

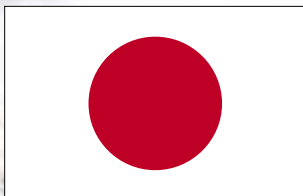


HPLC Columns for Ultra Fast LC



Worldwide Availability

For inquiries in Asia, Australia,
Oceania please contact:



YMC

For inquiries in the Americas
please contact:



YMC

For inquiries in Europe, Africa,
Middle East please contact:



YMC
EUROPE GMBH

Analytical Columns:

YMC, Inc.
c/o Waters Corporation
34 Maple Street
Milford, MA 01757 USA
Phone (1) 800-252-4752
Fax (1) 508-482-4820

Preparative Bulk Media:

Seika Corp. of America
Allentown, PA 18109 USA
Phone (1) 610-266-8650
Fax (1) 610-266-8652
www.seikacorporation.com

YMC Co., Ltd.
Kyoto, 600-8106 Japan
Phone (81) 75-342-4515
Fax (81) 75-342-4550
www.ymc.co.jp

YMC Europe GmbH
Schöttmannshof 19
D-46539 Dinslaken
Phone (49) 02064/427-0
Fax (49) 02064/427-222
www.ymc.de

European Distributors



www.pineco.net



www.teknolab.no



www.scanteclab.se



www.mikrolab.dk



www.hichrom.co.uk
www.crawfordscientific.com
www.kinesis.co.uk



www.apexscientific.ie
www.agb.ie



adao.araujo@elnor.com



comercial@teknokroma.com
elnoriberica@elnoriberica.com



www.interchim.com
www.cluzeau.com
www.aifrance.net



www.achrom.be



www.inacom.nl



www.ymc.de



www.stagroma.com



www.cps.it



www.cp-analytica.at



www.lab-comp.hu
 Preparative HPLC /
 Systems / Bulk Media:
www.edisonhouse.hu



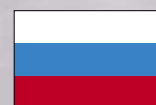
www.terralab.com.tr
www.kutaygroup.com



www.cast-sa.co.za



ophir-ana@bezegint.net



www.fizlabpribor.ru



www.armgate.lt



www.armgate.lt



www.armgate.lt

For all other countries from Europe, Middle East or Africa kindly refer to YMC Europe GmbH,
 Phone (49) 0 20 64 / 427-0, Fax (49) 0 20 64 / 427-222, E-mail: info@ymc.de, Website: www.ymc.de.

Introduction

HPLC Columns for Ultra Fast Liquid Chromatography

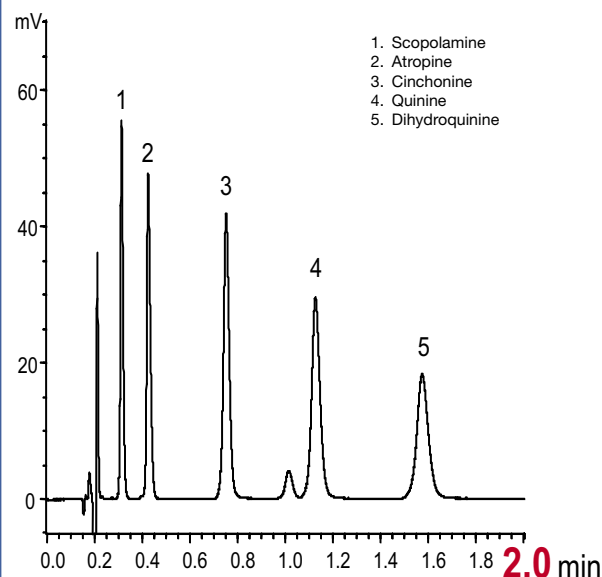
Nowadays, especially in the pharmaceutical industry, the need for Ultra Fast LC and Rapid Resolution is still growing due to the continuous demand for high throughput analysis in research & development and quality control.

Especially for these Ultra Fast LC methods, YMC introduced YMC-UltraHT columns, which ideally matches the latest instrumentation technology for “extra” high pressure application e.g. with Agilent 1200™ series or Waters Acquity UPLC™.

As a column and bulk media supplier with many years of practical chromatographic experience, YMC found unacceptable that the use of novel separation media is often limited to dedicated equipment only – particularly with regard to the large installed base of “conventional” HPLC systems with a standard pressure rating of 5800 psi (400 bar), 40 MPa. For this reason, specifications for YMC-UltraHT columns are set to provide powerful chromatographic improvements concerning velocity and resolution also under conventional operating conditions. Since YMC-UltraHT columns provides a substantially lower pressure drop than most competitive 2 µm or sub-2 µm media, high flow rates can be achieved without generating excessive back pressure and without the need for specialized equipment (see page 10 for details).

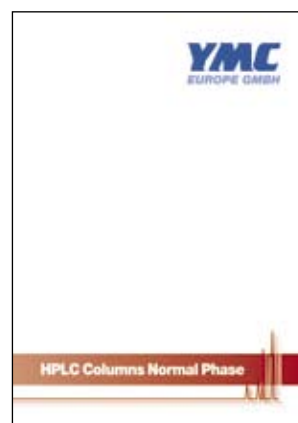
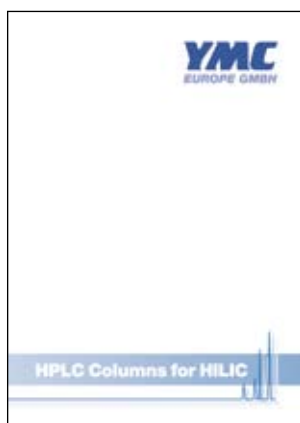
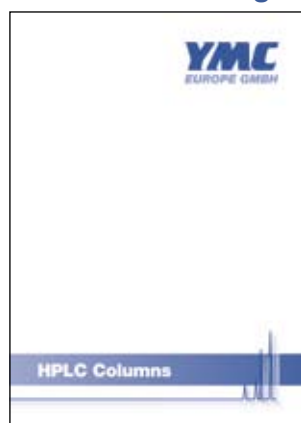
For effective high throughput separations, YMC offers a wide range of high performance HPLC columns which allow Ultra Fast analytical HPLC with conventional equipment. Due to the down-scalability of the majority of YMC’s stationary phases, the time needed for a single analysis can so be reduced to less than 60 seconds, depending on the sample conditions.

YMC-UltraHT Pro C18, 2 µm, 50 x 2.0 mm i.d.



Eluent: 20 mM CH₃COOH-CH₃COONH₄ (pH 4.9) / acetonitrile (80/20)
 Flow rate: 0.6 ml/min (3.18 mm/sec)
 Temperature: 40 °C
 Detection: UV at 220 nm
 Pressure: 4350 psi (292 bar), 29.2 MPa

Other YMC catalogues available:



Content

Products



- Ultra Fast LC 6



- Features of Packing Material 8



- Downscale of Methods 10



- Polar Analytes 14



- Fast LC..... 16

Appendices

- Guide to IPC (International Product Code) ... 26

- Trademarks 27

- Terms and Conditions of Sale..... 27

Ultra Fast LC Columns



- YMC Pack **Pro**Family chemistries, based on ultra high purity silica, provide excellent resolution for a wide range of analytes



- YMC-UltraHT LC Columns provide considerable time saving without resort to ultra high pressures



- YMC-UltraHT LC Columns achieve ultra fast separations even with conventional HPLC equipment

- Fully up- and down-scalable selectivity



	YMC-UltraHT Pro C18	YMC-UltraHT Hydrosphere C18
Particle size / μm	2	2
Pore size / nm	12	12
Surface area / m^2g^{-1}	330	330
Carbon content / %	17	12
pH range	2 - 8	2 - 8

General

YMC-UltraHT Pro C18

Since the introduction of the *Pro*Family series of phases, YMC-Pack *Pro* C18 has proved to be one of the first choices for a wide range of HPLC applications in pharmaceutical and biotechnological research and production, where efficiency and reliability are a major demand. YMC has transferred these outstanding qualities to Ultra Fast LC with the introduction of YMC-UltraHT *Pro* C18.

YMC-UltraHT Hydrosphere C18

In many cases, the separation of highly polar compounds requires highly aqueous mobile phase conditions to achieve sufficient retention on the stationary phase. Conventional reversed phase selectivities do not give reproducible results under these conditions due to mainly collapse of the C18 chains. Therefore, YMC did developed Hydrosphere C18 in order of to overcome the loss in retention. Now, this outstanding chromatographic behaviour has been transferred to YMC-UltraHT Hydrosphere C18.



fully upscalable



fully downscalable

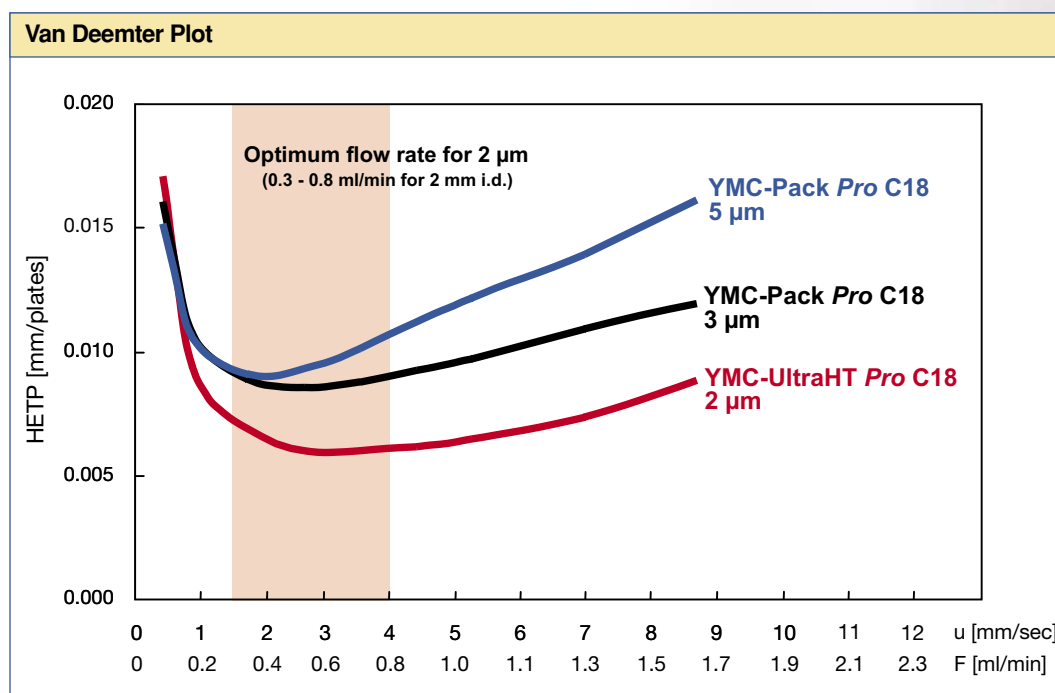


LC/MS-capable

Ultra Fast LC Columns

Why Smaller Particles?

Ever since in the beginning of HPLC, more-demanding analytical problems have required a progressive improvement in separation efficiency. The challenges include ever more complex analytes and the reduction in analysis times to keep up with the increasing numbers of samples. In addition to reducing the column dimensions and increasing flow rates, the implementation of small particles is a powerful tool to increase efficiency.



The van Deemter equation describes the “Height Equivalent of the Theoretical Plate” (HETP) as a function of the linear velocity (u) by

$$H = A + B/u + C \cdot u$$

where A, B and C are constants and u is the mobile phase linear velocity measured in mm/sec.

The resulting van Deemter plots show the reduction of HETP when using smaller particle sizes of YMC-Pack Pro C18 with an additional shift of the minimum value to higher flow rates.

By comparing the relationship between particle size and the number of theoretical plates, the effect can be summarised as shown in the table below. Table 1 summarises comprehensively the effect of particle sizes on column efficiency. Reduction of the particle size from 5 μm to 3 μm to 2 μm , allows the column length to be reduced by nearly two thirds without compromising efficiency. This provides a corresponding reduction in separation time and eluent use.

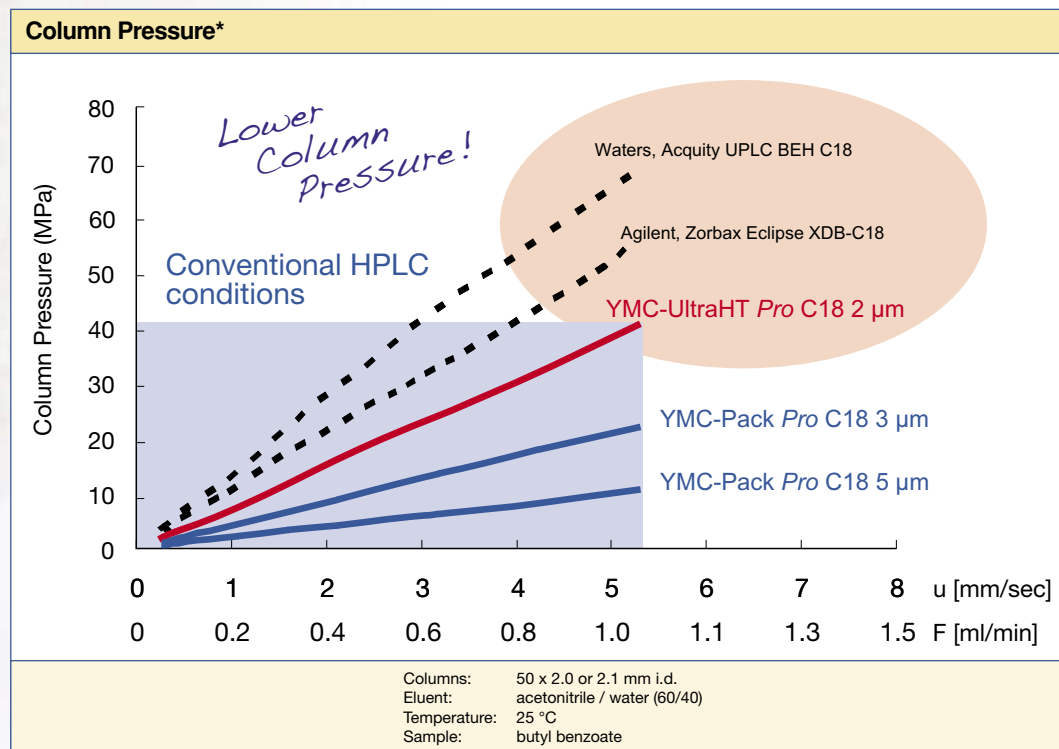
Table 1

Column Length [mm]	Number of Theoretical Plates Particle Size		
	5 μm	3 μm	2 μm
150	80,000	120,000	190,000
100	67,000	80,000	160,000
50	33,000	40,000	80,000

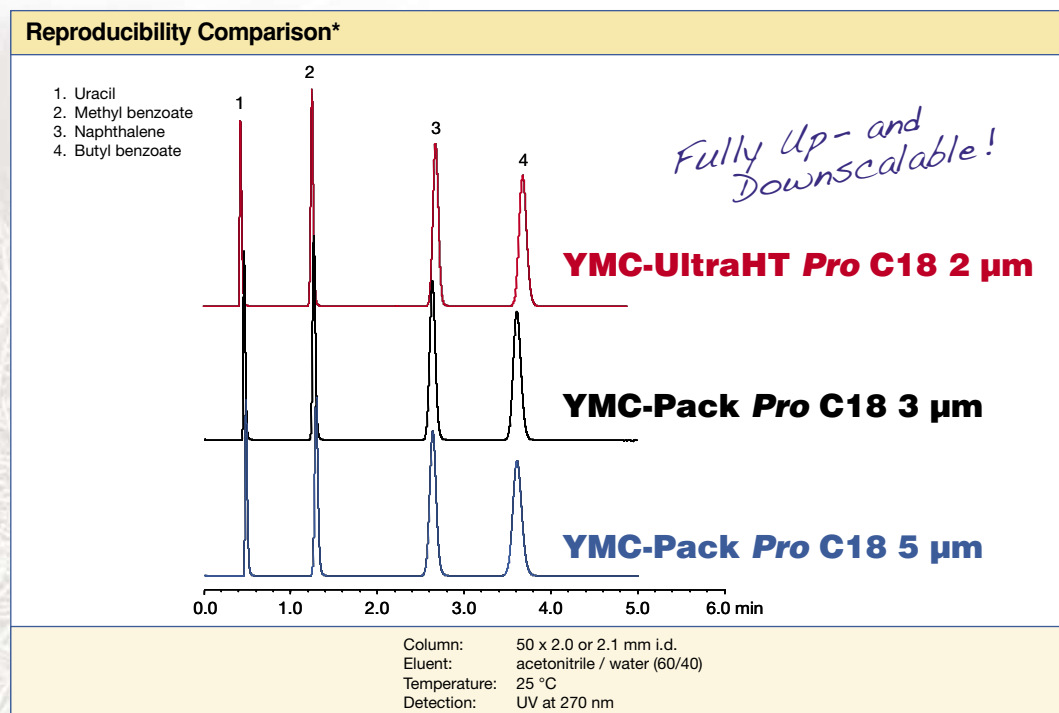
Features of Packing Material

When starting to focus on Ultra Fast LC through the use of small particles, very high back pressures have to be considered and a balance sought. The extensive experience in silica production enables YMC to provide small particles with an extremely narrow particle size distribution which results in low back pressures.

YMC's UltraHT Pro C18 columns offer outstanding efficiency for Fast LC without exhibiting extremely high back pressure values which can be obtained with sub-2 μm particles from other manufacturers. Therefore YMC's UltraHT Pro C18 may not require dedicated HPLC equipment for providing outstanding column performances.



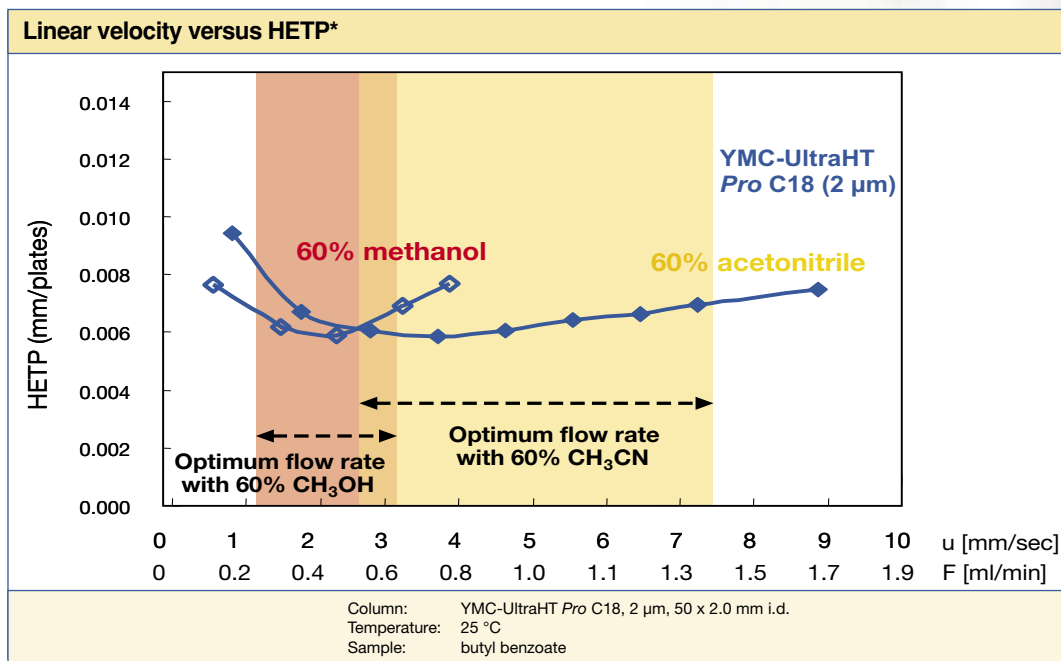
The introduction of YMC-Pack Pro C18 2 μm allows easy downscaling of existing methods which use YMC-Pack Pro C18 3 μm and 5 μm .



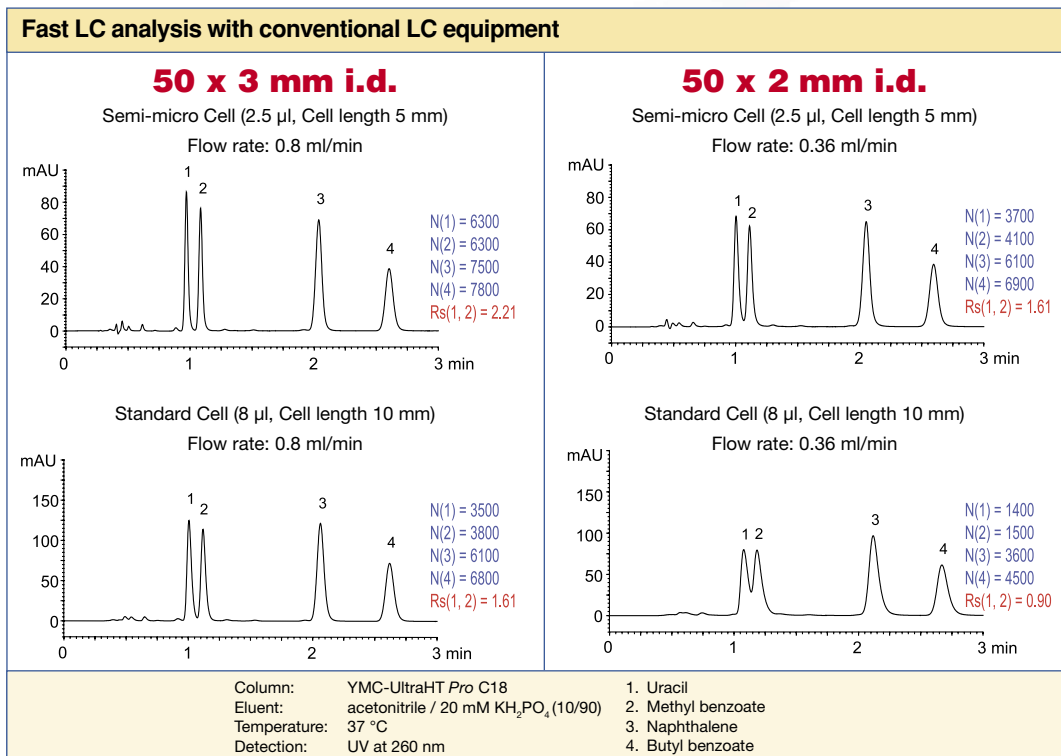
Features of Packing Material

The graph below shows the dependency of “Height Equivalent of the Theoretical Plate” (HETP) and the linear velocity in the presence of different organic solvents. When methanol is used, the optimum HETP is achieved within a different range of velocity compared to when acetonitrile is used due to their different viscosities. Therefore the optimum range of flow rate changes with the organic solvent.

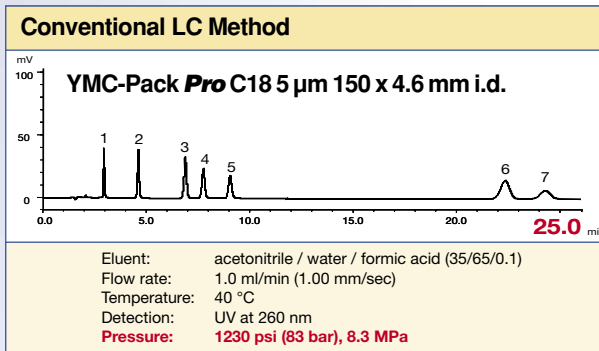
The maximum resolution is obtained by optimising flow rate, temperature, and organic solvent in order to achieve the optimum back pressure.



Since YMC-UltraHT columns provide substantially lower pressure drop than most competitive 2 µm or sub-2 µm media, high flow rates can be achieved without generating excessive back pressure and without the need for specialized equipment. Nevertheless, 3 mm i.d. columns are less affected by the diffusion volume than 2 mm i.d. columns. Therefore, it is necessary to reduce the system volume in order to obtain outstanding chromatographic performances with 2 mm i.d. columns.

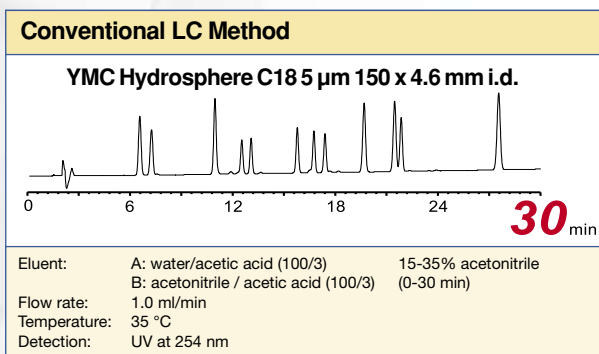
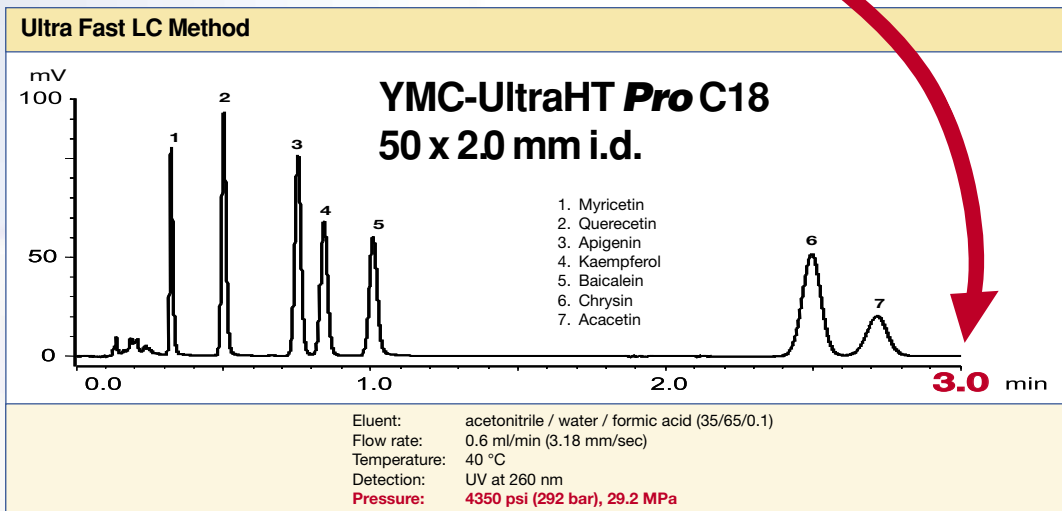


Downscale of Methods

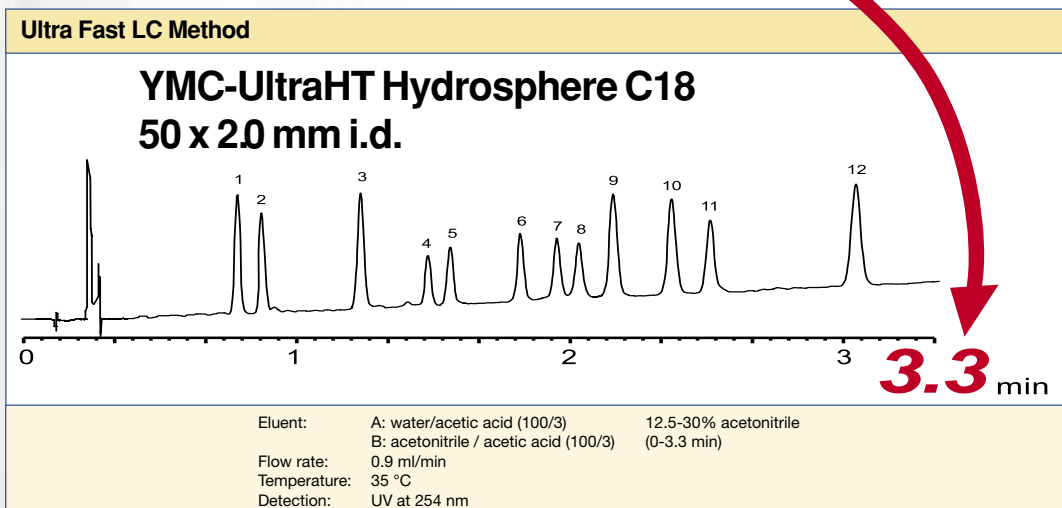


Due to the production processes used to manufacture YMC-Pack ProFamily, methods can be easily downscaled with unchanged selectivity.

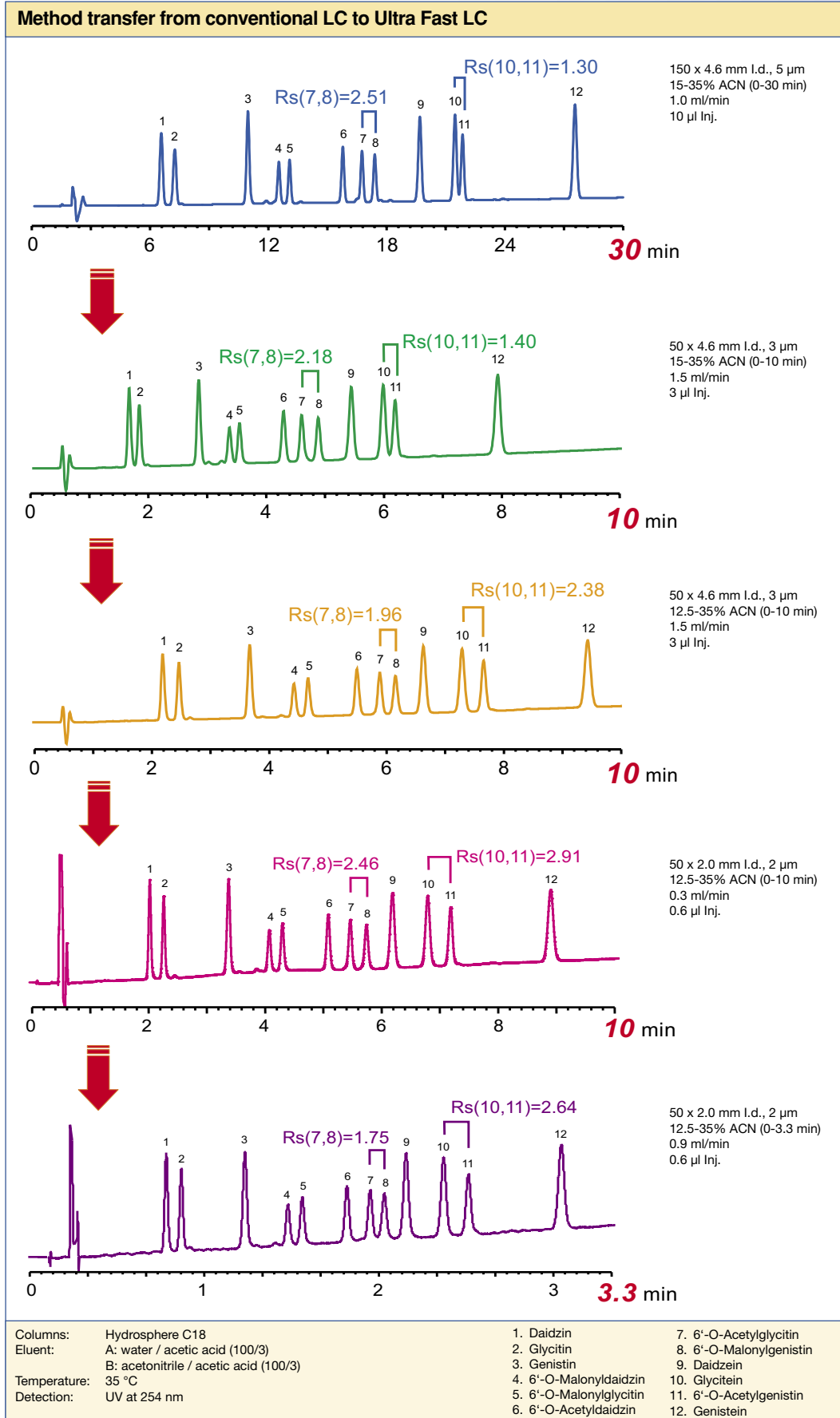
As the examples shown demonstrate, conventional HPLC methods can be transferred easily to Ultra Fast LC methods by choosing YMC-UltraHT columns to gain efficiency and significantly reduce analysis time.



1. Daidzin
2. Glycitin
3. Genistin
4. 6'-O-Malonyldaidzin
5. 6'-O-Malonylglycitin
6. 6'-O-Acetyldaidzin
7. 6'-O-Acetylglycitin
8. 6'-O-Malonylgenistin
9. Daidzein
10. Glycitein
11. 6'-O-Acetylgenistin
12. Genistein



Downscale of Methods



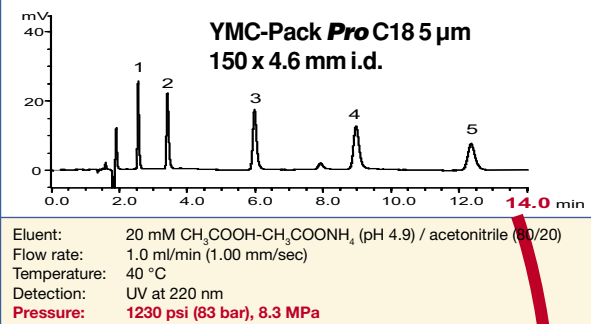
Downscale of Methods

Efficiency 90% ↑

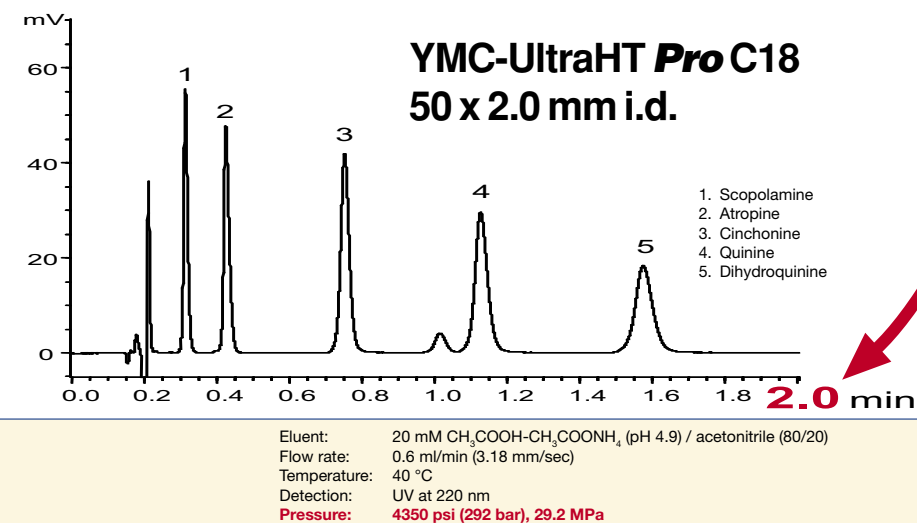
Analysis time 90% ↓

Solvent volume 93% ↓

Conventional LC Method

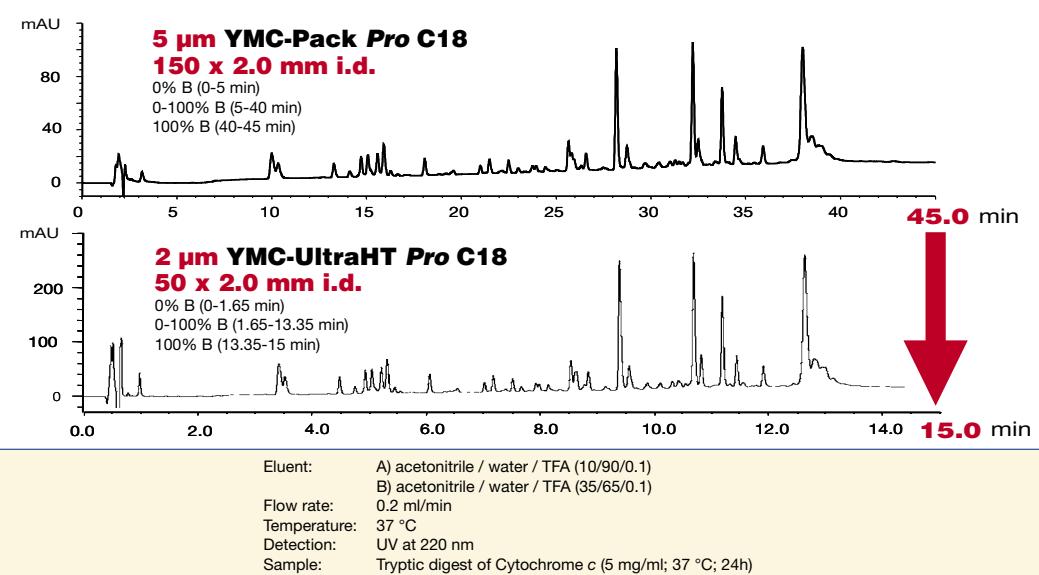


Ultra Fast LC Method



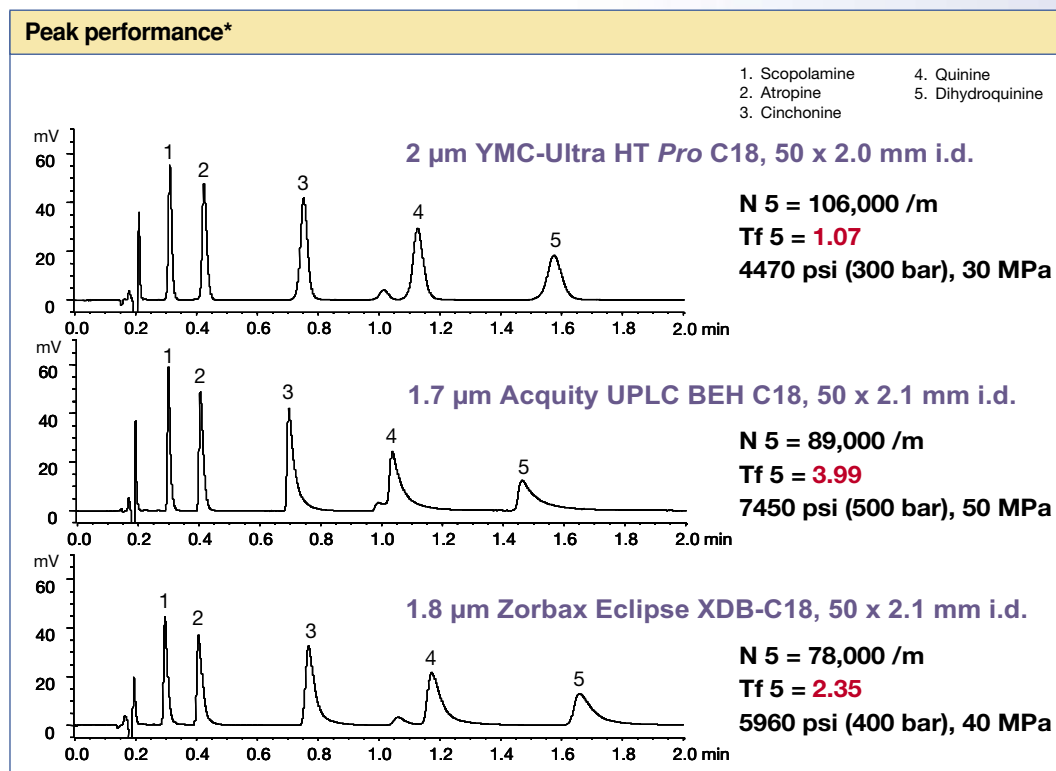
The application of HPLC to biologically relevant separations is an existing and rapidly growing field. YMC-UltraHT Pro C18 provides outstanding chromatographic performance, which is more than capable of meeting the challenge of peptide mapping, where a large number of peptide fragments are generated from enzymatic digestion.

Peptide mapping

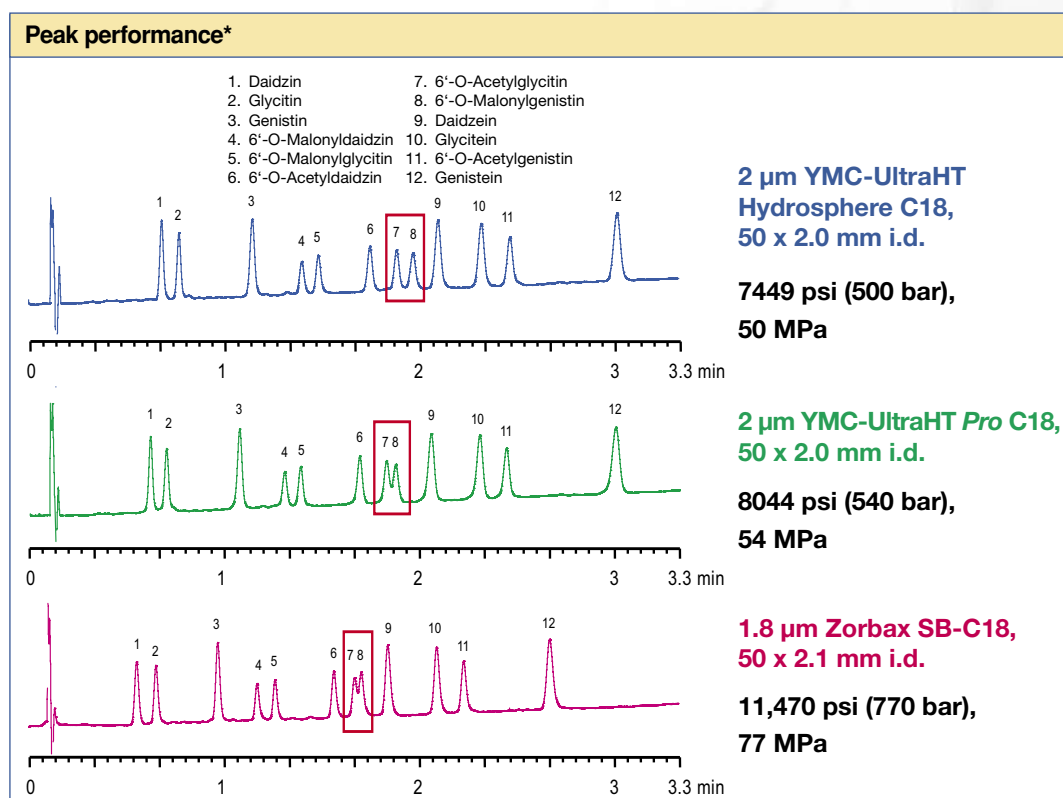


Downscale of Methods

Why not take the pressure out of Fast LC!



With YMC-UltraHT Pro C18 you have all the efficiency you need to develop your Fast LC methods with none of the pressure or heat some would have you believe is essential!

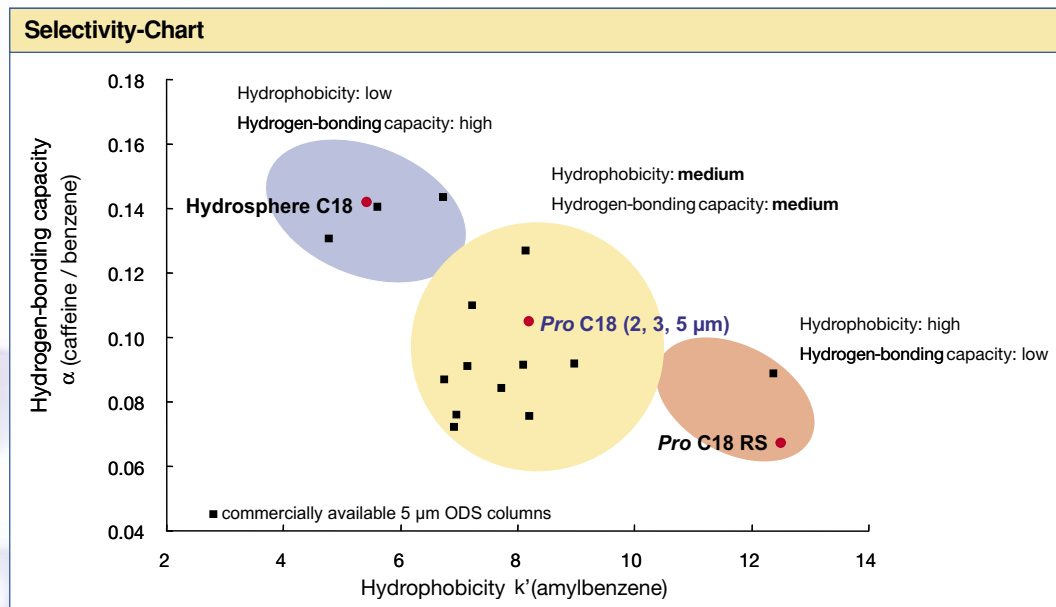


* Source: Courtesy of YMC Co., Ltd.

Polar Analytes

YMC-Pack *Pro* C18 is a well-established C18 silica-based column, which provides a medium balance of hydrogen-bonding capacity and hydrophobicity, as shown below. Conversely, Hydrosphere C18 is optimal selectivity for the separation of highly polar compounds.

This makes YMC Hydrosphere C18 the column of choice for method development of high polar compounds.



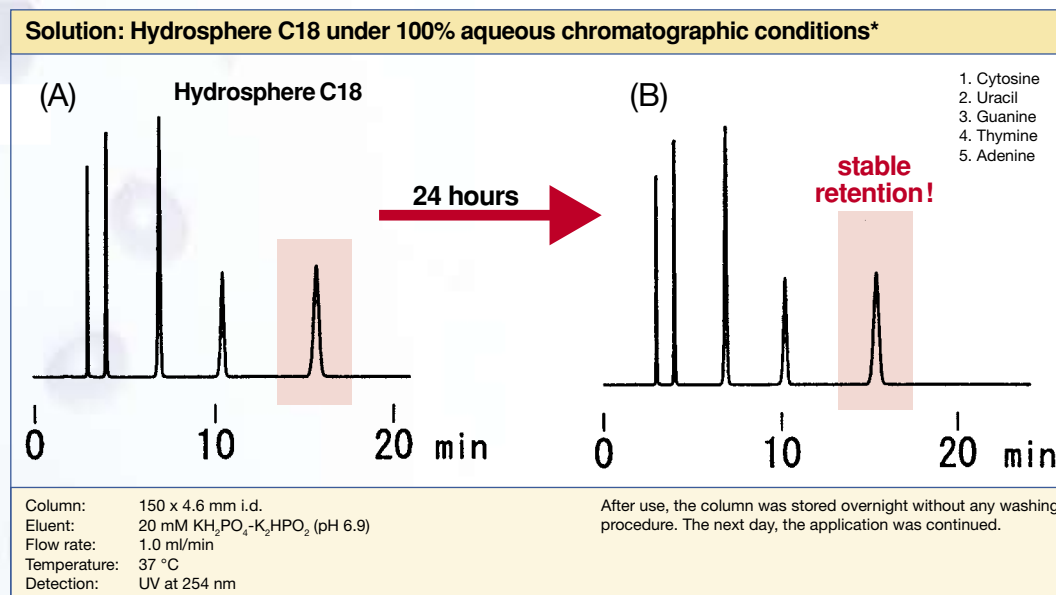
General

The separation of polar compounds in many cases requires highly aqueous mobile phase conditions to achieve sufficient retention on the stationary phase. Conventional reversed phase selectivities do not give reproducible results under these conditions due to mainly collapse of the C18 chains.

YMC developed Hydrosphere C18 and YMC-Pack ODS-AQ in order to overcome the loss in retention.

Properties

A proprietary derivatisation procedure enables Hydrosphere C18 to be equilibrated in water without losing its brush-like chain structure. This model of the so-called phase collapse is one explanation for a phenomenon, where the retention times decrease after a very short time in 100% aqueous eluent with conventional C18 phases.



* By courtesy YMC Co., Ltd.

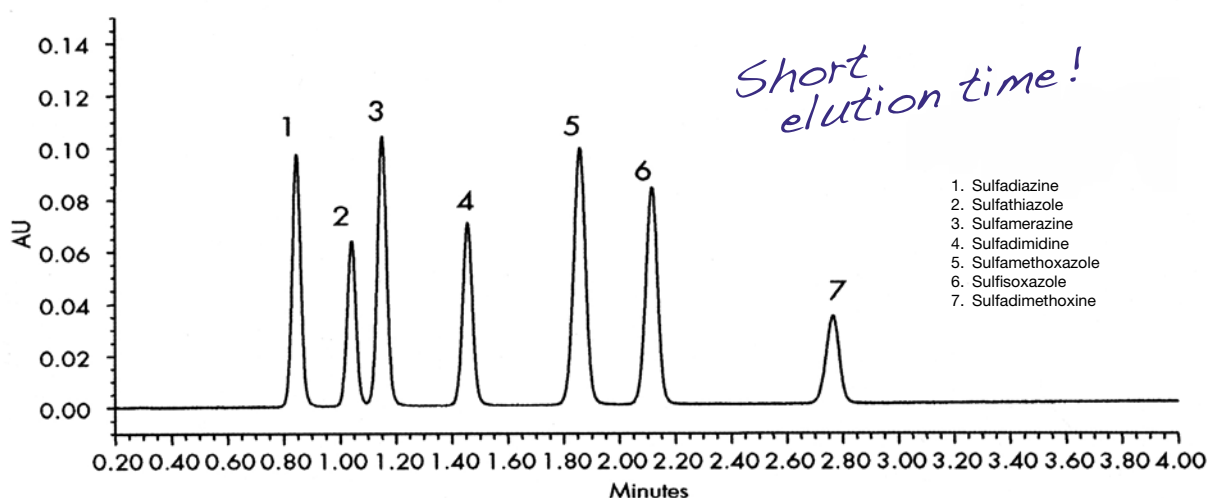
Fast LC

In the preceding pages the outstanding characteristics of YMC-UltraHT Pro C18 and YMC-UltraHT Hydrosphere C18 have been presented. However, it should be noted that accelerated sample throughput can be successfully achieved with all YMC 3 or 4 μm selectivities. These YMC columns for Fast HPLC are based on the improved selectivity, maximum resolution and excellent peak shape obtainable with YMC high performance supports. This enables chromatographers to meet the challenges of developing fast separations that completely characterise the constituents of samples. These improvements are achieved by using YMC Fast LC columns packed with 3 μm YMC high purity, high efficiency materials in columns of 10 mm, 20 mm or 33 mm lengths and 2.1, 3.0 or 4.0 mm i.d. without compromising the quantitative or qualitative data.

Product Name		Particle size (μm)	Pore size (nm)	Usable pH range	Characteristics
YMC-Pack series	UltraHT Pro C18	2	12	2-8	fat-soluble vitamins, antioxidants, metabolites, acidic, neutral, basic and chelating compounds
	Pro C18	3	12		
		5	12		
	Pro C18 RS	3	8	1-10	suitable for wide range of samples including acidic and basic compounds
		5	8		
	UltraHT HS* C18	2	12	2-8	strong polar compounds, antibiotics, catecholamines, nucleic acids, water-soluble vitamins, acidic, neutral, basic and chelating compounds
	Hydrosphere C18	3	12		
		5	12		
	Pro C8	3	12	2-7.5	acidic, neutral, basic and chelating compounds, drugs and metabolites
		5	12		
Pro C4	3	12			
	5	12			
J'sphere (JH, JM, JL)	4	8	1-9 (JH) 2-7.5 (JM, JL)	positional isomers, complexing agents, pharmaceuticals	
PAH	3	-	2-7	polynuclear aromatic hydrocarbons	
	5	-			

* HS = YMC-Code for Hydrosphere

Sulfonamides

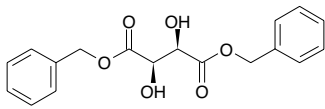


Column: Pro C18 (3 μm , 12 nm) 20 x 4.6 mm i.d.
 Eluent: A) water / formic acid (100/0.1)
 B) ACN / formic acid (100/0.1)
 Gradient: 0-50% B (0-4 min)
 Flow rate: 3.0 ml/min
 Temperature: 30 °C
 Detection: UV at 270 nm
 Injection: 10 μl
 Pressure: 2300 psi (155 bar), 15.5 MPa

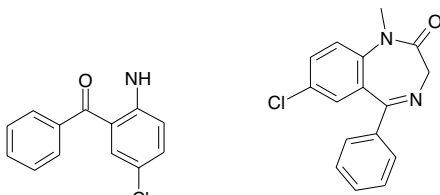
Fast LC

Sub 1-Minute LC

Under conventional HPLC conditions (C18, 3 μm , 50 x 4.6 mm, 1.5 ml/min, H₂O (0.05% formic acid)/acetonitrile gradient) the sample consisting of diazepam, dibenzyl L-tartrate and 4-chloro-2-benzoylaniline elutes within 4.5 minutes.



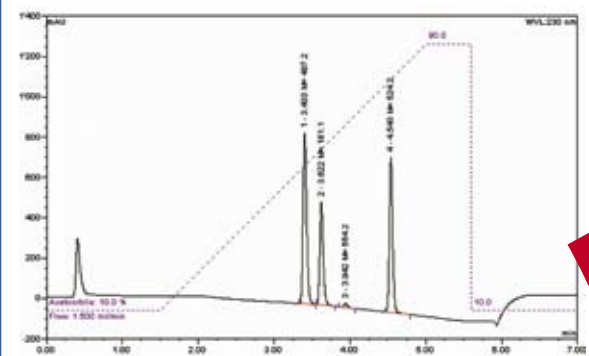
1. Dibenzyl L-tartrate



2. 4-Chloro-2-benzoylaniline

3. Diazepam

Conventional LC Method



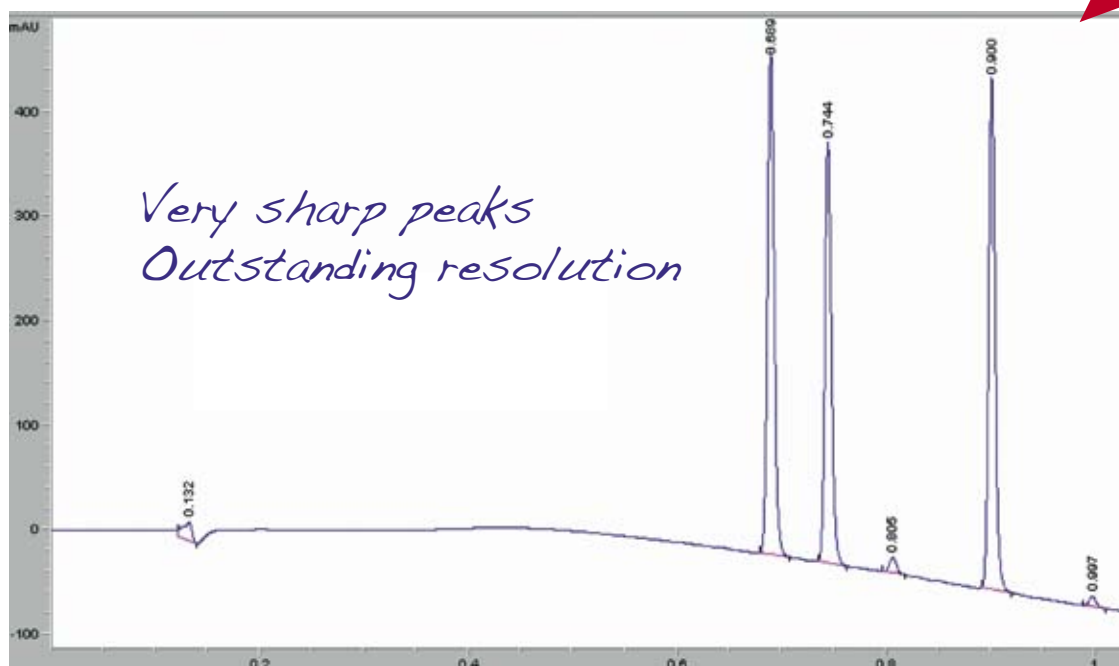
Column: Zorbax XDB-C18 50 x 4.6 mm i.d.
 Eluent: acetonitrile / water (0.05% formic acid) (10-95%)
 Temperature: 25 °C
 Flow: 1.5 ml/min

However, the combination of high efficient YMC-Pack *Pro* C18 Fast LC columns and state of the art analytical equipment allows a significant reduction in analysis time.

The application below demonstrates how an advanced chromatographic column can reduce run times, resulting in considerable savings in time and solvents without compromising peak shape or resolution.

More significantly, YMC-Pack *Pro* C18 Fast LC columns create a much lower pressure drop than observed for competitive products and one which is significantly lower than obtained with Ultra Fast LC columns, whilst providing a separation that compares very favourably with the chromatographic behaviour of many sub 2 μm columns.

Fast LC Method



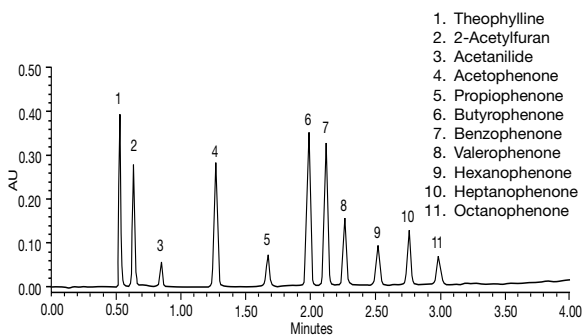
Column: YMC-Pack *Pro* C18, 3 μm , 50 x 4.0 mm i.d.
 Eluent: acetonitrile / water (0.05% formic acid) (10-95%)
 Temperature: 80 °C
 Flow: 4.0 ml/min

Fast LC

The following application notes demonstrate how an advanced chromatographic column can:

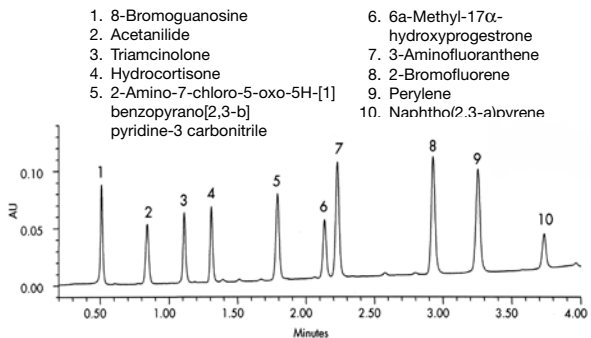
- reduce run times
- provide considerable time savings
- provide the resolution necessary to deal with a range of analytes in a variety of samples with existing HPLC equipment, without resorting to ultrahigh pressure elution techniques.

Aromatic Ketones*



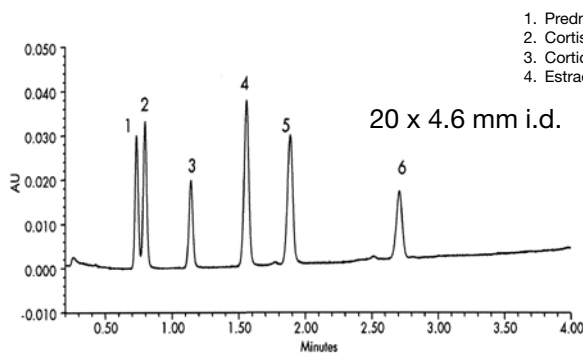
Column: YMC-Pack Pro C18 (3 μ m, 12 nm) 20 x 4.6 mm i.d.
 Eluent: A) water / formic acid (100/0.1)
 B) acetonitrile / formic acid (100/0.1)
 Gradient: 0-100% B (0-4 min)
 Flow rate: 3.0 ml/min
 Temperature: 30 °C
 Detection: UV at 254 nm
 Injection: 10 μ l
 Pressure: 1410 psi (95 bar), 9.5 MPa

Polar and non-polar compounds*

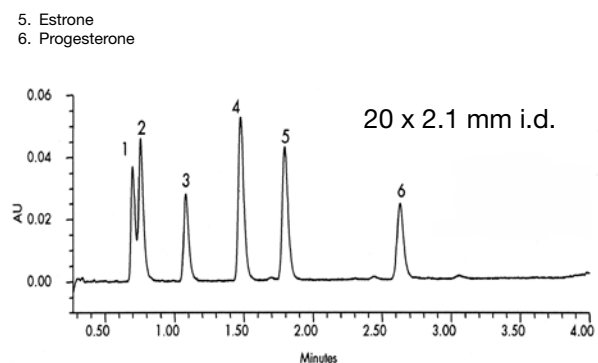


Column: YMC-Pack Pro C18 (3 μ m, 12 nm) 20 x 4.6 mm i.d.
 Eluent: A) water / formic acid (100/0.1)
 B) acetonitrile / formic acid (100/0.1)
 Gradient: 0-100% B (0-4 min)
 Flow rate: 3.0 ml/min
 Temperature: 30 °C
 Detection: UV at 254 nm
 Injection: 10 μ l
 Pressure: 1490 psi (100 bar), 10 MPa

Steroids*



Column: YMC-Pack Pro C18 (3 μ m, 12 nm) 20 x 4.6 mm i.d.
 Eluent: A) water
 B) acetonitrile
 Gradient: 20-64% B (0-4 min)
 Flow rate: 3.0 ml/min
 Temperature: 30 °C
 Detection: UV at 220 nm
 Injection: 10 μ l
 Pressure: 1400 psi (94 bar), 9.4 MPa



Column: YMC-Pack Pro C18 (3 μ m, 12 nm) 20 x 2.1 mm i.d.
 Eluent: A) water
 B) acetonitrile
 Gradient: 20-64% B (0-4 min)
 Flow rate: 0.6 ml/min
 Temperature: 30 °C
 Detection: UV at 220 nm
 Injection: 5 μ l
 Pressure: 1600 psi (107 bar), 10.7 MPa

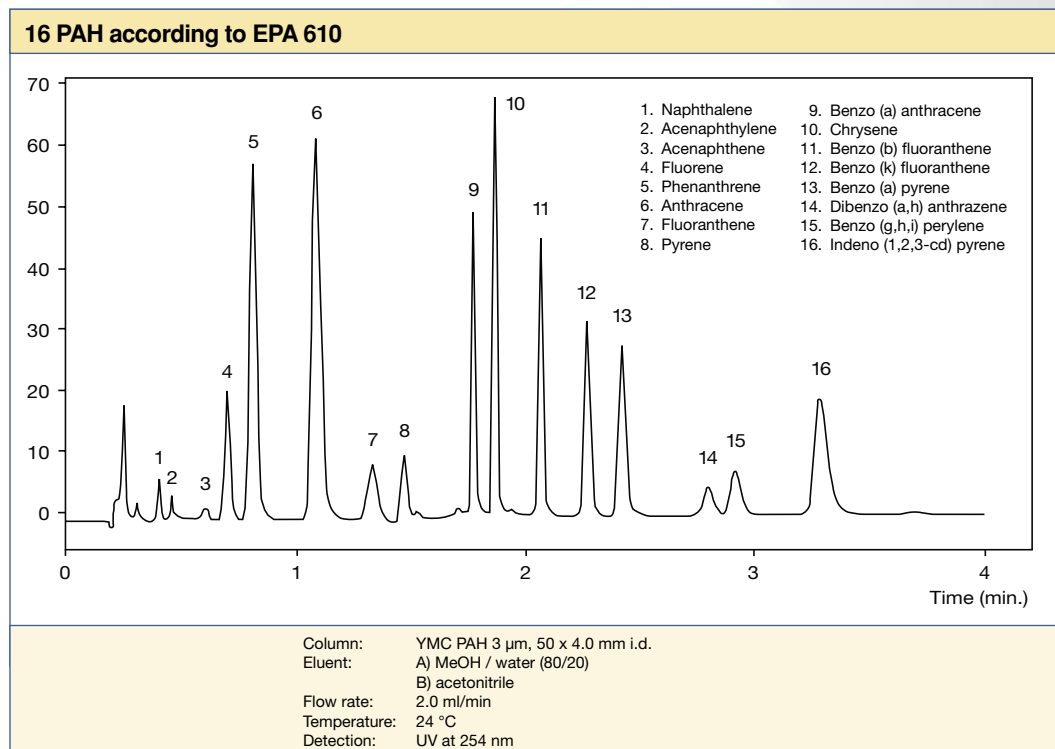
* Applications provided by YMC Inc.

Fast LC

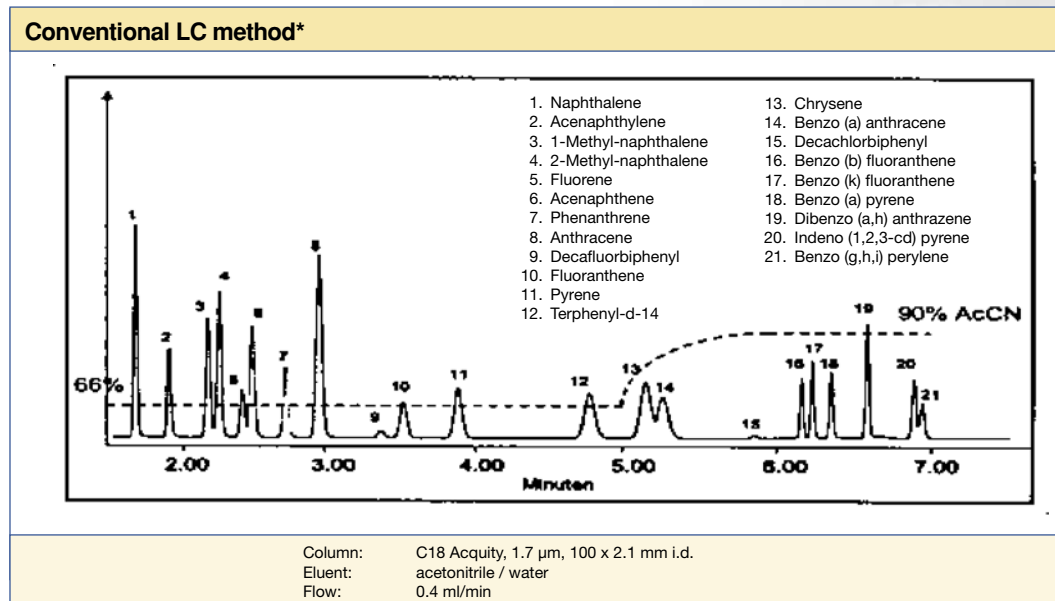
16 PAHs in less than 4 minutes!

Polynuclear Aromatic Hydrocarbons are among the most frequently monitored environmental contaminants due to pollution concerns. The combination of YMC Fast LC columns and YMC's PAH bonded phase leads to the separation of 16 PAH compounds listed by the Environmental Protection Agency (EPA) in less than 4 minutes.

YMC offers 3 μm material in 10 mm, 20 mm, 33 mm and 50 mm length columns with 2.1, 3.0 and 4.0 mm i.d.



The YMC application compares very favourably with the recent published application by Waters, in which the separation takes only 4 minutes compared to 7 minutes and which does not require the use of equipment other than a standard HPLC system.



* M. Swartz (Waters Corp.), C. Weiß (Waters GmbH), GIT Labor-Fachzeitschrift 3 (2005) 243

Ordering Information



YMC-UltraHT Pro C18, 12 nm, 2 μm

Column i.d. (mm)	Column length (mm)				
	30	50	75	100	150
2.0	AS12S020302	AS12S020502	AS12S02L502	AS12S021002	AS12S021502
3.0		AS12S020503	AS12S02L503	AS12S021003	AS12S021503



YMC-UltraHT Hydrosphere C18, 12 nm, 2 μm

Column i.d. (mm)	Column length (mm)				
	30	50	75	100	150
2.0	HS12S020302	HS12S020502	HS12S02L502	HS12S021002	HS12S021502
3.0		HS12S020503	HS12S02L503	HS12S021003	HS12S021503



YMC-Pack Pro C18, 12 nm, 3 μm

Column i.d. (mm)	Column length (mm)				
	33	50	100	150	250
1.0	AS12S030301	AS12S030501	AS12S031001	AS12S031501	AS12S032501
2.1	AS12S030302	AS12S030502	AS12S031002	AS12S031502	AS12S032502
3.0	AS12S030303	AS12S030503	AS12S031003	AS12S031503	AS12S032503
4.0	AS12S030304	AS12S030504	AS12S031004	AS12S031504	AS12S032504
4.6	AS12S030346	AS12S030546	AS12S031046	AS12S031546	AS12S032546
4.6		CCASS030546			
10.0			AS12S031010	AS12S031510	AS12S032510
20.0		AS12S030520	AS12S031020	AS12S031520	AS12S032520
20.0		CCASS030520			
30.0				AS12S031530	AS12S032530

Note: Part numbers in grey are available but not recommended for Fast LC or Ultra Fast LC applications.



YMC-Pack Pro C18, 12 nm, 5 μm

Column i.d. (mm)	Column length (mm)				
	33	50	100	150	250
1.0	AS12S050301	AS12S050501	AS12S051001	AS12S051501	AS12S052501
2.1	AS12S050302	AS12S050502	AS12S051002	AS12S051502	AS12S052502
3.0	AS12S050303	AS12S050503	AS12S051003	AS12S051503	AS12S052503
4.0	AS12S050304	AS12S050504	AS12S051004	AS12S051504	AS12S052504
4.6	AS12S050346	AS12S050546	AS12S051046	AS12S051546	AS12S052546
4.6		CCASS050546			
10.0			AS12S051010	AS12S051510	AS12S052510
20.0		AS12S050520	AS12S051020	AS12S051520	AS12S052520
20.0		CCASS050520			
30.0				AS12S051530	AS12S052530

Note: Part numbers in grey are available but not recommended for Fast LC or Ultra Fast LC applications.

Ordering Information

YMC-Pack Pro C18 RS, 8 nm, 3 μ m

Column i.d. (mm)	Column length (mm)				
	33	50	100	150	250
1.0	RS08S030301	RS08S030501	RS08S031001	RS08S031501	RS08S032501
2.1	RS08S030302	RS08S030502	RS08S031002	RS08S031502	RS08S032502
3.0	RS08S030303	RS08S030503	RS08S031003	RS08S031503	RS08S032503
4.0	RS08S030304	RS08S030504	RS08S031004	RS08S031504	RS08S032504
4.6	RS08S030346	RS08S030546	RS08S031046	RS08S031546	RS08S032546
4.6		CCRSS030546			
10.0			RS08S031010	RS08S031510	RS08S032510
20.0		RS08S030520	RS08S031020	RS08S031520	RS08S032520
20.0		CCRSS030520			
30.0				RS08S031530	RS08S032530

RS

8 nm

3 μ m

Note: Part numbers in grey are available but not recommended for Fast LC or Ultra Fast LC applications.

YMC-Pack Pro C18 RS, 8 nm, 5 μ m

Column i.d. (mm)	Column length (mm)				
	33	50	100	150	250
1.0	RS08S050301	RS08S050501	RS08S051001	RS08S051501	RS08S052501
2.1	RS08S050302	RS08S050502	RS08S051002	RS08S051502	RS08S052502
3.0	RS08S050303	RS08S050503	RS08S051003	RS08S051503	RS08S052503
4.0	RS08S050304	RS08S050504	RS08S051004	RS08S051504	RS08S052504
4.6	RS08S050346	RS08S050546	RS08S051046	RS08S051546	RS08S052546
4.6		CCRSS050546			
10.0			RS08S051010	RS08S051510	RS08S052510
20.0		RS08S050520	RS08S051020	RS08S051520	RS08S052520
20.0		CCRSS050520			
30.0				RS08S051530	RS08S052530

RS

8 nm

5 μ m

Note: Part numbers in grey are available but not recommended for Fast LC or Ultra Fast LC applications.

Hydrosphere, 12 nm, 3 μ m

Column i.d. (mm)	Column length (mm)				
	33	50	100	150	250
1.0	HS12S030301	HS12S030501	HS12S031001	HS12S031501	HS12S032501
2.1	HS12S030302	HS12S030502	HS12S031002	HS12S031502	HS12S032502
3.0	HS12S030303	HS12S030503	HS12S031003	HS12S031503	HS12S032503
4.0	HS12S030304	HS12S030504	HS12S031004	HS12S031504	HS12S032504
4.6	HS12S030346	HS12S030546	HS12S031046	HS12S031546	HS12S032546
4.6		CCHSS030546			
10.0			HS12S031010	HS12S031510	HS12S032510
20.0		HS12S030520	HS12S031020	HS12S031520	HS12S032520
20.0		CCHSS030520			
30.0				HS12S031530	HS12S032530

HS

12 nm

3 μ m

Note: Part numbers in grey are available but not recommended for Fast LC or Ultra Fast LC applications.

LC-MS

Combinatorial chemistry

Semi-preparative

Ordering Information



Hydrosphere, 12 nm, 5 μm

Column i.d. (mm)	Column length (mm)				
	33	50	100	150	250
1.0	HS12S050301	HS12S050501	HS12S051001	HS12S051501	HS12S052501
2.1	HS12S050302	HS12S050502	HS12S051002	HS12S051502	HS12S052502
3.0	HS12S050303	HS12S050503	HS12S051003	HS12S051503	HS12S052503
4.0	HS12S050304	HS12S050504	HS12S051004	HS12S051504	HS12S052504
4.6	HS12S050346	HS12S050546	HS12S051046	HS12S051546	HS12S052546
4.6		CCHSS050546			
10.0			HS12S051010	HS12S051510	HS12S052510
20.0		HS12S050520	HS12S051020	HS12S051520	HS12S052520
20.0		CCHSS050520			
30.0				HS12S051530	HS12S052530

Note: Part numbers in grey are available but not recommended for Fast LC or Ultra Fast LC applications.



YMC-Pack Pro C8, 12 nm, 3 μm

Column i.d. (mm)	Column length (mm)				
	33	50	100	150	250
1.0	OS12S030301	OS12S030501	OS12S031001	OS12S031501	OS12S032501
2.1	OS12S030302	OS12S030502	OS12S031002	OS12S031502	OS12S032502
3.0	OS12S030303	OS12S030503	OS12S031003	OS12S031503	OS12S032503
4.0	OS12S030304	OS12S030504	OS12S031004	OS12S031504	OS12S032504
4.6	OS12S030346	OS12S030546	OS12S031046	OS12S031546	OS12S032546
4.6		CCOSS030546			
10.0			OS12S031010	OS12S031510	OS12S032510
20.0		OS12S030520	OS12S031020	OS12S031520	OS12S032520
20.0		CCOSS030520			
30.0				OS12S031530	OS12S032530

Note: Part numbers in grey are available but not recommended for Fast LC or Ultra Fast LC applications.



YMC-Pack Pro C8, 12 nm, 5 μm

Column i.d. (mm)	Column length (mm)				
	33	50	100	150	250
1.0	OS12S050301	OS12S050501	OS12S051001	OS12S051501	OS12S052501
2.1	OS12S050302	OS12S050502	OS12S051002	OS12S051502	OS12S052502
3.0	OS12S050303	OS12S050503	OS12S051003	OS12S051503	OS12S052503
4.0	OS12S050304	OS12S050504	OS12S051004	OS12S051504	OS12S052504
4.6	OS12S050346	OS12S050546	OS12S051046	OS12S051546	OS12S052546
4.6		CCOSS050546			
10.0			OS12S051010	OS12S051510	OS12S052510
20.0		OS12S050520	OS12S051020	OS12S051520	OS12S052520
20.0		CCOSS050520			
30.0				OS12S051530	OS12S052530

Note: Part numbers in grey are available but not recommended for Fast LC or Ultra Fast LC applications.

Ordering Information

YMC-Pack Pro C4, 12 nm, 3 μ m

Column i.d. (mm)	Column length (mm)				
	33	50	100	150	250
1.0	BS12S030301	BS12S030501	BS12S031001	BS12S031501	BS12S032501
2.1	BS12S030302	BS12S030502	BS12S031002	BS12S031502	BS12S032502
3.0	BS12S030303	BS12S030503	BS12S031003	BS12S031503	BS12S032503
4.0	BS12S030304	BS12S030504	BS12S031004	BS12S031504	BS12S032504
4.6	BS12S030346	BS12S030546	BS12S031046	BS12S031546	BS12S032546
4.6		CCBSS030546			
10.0			BS12S031010	BS12S031510	BS12S032510
20.0		BS12S030520	BS12S031020	BS12S031520	BS12S032520
20.0		CCBSS030520			
30.0				BS12S031530	BS12S032530

BS

12 nm

3 μ m

Note: Part numbers in grey are available but not recommended for Fast LC or Ultra Fast LC applications.

YMC-Pack Pro C4, 12 nm, 5 μ m

Column i.d. (mm)	Column length (mm)				
	33	50	100	150	250
1.0	BS12S050301	BS12S050501	BS12S051001	BS12S051501	BS12S052501
2.1	BS12S050302	BS12S050502	BS12S051002	BS12S051502	BS12S052502
3.0	BS12S050303	BS12S050503	BS12S051003	BS12S051503	BS12S052503
4.0	BS12S050304	BS12S050504	BS12S051004	BS12S051504	BS12S052504
4.6	BS12S050346	BS12S050546	BS12S051046	BS12S051546	BS12S052546
4.6		CCBSS050546			
10.0			BS12S051010	BS12S051510	BS12S052510
20.0		BS12S050520	BS12S051020	BS12S051520	BS12S052520
20.0		CCBSS050520			
30.0				BS12S051530	BS12S052530

BS

12 nm

5 μ m

Note: Part numbers in grey are available but not recommended for Fast LC or Ultra Fast LC applications.

J'sphere ODS, 8 nm, 4 μ m

Column i.d. (mm)	Column length (mm)				
	33	50	100	150	250
1.0	XX08S040301	XX08S040501	XX08S041001	XX08S041501	XX08S042501
2.1	XX08S040302	XX08S040502	XX08S041002	XX08S041502	XX08S042502
3.0	XX08S040303	XX08S040503	XX08S041003	XX08S041503	XX08S042503
4.0	XX08S040304	XX08S040504	XX08S041004	XX08S041504	XX08S042504
4.6	XX08S040346	XX08S040546	XX08S041046	XX08S041546	XX08S042546
4.6		CCXXS040546			
10.0			XX08S041010	XX08S041510	XX08S042510
20.0		XX08S040520	XX08S041020	XX08S041520	XX08S042520
20.0		CCXXS040520			
30.0				XX08S041530	XX08S042530

JH

JM

JL

8 nm

4 μ m

Please replace **XX** by: **JH** for J'sphere ODS-H80; **JM** for J'sphere ODS-M80; **JL** for J'sphere ODS-L80

Note: Part numbers in grey are available but not recommended for Fast LC or Ultra Fast LC applications.

LC-MS

Combinatorial chemistry

Semi-preparative

Ordering Information



YMC PAH, 3 µm

Column i.d. (mm)	Column length (mm)				
	33	50	100	150	250
1.0	YP99S030301	YP99S030501	YP99S031001	YP99S031501	YP99S032501
2.1	YP99S030302	YP99S030502	YP99S031002	YP99S031502	YP99S032502
3.0	YP99S030303	YP99S030503	YP99S031003	YP99S031503	YP99S032503
4.0	YP99S030304	YP99S030504	YP99S031004	YP99S031504	YP99S032504
4.6	YP99S030346	YP99S030546	YP99S031046	YP99S031546	YP99S032546
4.6		CCYPS030546			
10.0			YP99S031010	YP99S031510	YP99S032510
20.0		YP99S030520	YP99S031020	YP99S031520	YP99S032520
20.0		CCYPS030520			
30.0				YP99S031530	YP99S032530

Note: Part numbers in grey are available but not recommended for Fast LC or Ultra Fast LC applications.

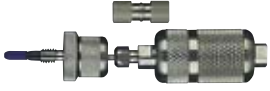


YMC PAH, 5 µm

Column i.d. (mm)	Column length (mm)				
	33	50	100	150	250
1.0	YP99S050301	YP99S050501	YP99S051001	YP99S051501	YP99S052501
2.1	YP99S050302	YP99S050502	YP99S051002	YP99S051502	YP99S052502
3.0	YP99S050303	YP99S050503	YP99S051003	YP99S051503	YP99S052503
4.0	YP99S050304	YP99S050504	YP99S051004	YP99S051504	YP99S052504
4.6	YP99S050346	YP99S050546	YP99S051046	YP99S051546	YP99S052546
4.6		CCYPS050546			
10.0			YP99S051010	YP99S051510	YP99S052510
20.0		YP99S050520	YP99S051020	YP99S051520	YP99S052520
20.0		CCYPS050520			
30.0				YP99S051530	YP99S052530

Note: Part numbers in grey are available but not recommended for Fast LC or Ultra Fast LC applications.

Guard cartridges for J'sphere ODS-H80, ODS-M80, ODS-L80

Column i.d. (mm)	Guard cartridges with 10 mm length 4 µm (pack of 5)	 <p>The quality of the guard cartridges can dramatically influence the entire chromatographic separation. Also, the connection between column and guard cartridge/holder should be void volume free to obtain good peak shapes. YMC highly recommends the permanent usage of guard cartridges to protect chromatography columns. Hereby, it should be noted that YMC's hardware guarantee a low void volume connection and that YMC solely offers tested guard cartridges to meet YMC's high quality standards.</p>
1.0	XX08S040101	
2.1	XX08S040102	
3.0	XX08S040103	
4.0	XX08S040104	
4.6	XX08S040104	
10.0	XX08S040108FC ¹	
20.0	XX08S040120FC ¹	

Integral guard cartridge holder for columns with 1.0-4.0 mm i.d.: XPGCS-Q1
 Universal guard cartridge holder for columns with 4.6 mm i.d.: XPGCH-Q1
 SemiPrep guard cartridge holder for columns with 10 mm i.d.: XPGCE08
 SemiPrep guard cartridge holder for columns with 20 mm i.d.: XPGCE20
 Guard cartridges with 20 mm length and the corresponding guard cartridge holders are available on request.

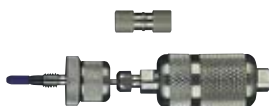
Please replace **XX** by: **JH** for J'sphere ODS-H80; **JM** for J'sphere ODS-M80; **JL** for J'sphere ODS-L80

¹ Pack of 2



Ordering Information

Guard cartridges

Column i.d. (mm)	Guard cartridges with 10 mm length 3 µm (pack of 5)	Guard cartridges with 10 mm length 5 µm (pack of 5)	 <p>The quality of the guard cartridges can dramatically influence the entire chromatographic separation. Also, the connection between column and guard cartridge/holder should be void volume free to obtain good peak shapes. YMC highly recommends the permanent usage of guard cartridges to protect chromatography columns. Hereby, it should be noted that YMC's hardware guarantee a low void volume connection and that YMC solely offers tested guard cartridges to meet YMC's high quality standards.</p>
1.0	XXYYS030101	XXYYS050101	
2.1	XXYYS030102	XXYYS050102	
3.0	XXYYS030103	XXYYS050103	
4.0	XXYYS030104	XXYYS050104	
4.6	XXYYS030104	XXYYS050104	
10.0	XXYYS030108FC ¹	XXYYS050108FC ¹	
20.0	XXYYS030120FC ¹	XXYYS050120FC ¹	
30.0		XXYYS050230FC ²	

Integral guard cartridge holder for columns with 1.0-4.0 mm i.d.: XPGCS-Q1
 Universal guard cartridge holder for columns with 4.6 mm i.d.: XPGCH-Q1
 SemiPrep guard cartridge holder for columns with 10 mm i.d.: XPGCE08
 SemiPrep guard cartridge holder for columns with 20 mm i.d.: XPGCE20
 SemiPrep guard cartridge holder for columns with 30 mm i.d.: XPGCE30

Guard cartridges with 20 mm length and the corresponding guard cartridge holders are available on request.



Please replace **XX** by: **AS** for Pro C18; **RS** for Pro C18 RS; **HS** for Hydrosphere; **OS** for Pro C8; **BS** for Pro C4; **YP** for PAH
 Please replace **YY** by: **08** for 8 nm pore size; **12** for 12 nm pore size; **99** for PAH; not all combinations possible - see tables above

¹ Pack of 2

² Pack of 1, only available in 20 mm length

Sure-Fit™ Connector

Since different column hardware manufacturers have introduced a variety of connecting port geometries over the years, the Sure-Fit™ Connector represents an ideal tool to avoid dead volumes, irrespective of the column brand, when connecting different columns to a given HPLC system.



YMC strongly recommends the use of the Sure-Fit™ Connector due to its internal spring tensioned mechanism which automatically self-adjusts to any port depth while maintaining constant pressure on the capillary tubing to guarantee a connection free from any dead volume. Column changeovers become easy, especially as no tools are required. The Sure-Fit™ Connector is fingertight to 6000 psi and is available in a range of capillary tubing i.d.'s and lengths.

Column i.d.* (mm)	Tubing i.d.* (mm)	Single end unit (incl. 20 mm stainless steel capillary)	Double end unit (incl. 20 mm stainless steel capillary)
1.0-3.0	0.13	SFS2005	SFD2005
3.0-4.6	0.18	SFS2007	SFD2007
8.0-10	0.25	SFS2010	SFD2010
20-30	0.50	SFS3020 ¹	SFD3020 ¹

* Other versions available on request

¹ Includes 30 mm stainless steel capillary

Other columns / product versions

The above product listing represents commonly used "standard" column dimensions. To identify any specific product version and order number, please refer to our IPC (International Product Code) for:

- capillary columns available in 50, 75, 100, 200, 300, 500, 800 µm i.d.
- 6, 8, 10, 20, 30 mm i.d. analytical /semi-prep columns
- PEEK or glass columns also available on request
- customised stationary phases, lot reservation or customized QC also available on request



For more details



contact your local distributor or

YMC Europe GmbH, Schöttmannshof 19, D-46539 Dinslaken, Phone: +49 (0) 2064 / 427-0, Fax +49 (0) 2064 / 427-222, e-mail: info@ymc.de, homepage: www.ymc.de

Guide to IPC (International Product Code)

- International Product Code (IPC) for uniform product identification worldwide
- product labelling
- ISO9001 quality management



In order to ensure reliable product identification worldwide, YMC established its International Product Code (IPC), consisting of “readable” modules for parts, column hardware and prepacked columns. Implementation of the IPC ensures that one specific part number is assigned to any product, even exotic or customised versions, that may become required for increasingly demanding applications in terms of column length, diameter or customised media chemistry, etc. In spite of the numerous theoretical product configurations, the IPC is designed to be as intuitive as possible. Therefore, as well as being able to generate a part number even for non-standard product configurations, the IPC will greatly assist endusers worldwide to communicate on the verification of method transfer or validation, based on the descriptive information provided on the product labels. Operating errors and ordering errors, which result in delays in supply and/or delay of work, are therefore minimised.

In terms of quality management, YMC column labels routinely provide information on the (IPC) part number, which identifies all product components and a serial number for traceability data, recorded at YMC, for example on the base silica lot, the derivatisation lot, the packing protocol (inspection report), etc. The following column label for a prepacked analytical column illustrates the basis of the IPC:

YMC
HPLC COLUMN

YMC Co., Ltd. Japan
YMC, Inc. U.S.A.
YMC Europe GmbH

FLOW

YMC-Pack ODS-AQ
AQ12S05-2546WT
250 x 4.6 mm i.d.
S-5 µm, 12 nm
Ser.-No. 0436829701(w)

The **part number** consists of

- the “Gel Code” identifying the packing material
 - AQ** = YMC-Pack ODS-AQ
 - 12** = 12 nm (120 Å)
 - S** = spherical
 - 05** = 5 microns particle size
- the “Hardware Code” identifying the column dimensions (and the type of column hardware*)
 - 25** = 25 cm (250 mm) length
 - 46** = 4.6 mm i.d.

The **serial number** provides a link, recorded at YMC, on the base silica, the derivatisation and column packing, which are further traceable by means of their individual manufacturing protocols monitored and documented at YMC.

* WT = Waters-type endfitting/connector geometry / T = threaded hardware type are routinely assigned to all 4.6 mm i.d. columns. A full listing of column hardware types is available in YMC's Technical Data Sheet "Analytical Column Hardware and Accessories".

Guide to IPC (International Product Code)

The following table provides a full listing of stationary phases and column dimensions available from YMC. However, please note that combinations of features cannot be selected at random, but only from the possible specifications for a chosen stationary phase. These can be determined from the individual product sections in this catalogue, from corresponding YMC Technical Data Sheets or from our homepage www.ymc.de.*

Chemistry code		Pore size in nm		Particle shape		Particle size in µm		Length in mm		Inner diameter in mm	
YMC30	CT	6	06	spherical	S	2	02	10	01	0.05	E5
<i>Pro C18</i>	AS	8	08			3	03	20	02	0.075	E8
<i>Pro C18 RS</i>	RS	12	12	irregular	I	4	04	33	03	0.1	F0
Hydrosphere C18	HS	20	20			5	05	50	05	0.2	G0
ODS-A	AA	30	30			6	06	75	L5	0.3	H0
ODS-AM	AM	100	A0					100	10	0.5	J0
ODS-AQ	AQ	proprietary	99			10	11	125	R5	0.8	M0
J'sphere ODS-H80	JH					15	16	150	15	1.0	O1
J'sphere ODS-M80	JM					20	21	250	25	2.1	O2
J'sphere ODS-L80	JL					50	50			3.0	O3
ODS-AL	AL					75	75	300	30	4.0	O4
Polymer C18	PC					63/210	A4	500	50	4.6	O6
<i>Pro C8</i>	OS					150	A5	1000	A0	6.0	O6
C8 (Octyl)	OC							1500	A5	8.0	O8
YMCbasic	BA							2000	B0	10	10
Phenyl	PH									20	20
<i>Pro C4</i>	BS									30	30
C4 (Butyl)	BU										
Protein-RP	PR									50 (2000 psi)	52
C1 (TMS)	TM									70 (2000 psi)	72
PVA-SIL	PV									100 (2000 psi)	A2
Polyamine II	PB									150 (2000 psi)	B2
Amino	NH									200 (2000 psi)	C2
Cyano	CN										
Diol	DL										
Silica	SL										
RP Chiral NEA (R)	NR										
RP Chiral NEA (S)	NS										
NP Chiral NEA (R)	CR										
NP Chiral NEA (S)	CS										
Chiral CD BR α	DA										
Chiral CD BR β	DB										
Chiral CD BR γ	DG										
Chiral Prep CD ST	ST										
Chiral Prep CD PM	PM										

Example:

For ordering a YMC-Pack *Pro C18* column with 12 nm pore size, 3 µm particle size, 50 mm length and 2.1 mm i.d. the corresponding product number will be:

AS12S030502



Should you require assistance, please feel free to contact your local distributor or

YMC Europe GmbH, Schöttmannshof 19, D-46539 Dinslaken, Phone: +49 (0)2064/427-0, Fax +49 (0)2064/427-222, e-mail: info@ymc.de, homepage: www.ymc.de

Trademarks

YMC hereby acknowledges, to the best of their knowledge, third party trademarks as follows:

Sure-Fit is a registered trademark of Isolation Technologies.

Acquity UPLC BEH C18 is a registered trademark of Waters Corporation.

Zorbax Eclipse XDB-C18 is a registered trademark of Agilent Technologies Inc..

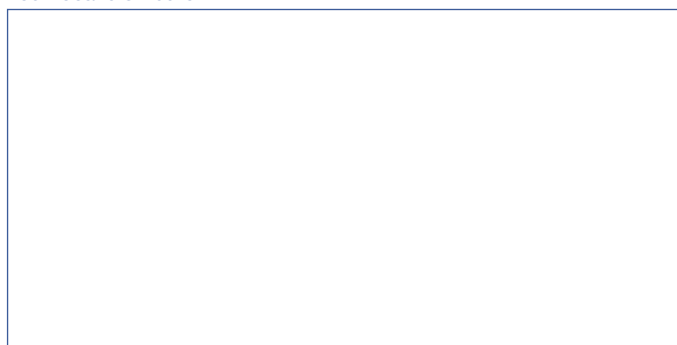
Zorbax XDBC-C18 is a registered trademark of Agilent Technologies Inc..

Terms and Conditions of Sale

YMC General Terms and Conditions of Sale (12/2002) and/or relevant updates are applicable.

* Final verification by YMC is required to confirm or reject availability of "exotic" product versions or custom manufacturing.

Your local distributor:



YMC Co., Ltd.

YMC Karasuma-Gojo Bld. 284 Daigo-cho,
Karasuma Nisiiru Gojo-dori Shimogyo-ku,
Kyoto 600-8106 Japan
TEL. +81(0)75-342-4515, FAX +81(0)75-342-4550
www.ymc.co.jp

Analytical Columns:

**YMC, Inc.
c/o Waters Corp.**

34 Maple Street
Milford, MA 01757 USA
TEL. +1-800-252-4752, FAX +1-508-482-4820

Preparative Bulk Media:

Seika Corporation of America

941 Marcon Boulevard Suite 301
Allentown, PA18109 USA
TEL. +1-610-266-8650, FAX +1-610-266-8652
www.seikacorporation.com

YMC Europe GmbH

Schöttmannshof 19
D-46539 Dinslaken
Germany
TEL. +49(0)2064/427-0, FAX +49(0)2064/427-222
www.ymc.de