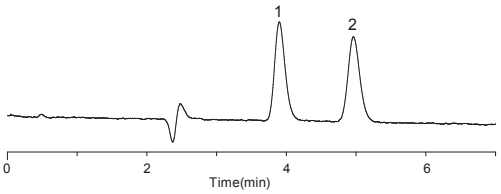
Vitamin A in Food



Conditions

Column	: Inertsil ODS-3 (5 µm, 250 × 4.6 mm I.D.)	Sample :
Eluent	: A) CH_3OH	1. Retinol (50 µg/L)
	B) H_2O	
	A/B = 95/5, v/v	
Flow Rate	: 1.0 mL/min	
Col. Temp.	: 40 °C	
Detection	: UV 325 nm	
Injection Vol.	: 20 µL	
Data Source	: LC Technical Note No. 32	

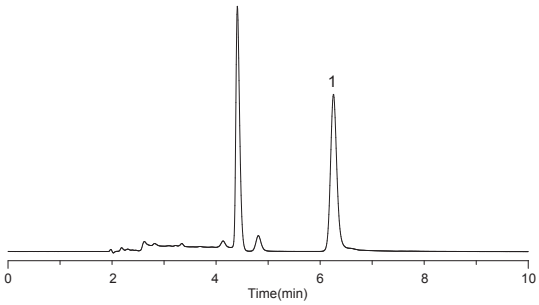
Vitamin B1



Conditions

Column	: Inertsil ODS-3	Sample :
	(5 µm, 150 × 4.6 mm I.D.)	1. Thiamine
Eluent	: A) CH_3OH	2. Hydroxyethyl thiamine (HET)
	B) 0.01 M NaH_2PO_4,	(10 µg/L each)
	0.15 M $NaClO_4$ in H_2O (pH2.2)	
	A/B = 1/9, v/v	
Reaction Reagent	: 0.05 w/v % K3[Fe(CN)6]	
	+15 w/v % NaOH, 0.4 mL/min	
Flow Rate	: 0.8 mL/min	
Col. Temp.	: 40 °C	
Detection	: FL Ex 375 nm Em 440 nm	
Injection Vol.	: 20 µL	
Data Source	: LC Technical Note No. 10	

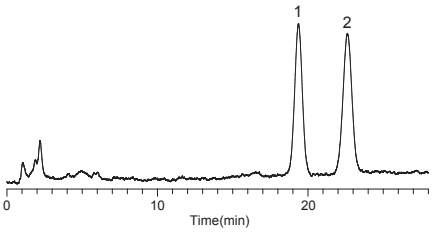
Vitamin C in Food



Conditions

Column	: Inertsil SIL-100A (5 µm, 250 × 4.6 mm I.D.)	Sample :
Eluent	: A) $CH_3COOC_2H_5$	1. Ascrobic acid
	B) n-Hexane	
	C) CH_3COOH	
	A/B/C = 50/40/10, v/v/v	
Flow Rate	: 1.5 mL/min	
Col. Temp.	: 40 °C	
Detection	: VIS 495 nm	
Injection Vol.	: 20 µL	
Data Source	: LC Technical Note No. 9	

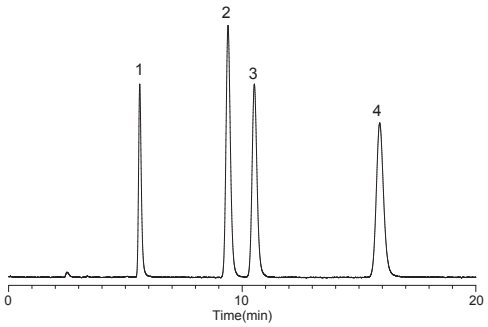
Vitamin D2, D3



Conditions

Column	: Inertsil ODS-P (5 µm, 250 × 4.6 mm I.D.)	Sample :
Eluent	: CH_3CN	1. Vitamin D2 (Ergocalciferol)
Flow Rate	: 1.5 mL/min	2. Vitamin D3 (Cholecarciferol)
Col. Temp.	: 40 °C	(0.1 mg/L each)
Detection	: UV 265 nm	
Injection Vol.	: 200 µL	
Data Source	: LC Technical Note No. 33	

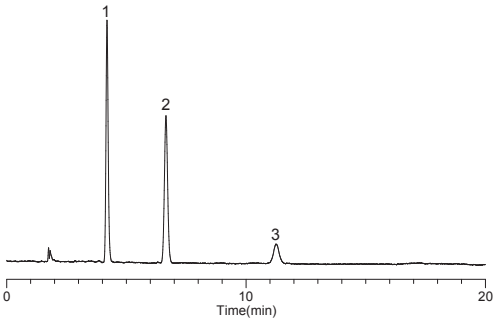
Vitamin E



Conditions

Column	: Inertsil NH2 (5 µm, 250 × 4.6 mm I.D.)	Sample :
Eluent	: A) 2-Propanol	1. α-Tocopherol
	B) n-Hexane	2. β-Tocopherol
	A/B = 2/98, v/v	3. γ-Tocopherol
Flow Rate	: 1.2 mL/min	4. δ-Tocopherol
Col. Temp.	: 40 °C	(1.0 mg/L each)
Detection	: FL Ex 298 nm Em 330 nm	
Injection Vol.	: 20 µL	
Data Source	: LC InertSearch No. LB199	

Vitamin K

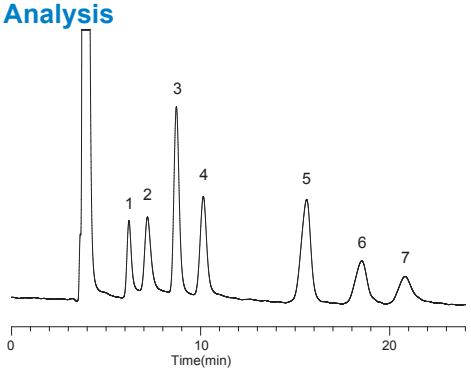


Conditions

Column	: InertSustain C8 (5 µm, 150 × 3.0 mm I.D.)	Sample :
Eluent	: CH_3CN	1. Vitamin K2 (MK-4)
Flow Rate	: 1.0 mL/min	2. Vitamin K1
Col. Temp.	: 40 °C	3. Vitamin K2 (MK-7)
Detection	: UV 270 nm	(5 mg/L each)
Injection Vol.	: 5 µL	
Data Source	: LC InertSearch No. LB030	

Others

Sugar Analysis

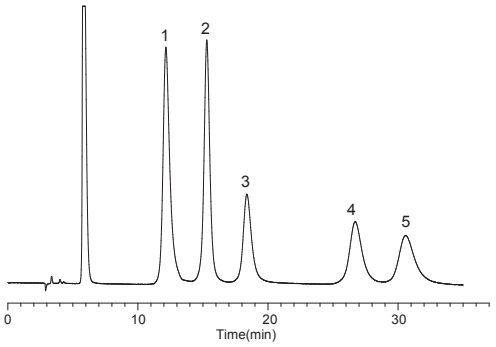


Conditions

Column : InertSustain NH2 (5 µm, 250 × 4.6 mm I.D.)
Eluent : A) CH_3CN
B) H_2O
A/B = 85/15, v/v
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : RI
Injection Vol. : 10 µL
Data Source : LC InertSearch No. LB180

Sample :
1. Rhamnose
2. Fucose
3. Fructose
4. Glucose
5. Sucrose
6. Maltose
7. Lactose
(10 mg/mL each)

Sugar Analysis Using HPLC-ECD

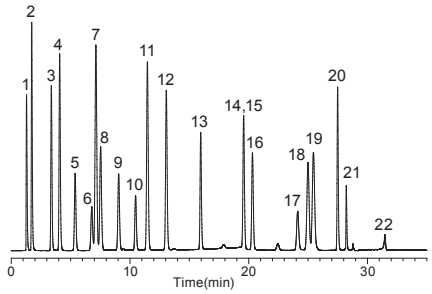


Conditions

Column : InertSphere Sugar-1 (5 µm, 150 × 4.6 mm I.D.)
Eluent : 100 mM NaOH
Flow Rate : 0.5 mL/min
Col. Temp. : 25 °C
Detection : ECD Pulse Mode
Injection Vol. : 10 µL
Data Source : LC Technical Note No. 101

Sample :
1. Fucose
2. Glucose
3. Fructose
4. Lactose
5. Sucrose
(10 mg/L each)

Analysis of Pre-column Derivatized Amino Acids

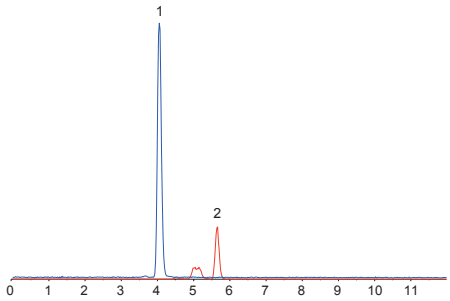


Conditions

Column : Inertsil ODS-4(3 µm, 150 × 3.0 mm I.D.)
Eluent : A) $CH_3CN/CH_3OH/H_2O$ = 45/40/15, v/v/v
B) 20 mM KH_2PO4 (pH 6.9, H_3PO_4)
A/B = 11/89 - 3 min - 11/89 - 9 min
- 22/78 - 2 min - 28/72 - 9 min - 30/70
- 4 min - 65/35 - 7 min - 75/25 - 1 min
- 100/0, v/v
Flow Rate : 0.7 mL/min
Col. Temp. : 35 °C
Detection : FL Ex 350 nm Em 450 nm (0-29 min)
Ex 266 nm Em 305 nm (29-35 min)
Injection Vol. : 1 µL
Sample : Derivatized Amino Acids
Data Source : LC InertSearch No. LB088

Sample :
1. OPA-Aspartic Acid
2. OPA-Glutamic Acid
3. OPA-Asparagine
4. OPA-Serine
5. OPA-Glutamine
6. OPA-Histidine
7. OPA-Glycine
8. OPA-Threonine
9. OPA-Citru l line
10. OPA-Arginine
11. OPA-Alanine
12. OPA-GABA
(4-aminobutanoic acid)
13. OPA-Tyrosine
14. OPA-Cys-Cys
15. OPA-Valine
16. OPA-Methionine
17. OPA-Tryptophan
18. OPA-Phenylalanine
19. OPA-Isoleucine
20. OPA-Leucine
21. OPA-Lysine
22. Fmoc-Proline
(10 µg/mL each)

PFOS and PFOA

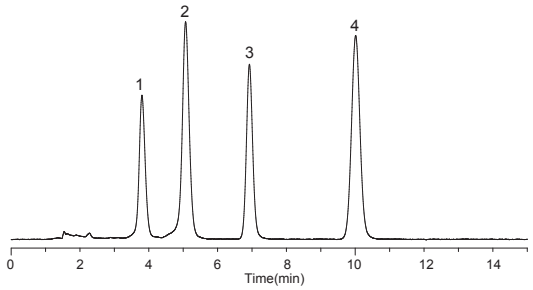


Conditions

Column : Inertsil ODS-4
(3 µm, 100 × 2.1 mm I.D.)
Eluent : A) 5 mM CH_3COONH_4 in H_2O
B) 5 mM CH_3COONH_4 in CH_3OH
A/B = 40/60 - 8 min - 25/75 - 0.1 min
-10/90 - 1.9 min - 10/90 - 0.1 min
- 40/60 - 4.9 min - 10/90, v/v
Flow Rate : 0.6 mL/min
Col. Temp. : 40 °C
Detection : LC/MS/MS (4000 QTRAP : ESI, Negative, MRM)
Injection Vol. : 2 µL
Data Source : LC InertSearch No. LA864

Sample :
1. PFOA (Perfluorooctanoic acid)
2. PFOS (Perfluorooctanesulfonic acid)
(1 mg/L each)

Analysis of Pre-column Derivatized Aflatoxin

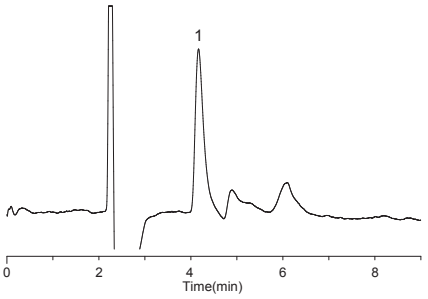


Conditions

Column : InertSustain C18 (5 µm, 150 × 4.6 mm I.D.)
Eluent : A) CH_3OH B) CH_3CN C) H_2O
A/B/C = 30/10/60, v/v/v (Premix)
Flow Rate : 1.0 mL/min
Col. Temp. : 40 °C
Detection : FL Ex 365 nm Em 450 nm
Injection Vol. : 20 µL
Data Source : LC InertSearch No. LB107

Sample :
1. Aflatoxin G1
2. Aflatoxin B1
3. Aflatoxin G2
4. Aflatoxin B2
(5 ng/mL each)

Hydrogen Peroxide (H_2O_2)



Conditions

Column : Inertsil CX (5 µm, 250 × 4.6 mm I.D.)
Flow Rate : 0.8 mL/min
Detection : ECD
Injection Vol. : 100 µL
Data Source : LC Technical Note No. 49

Sample :
1. Hydrogen peroxide(H_2O_2)
(10 µg/L)

Cat.No. INDEX

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-77001 97
-77007 97

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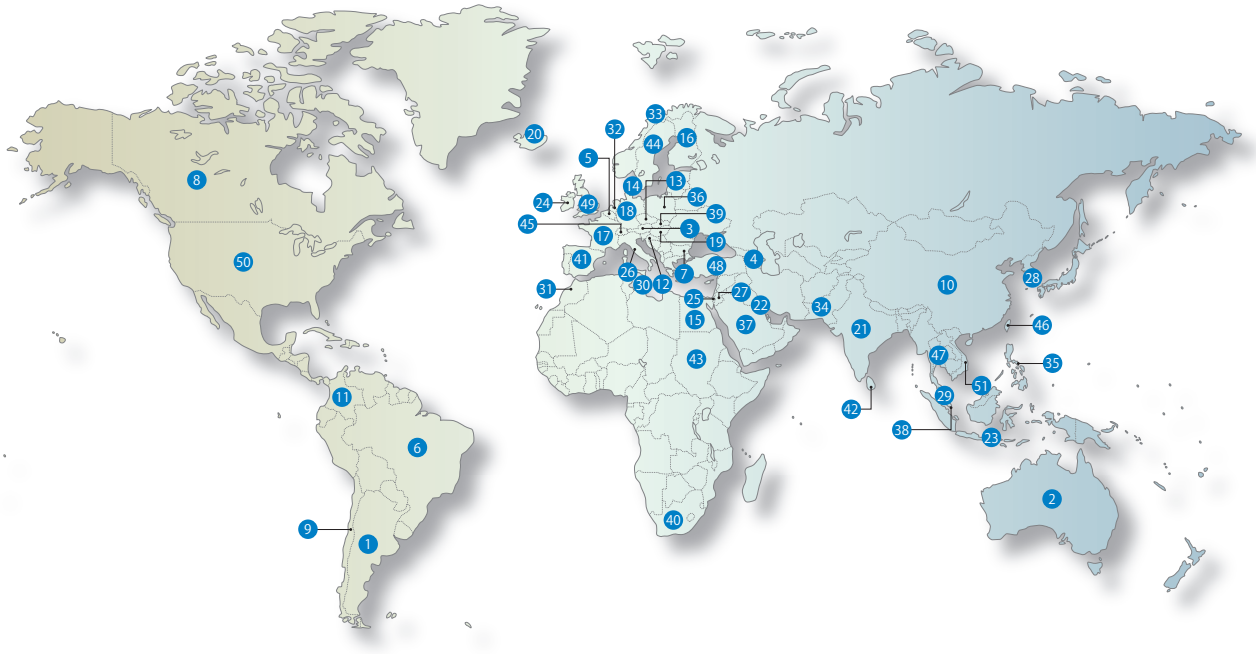

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