

by Nomura Chemical Co.

- **RP-Aqueous and RP-Aqueous-AR (C30) work with 100 % aqueous mobile phases and give added polar compound retention**
- **Cyano-UG is extremely pH stable**
- **Combi-RP (C30) columns are specially packed for high flow rate Combinatorial Chemistry Applications**
- **C18, C8, Phenyl and Cyano-UG Series provide excellent peak shape for acidic, basic and chelating compounds**

Supplied worldwide (except Japan) by Phenomenex, Develosil® HPLC columns provide high efficiency, high resolution separations.

Four different C18 chemistries enable chromatographers to choose the specific column for their application requirements. The ODS-HG and ODS-UG have similar carbon loading, although the ODS-HG is bonded using polychlorosilylating reagents while the ODS-UG is bonded with monochlorosilylating reagents. The ODS-MG provides high retention of polar compounds and shows excellent reproducibility under highly aqueous conditions. Each phase provides a slightly different selectivity to help fine-tune difficult separations.

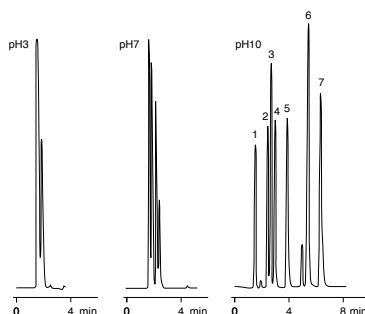
Material Characteristics

Packing Material	Particle Shape/Size (µm)	Pore Size (Å)	Surface Area (m ² /g)	Carbon Load %	Calculated Bonded Phase Coverage (µmole/m ²)	End Capping
Develosil Silica 60	Spher. 3, 5, 7, 10	60	500	n/a	–	–
Develosil Silica 100	Spher. 3, 5, 7, 10	100	350	n/a	–	–
Develosil TMS (C1)	Spher. 5, 7, 10	100	350	4, Monomeric	4.2	–
Develosil NH ₂	Spher. 5, 10	100	350	3, Polymeric	2.6	No
Develosil C8	Spher. 5, 7, 10	100	350	12, Monomeric	3.4	Yes
Develosil ODS	Spher. 3, 5, 7, 10	100	350	20, Monomeric	3.1	Yes
Develosil Phenyl	Spher. 5, 7, 10	100	350	9, Monomeric	3.1	Yes
Develosil ODS-UG	Spher. 3, 5	140	300	18, Monomeric	3.1	Yes
Develosil ODS-MG	Spher. 5	100	450	15, Monomeric	1.6	Yes
Develosil C8-UG	Spher. 5	140	300	11, Monomeric	4.4	Yes
Develosil Phenyl-UG	Spher. 5	140	300	8, Monomeric	4.1	Yes
Develosil CN-UG	Spher. 5	140	300	7, Monomeric	4.4	Yes
Develosil TMS-UG	Spher. 5	140	300	4.5, Monomeric	4.8	Yes
Develosil ODS-HG	Spher. 3, 5	140	300	18, Polymeric	3.4	Yes
Develosil RP-Aqueous[C30]	Spher. 3, 5	140	300	18, Monomeric	1.8	Yes
Develosil RP-Aqueous-AR[C30]	Spher. 3, 5	140	300	18, Trifunctional	1.8	Yes
Develosil Combi-RP[C30]	Spher. 3, 5	140	300	18, Monomeric	1.8	Yes
Develosil 300C8-HG	Spher. 5	300	160	6, Polymeric	4.2	Yes
Develosil 300ODS-HG	Spher. 5	300	160	11, Polymeric	3.8	Yes
Develosil 300C4-HG	Spher. 5	300	160	4, Polymeric	4.8	Yes

Basic Compounds

App ID 5291

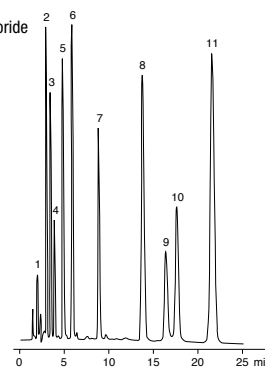
Column: Develosil ODS-UG-5
Dimensions: 150 x 4.6 mm
Part No.: CH0-3379
Mobile Phase: Acetonitrile/0.02 M Phosphate buffer (40:60)
Flow Rate: 1.0 mL/min
Temperature: 30 °C
Detection: UV @ 254 nm
Sample: 1. Pyridoxine 5. N-Methylbenzylamine
 2. Pyridine 6. Metoclopramide
 3. Procainamide 7. N,N-Dimethylbenzylamine
 4. Benzylamine



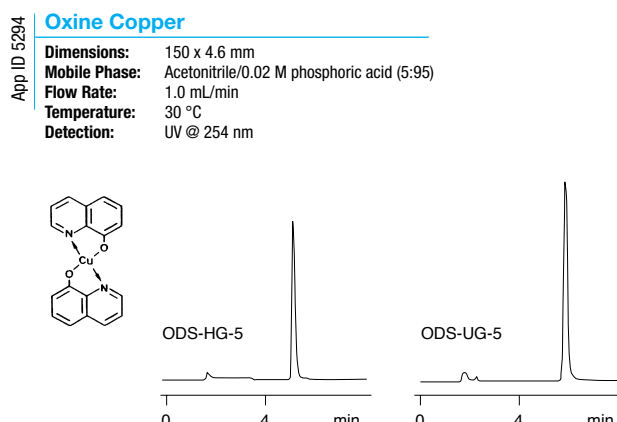
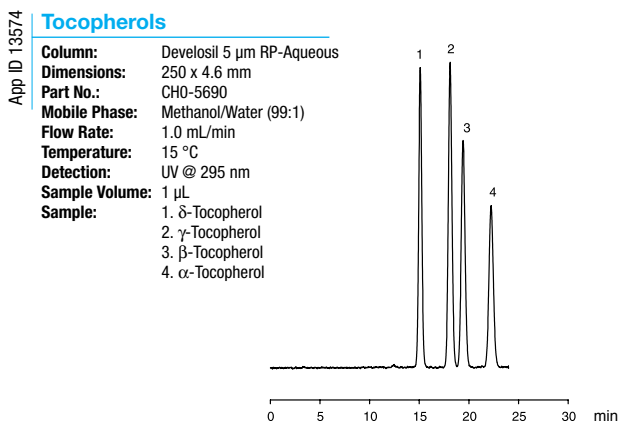
Water-Soluble Vitamins

App ID 5292

Column: Develosil ODS-UG-5
Dimensions: 150 x 4.6 mm
Part No.: CH0-3379
Mobile Phase: Acetonitrile/5 mM 1-Hexanesulfonic Acid Sodium Salt + 20 mM Phosphoric Acid (8:92)
Flow Rate: 1.0 mL/min
Temperature: 40 °C
Detection: UV @ 210 nm
Injection: 20 µL
Sample: 1. L (+) -Ascorbic Acid
 2. Nicotinic Acid
 3. Nicotinamide
 4. Calcium (+) - Pantothenate
 5. Pyridoxal Hydrochloride
 6. Pyridoxine Hydrochloride
 7. Pyridoxamine Dihydrochloride
 8. Thiamine Hydrochloride
 9. Folic Acid
 10. (+)-Biotin
 11. Riboflavin



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COMBI-RP (Patented)

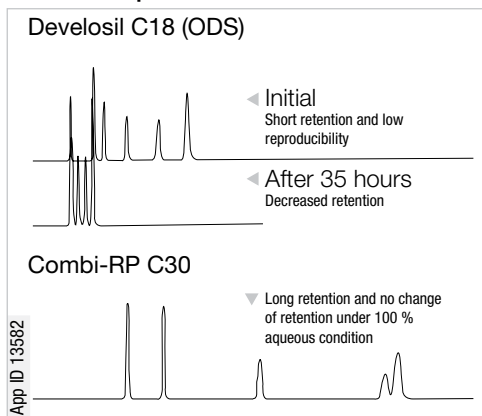
Combi-RP is a C30 chemistry engineered to provide a different selectivity compared to C18 columns with added polar compound selectivity and 100 % water compatibility.

Under 100 % aqueous conditions, conventional phases such as C18 collapse and fold on the silica gel surface in an effort to escape from water. The collapsing of ligands leads to changes in retention time and poor reproducibility. Additionally, column lifetime decreases under 100 % aqueous mobile phase conditions.

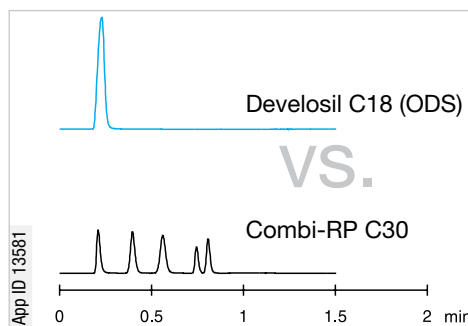
For these reasons, C18 columns are intended for use with >10 % organic in the mobile phase.

The lifetime of some conventional C18 columns may greatly decrease when the organic content of the mobile phase is less than 10 %. Develosil Combi-RP is very stable because of the long C-30 ligand, and can be used from pH 2 to pH 8 under 100 % aqueous conditions.

Under 100 % Aqueous Conditions

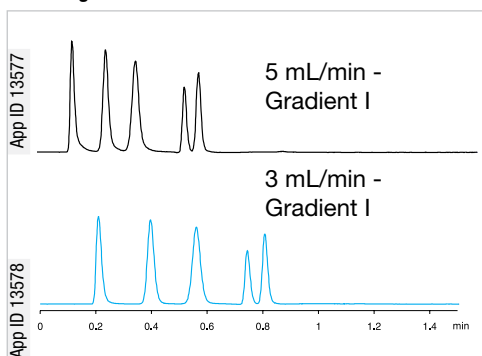


The Develosil C18(ODS) Column Shows Only One Peak, Combi-RP C-30 Separates 5 Peaks!

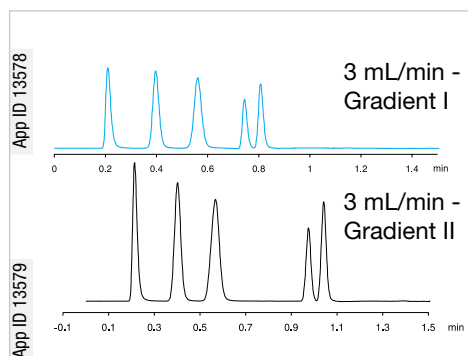


Dimensions: 50 x 4.6 mm
Mobile Phase: A) Buffer (pH 7.0) B) Acetonitrile
Gradient: C18 column: 10 % B to 100 % B in 5 minutes
 Combi-RP: 0 % B to 100 % B in 5 minutes
Flow Rate: 3.0 mL/min
Detection: UV @ 254 nm
Sample: Nucleic Acid Bases

Under High Flow Rates



Under Different Gradients



Column: Develosil Combi-RP-5
Dimensions: 50 x 4.6 mm
Order Number: CHO-5902
Mobile Phase: A) 10 mM Sodium phosphate (pH 7.0) B) Acetonitrile
Gradient: I - 0 % B to 100 % B in 5 minutes
 II - 0 % B hold for 15 seconds to 100 % B in 5 minutes
Flow Rate: 5 mL/min or 3 mL/min
Detection: UV @ 254 nm
Sample: Nucleic acid bases

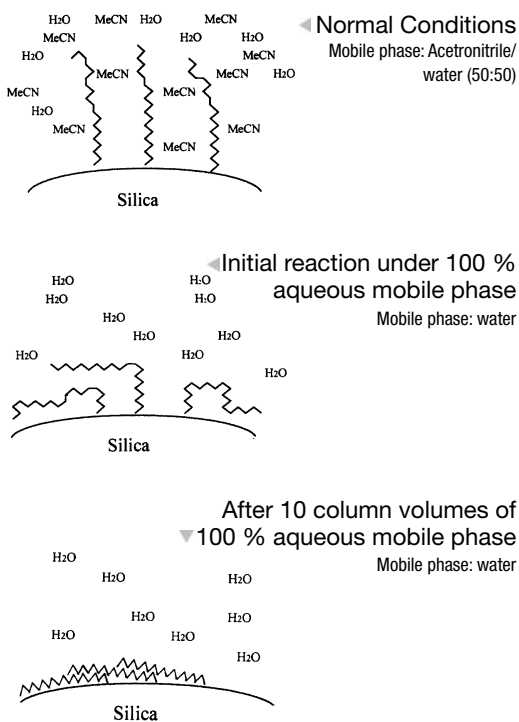
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RP-AQUEOUS AND RP-AQUEOUS-AR (Patented C30 Phases)

For Difficult Polar Compounds; Use AR Phase for Improved Acid Resistance

The Problem

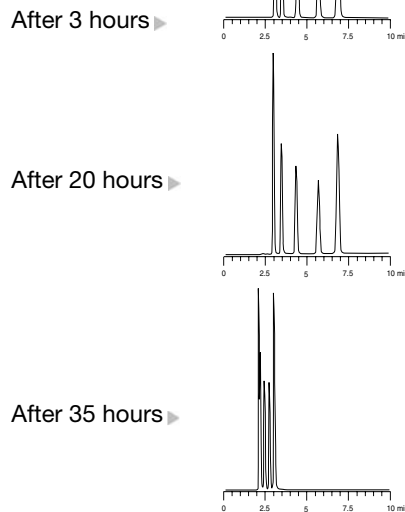
The problem with running 100 % aqueous mobile phases on a typical C8 or C18 column is: the long hydrophobic ligands bonded to the silica may mat down in an effort to escape from the water.



The Result

The result when ligands become matted down is ligand-sample interaction decreases and becomes inconsistent. This results in short retention time and poor reproducibility.

Column: Typical C18 column
Dimensions: 250 x 4.6 mm
Mobile Phase: Water
Flow Rate: 1.0 mL/min
Detection: UV @ 254 nm
Temperature: 40 °C
Sample:
1. Cytosine
2. Uracil
3. Cytidine
4. Uridine
5. Thymine



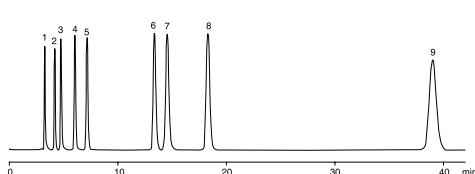
App ID 5295

The Solution: Develosil RP-Aqueous

App ID 13551

Nucleotides

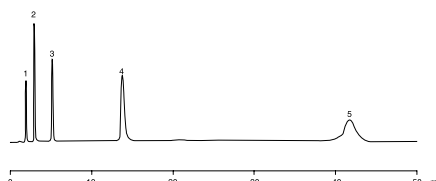
Column: Develosil 5 µm RP-Aqueous
Dimensions: 250 x 4.6 mm
Order Number: CHO-5690
Mobile Phase: 0.1 M K₂HPO₄ with KOH, pH 6.0
Flow Rate: 1.0 mL/min
Temperature: 30 °C
Detection: UV @ 260 nm
Sample volume: 4 µL
Sample:
1. 5'-CTP 6. 5'-GMP
2. 5'-CDP 7. 5'-ATP
3. 5'-CMP 8. 5'-ADP
4. 5'-GTP 9. 5'-AMP
5. 5'-GDP



App ID 13555

Fructo-Oligosaccharides

Column: Develosil 5 µm RP-Aqueous
Dimensions: 250 x 4.6 mm
Order Number: CHO-5690
Mobile Phase: Water
Flow Rate: 1.0 mL/min
Temperature: 30 °C
Detection: RI
Sample volume: 10 µL
Sample:
1. Glucose
2. Saccharose
3. 1-Kestose
4. Nystose
5. 1F-Fructofuranosylnystose



DEVELOASIL®

by Nomura Chemical Co.

ORDERING INFORMATION

Columns				
Part No.	Mfr. No.	Description	Size (mm)	Price
3 µm ODS-UG (C18)				
CHO-3506	UG11346050W	ODS-UG-3	50 x 4.6	
CHO-3406	UG11346075W	ODS-UG-3	75 x 4.6	
CHO-3407	UG11346100W	ODS-UG-3	100 x 4.6	
CHO-3408	UG11346150W	ODS-UG-3	150 x 4.6	
5 µm ODS-UG (C18)				
CHO-3378	UG11546100W	ODS-UG-5	100 x 4.6	
CHO-3379	UG11546150W	ODS-UG-5	150 x 4.6	
CHO-3380	UG11546250W	ODS-UG-5	250 x 4.6	
CHO-3384	UG11540010W	ODS-UG-5 (Guard Column)	10 x 4.0	
5 µm C8-UG				
CHO-4220	UG12546100W	C8-UG-5	100 x 4.6	
CHO-4221	UG12546150W	C8-UG-5	150 x 4.6	
CHO-4222	UG12546250W	C8-UG-5	250 x 4.6	
5 µm Ph-UG (Phenyl)				
CHO-4237	UG15546150W	Ph-UG-5	150 x 4.6	
CHO-4238	UG15546250W	Ph-UG-5	250 x 4.6	
5 µm CN-UG (Cyano)				
CHO-4244	UG16546100W	CN-UG-5	100 x 4.6	
CHO-4245	UG16546150W	CN-UG-5	150 x 4.6	
CHO-4246	UG16546250W	CN-UG-5	250 x 4.6	
CHO-4250	UG16540010W	CN-UG-5 (Guard Column)	10 x 4.0	
5 µm TMS-UG (C1)				
CHO-4228	UG14546100W	TMS-UG-5	100 x 4.6	
CHO-4229	UG14546150W	TMS-UG-5	150 x 4.6	
CHO-4230	UG14546250W	TMS-UG-5	250 x 4.6	
CHO-4234	UG14540010W	TMS-UG-5 (Guard Column)	10 x 4.0	
5 µm ODS-MG				
CHO-4468	MG11546100W	ODS-MG-5	100 x 4.6	
CHO-4469	MG11546150W	ODS-MG-5	150 x 4.6	
CHO-4470	MG11546250W	ODS-MG-5	250 x 4.6	
CHO-4477	MG11540010W	ODS-MG-5 (Guard Column)	10 x 4.0	
3 µm ODS-HG (C18)				
CHO-3411	HG11346050W	ODS-HG-3	50 x 4.6	
CHO-3413	HG11346100W	ODS-HG-3	100 x 4.6	
CHO-3414	HG11346150W	ODS-HG-3	150 x 4.6	
5 µm ODS-HG (C18)				
CHO-3387	HG11546150W	ODS-HG-5	150 x 4.6	
CHO-3388	HG11546250W	ODS-HG-5	250 x 4.6	
CHO-3392	HG11540010W	ODS-HG-5 (Guard Column)	10 x 4.0	
3 µm COMBI-RP				
CHO-5893	COMB330035W	Combi-RP-3	35 x 3.0	
CHO-5896	COMB346050W	Combi-RP-3	50 x 4.6	
5 µm COMBI-RP				
CHO-5899	COMB530035W	Combi-RP-5	35 x 4.6	
CHO-5902	COMB546050W	Combi-RP-5	50 x 4.6	
CHO-5904	COMB5P2050W	Combi-RP-5	50 x 20.0	
CHO-5905	COMB5P2100W	Combi-RP-5	100 x 20.0	
CHO-5906	COMB5P2150W	Combi-RP-5	150 x 20.0	
CHO-5909	COMB5P3050W	Combi-RP-5	50 x 28.0	
CHO-5910	COMB5P3250W	Combi-RP-5	250 x 28.0	

Columns (continued)				
Part No.	Mfr. No.	Description	Size (mm)	Price
3 µm RP-Aqueous				
CHO-5991	RPAQ310100W	RP-AQUEOUS-3	100 x 1.0	
CHO-5992	RPAQ310150W	RP-AQUEOUS-3	150 x 1.0	
CHO-5996	RPAQ320050W	RP-AQUEOUS-3	50 x 2.0	
CHO-5998	RPAQ320150W	RP-AQUEOUS-3	150 x 2.0	
CHO-5999	RPAQ330050W	RP-AQUEOUS-3	50 x 3.0	
CHO-6001	RPAQ330150W	RP-AQUEOUS-3	150 x 3.0	
CHO-6002	RPAQ346035W	RP-AQUEOUS-3	35 x 4.6	
CHO-6003	RPAQ346050W	RP-AQUEOUS-3	50 x 4.6	
CHO-6006	RPAQ346150W	RP-AQUEOUS-3	150 x 4.6	
5 µm RP-Aqueous				
CHO-5683	RPAQ520050W	RP-AQUEOUS-5	50 x 2.0	
CHO-5685	RPAQ520150W	RP-AQUEOUS-5	150 x 2.0	
CHO-5686	RPAQ520250W	RP-AQUEOUS-5	250 x 2.0	
CHO-5687	RPAQ546050W	RP-AQUEOUS-5	50 x 4.6	
CHO-5688	RPAQ546100W	RP-AQUEOUS-5	100 x 4.6	
CHO-5689	RPAQ546150W	RP-AQUEOUS-5	150 x 4.6	
CHO-5690	RPAQ546250W	RP-AQUEOUS-5	250 x 4.6	
CHO-5695	RPAQ5P1250W	RP-AQUEOUS-5	250 x 10.0	
CHO-5699	RPAQ5P2050W	RP-AQUEOUS-5	50 x 20.0	
CHO-5696	RPAQ5P2250W	RP-AQUEOUS-5	250 x 20.0	
CHO-5697	RPAQ540010W	RP-AQUEOUS (Guard Column)	10 x 4.0	
3 µm RP-Aqueous-AR				
CHO-7393	RPAR310050W	RP-AQUEOUS-AR-3	50 x 1.0	
CHO-7394	RPAR310150W	RP-AQUEOUS-AR-3	150 x 1.0	
CHO-7395	RPAR320150W	RP-AQUEOUS-AR-3	150 x 2.0	
CHO-7409	RPAR346050W	RP-AQUEOUS-AR-3	50 x 4.6	
CHO-7396	RPAR346100W	RP-AQUEOUS-AR-3	100 x 4.6	
CHO-7397	RPAR346150W	RP-AQUEOUS-AR-3	150 x 4.6	
5 µm RP-Aqueous-AR				
CHO-7398	RPAR510050W	RP-AQUEOUS-AR-5	50 x 1.0	
CHO-7399	RPAR510150W	RP-AQUEOUS-AR-5	150 x 1.0	
CHO-7400	RPAR510250W	RP-AQUEOUS-AR-5	250 x 1.0	
CHO-7401	RPAR520150W	RP-AQUEOUS-AR-5	150 x 2.0	
CHO-7402	RPAR520250W	RP-AQUEOUS-AR-5	250 x 2.0	
CHO-7403	RPAR546150W	RP-AQUEOUS-AR-5	150 x 4.6	
CHO-7404	RPAR546250W	RP-AQUEOUS-AR-5	250 x 4.6	
CHO-7405	RPAR540010W	RP-AQUEOUS-AR-5	10 x 4.0	
5 µm 300 ODS-HG (Widopore C18)				
CHO-3396	HG31546250W	300ODS-HG-5	250 x 4.6	
5 µm 300 C8-HG (Widopore C8)				
CHO-3399	HG32546150W	300C8-HG-5	150 x 4.6	
CHO-3400	HG32546250W	300C8-HG-5	250 x 4.6	
5 µm 300 C4-HG (Widopore C4)				
CHO-3403	HG33546150W	300C4-HG-5	150 x 4.6	
CHO-3404	HG33546250W	300C4-HG-5	250 x 4.6	
Guard Cartridges for UG and HG columns				
CHO-3417	UG11540010C	ODS-UG-5 (4/pk.)	10 x 4.0	
CHO-3418	HG11540010C	ODS-HG-5 (4/pk.)	10 x 4.0	
Guard Cartridge Holder for UG and HG columns				
CHO-3419	H000040010C	Guard Cartridge Holder	10 x 4.0	

HPLC

Develosil