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# Speciality Columns

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## Introduction

### Unique bonded phases

The YMC's Speciality Columns represents major advances in modern chromatography. In order to obtain maximum separation and resolution, selectivity has to be optimised.

YMC is dedicated to produce speciality phases, which are designed to provide robust, reliable and easy transferable method for specific applications. For this reason, YMC introduce YMC30 and YMC PAH phases, which are designed to show high recognition for structurally similar polar and nonpolar carotenoids and polyaromatic hydrocarbons, respectively.

In addition, YMC's J'sphere columns are a series of packings, which offer a range of different hydrophobicity controlled by then alternative process of C18 chain density.

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# YMC30



- **C30 chains**
- **very lipophilic**
- **exceptional selectivity pattern**
- **isomer recognition**
- **polar carotenes**
- **polar and nonpolar Xanthophylls**
- **steroids**
- **retinols**
- **fat-soluble vitamins**
- **LC-MS applications**



YMC30	Specification
Particle size / $\mu\text{m}$	3; 5*
Pore size / nm	proprietary
Surface area / $\text{m}^2\text{g}^{-1}$	proprietary
Carbon content / %	proprietary
Recommended pH range	2.0 - 6.0

\* Preparative grade material with 15  $\mu\text{m}$  particle size is available on request.

## General

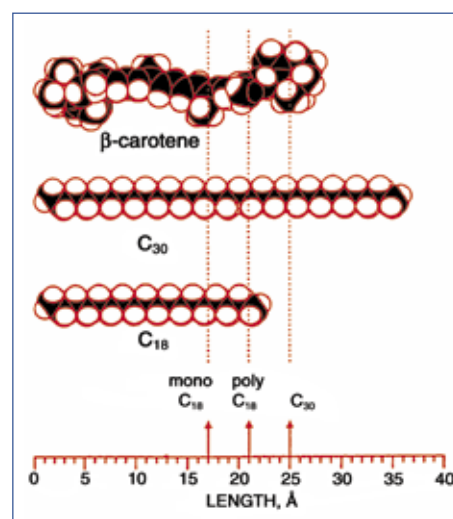
The separation of geometric and positional isomers is a challenging task in reversed phase chromatography. Subtle molecular differences have to be recognized and resolved by this particular stationary phase. Sander et al. have conclusively shown that polymeric C30 HPLC stationary phases are able to discriminate isomeric structures of long chain molecules [1,2].

## Properties

Compared to classical C18 stationary phases, YMC30 is much more hydrophobic. Even when pure organic eluents are applied, many sample solutes are retained. The use of non-aqueous reversed phase mobile phases facilitates 100% solvent recycling and LC-MS applications.

The YMC30 stationary phase provides sufficient phase thickness to enhance interaction with long chained molecules (see figure on right). Therefore, geometric and positional isomers of conjugated double bonding systems are recognised and resolved by the YMC30 phase.

The resolving power of YMC30 for isomers can be verified by the separation of carotenoids, which has been subject of considerable research efforts in the past. Carotenoids are found in a variety of natural sources including fruits and vegetables. In addition, carotenoids are considered as potential drugs for cancer intervention or prevention. Despite the complexity of carotenoid extracts and the minor shape differences between carotenoid isomers, the separation, identification and quantification of these compounds can be achieved by using YMC30 columns.



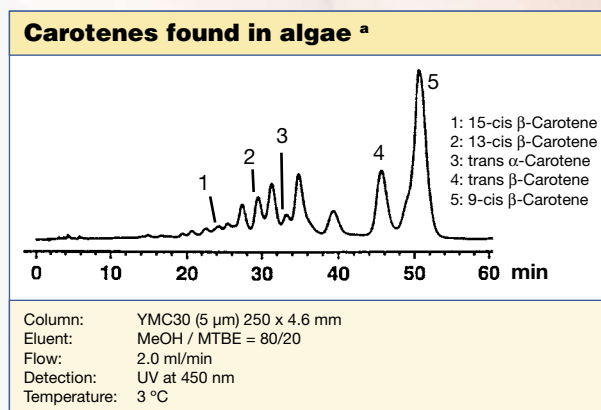
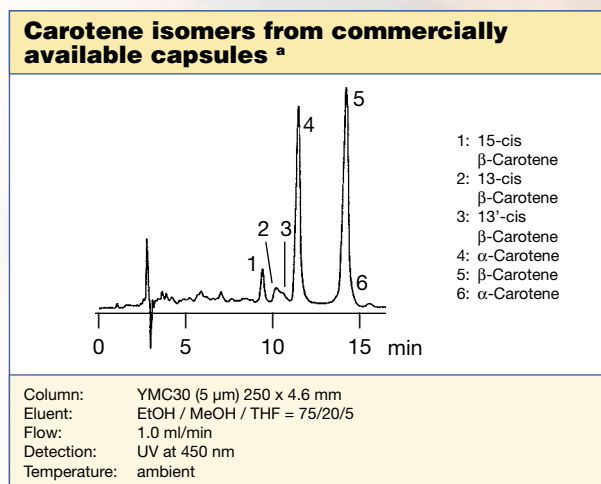
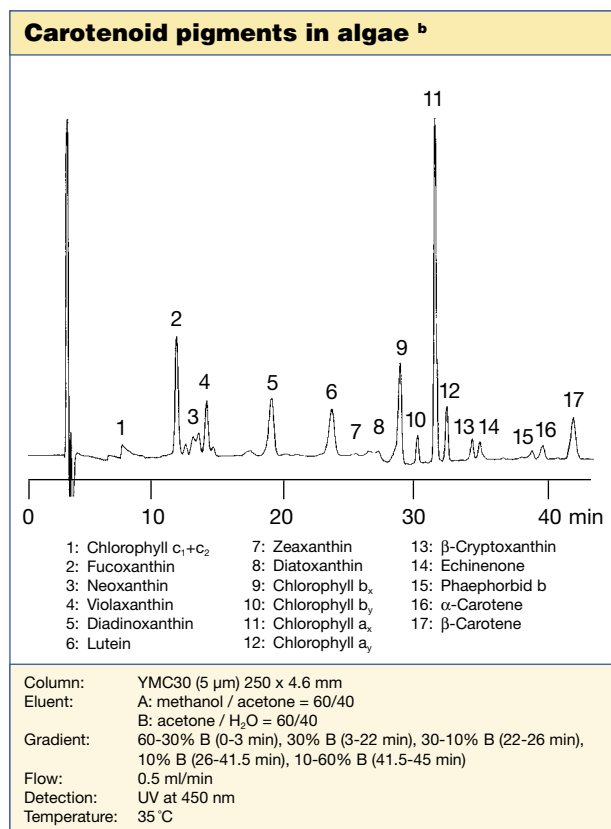
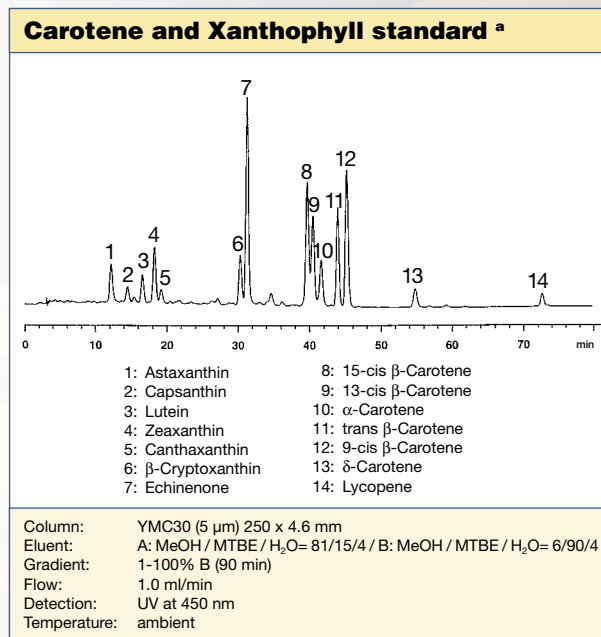
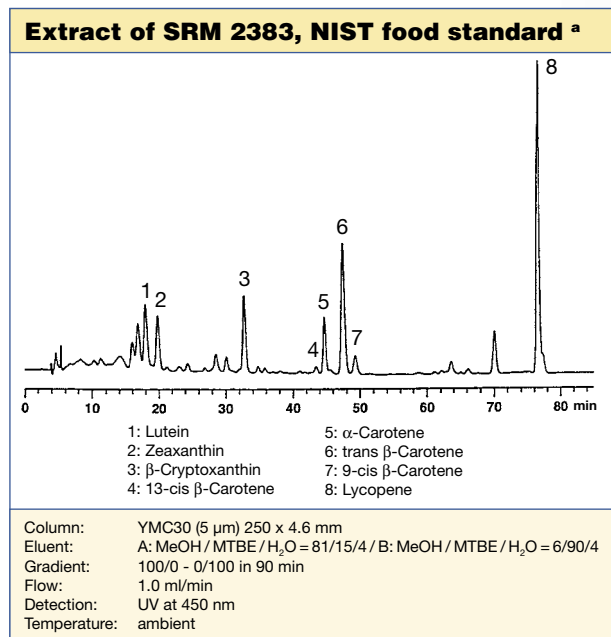
Comparison of the film thickness of C18 and C30 stationary phases with the molecular length of  $\beta$ -carotene (determined with Small Angle Neutron Scattering (SANS)).



## Applications

YMC30 columns are successfully used in the food industry, for the analysis of vitamin formulations, in environmental analysis, and for the control of algal growth. Other potential applications include the separation of prostaglandins and leucotrienes.

## Separation of natural compounds



## References

- [1] Sander, L.C. and S.A. Wise; *J. Chromatogr.* 1993, 656, 335-351  
[2] Sander, L.C. et al.; *Anal. Chem.* 1994, 66, 1667-1674  
[3] Block, G. and L. Langseth, "Antioxidant Vitamins and Disease Prevention", *Food Technology* July 1994

<sup>a</sup> Courtesy of L.C. Sander, NIST, Gaithersburg, NC, USA

<sup>b</sup> Courtesy of J. Schmid, Institut für Seenforschung, Langenargen, Germany

# YMC PAH



- specifically designed for the analysis of Polynuclear Aromatic Hydrocarbons
- provide the resolution necessary for a fast identification and quantification for PAHs



YMC PAH	Specification
Particle Size / $\mu\text{m}$	3; 5
Pore Size / nm	proprietary
Surface area / $\text{m}^2\text{g}^{-1}$	proprietary
Carbon content / %	proprietary
Recommended pH range	2.0 - 6.5

## General

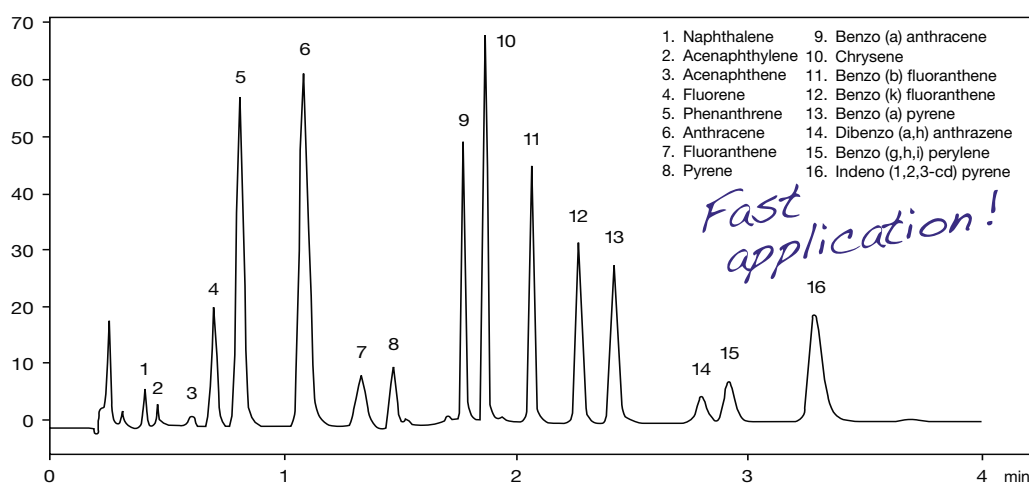
Polynuclear Aromatic Hydrocarbons (PAHs) are among the most frequently monitored environmental contaminants. YMC PAH columns have been specifically developed for the highly demanding analysis of Polynuclear Aromatic Hydrocarbons.

Standard and official methods for the analysis of PAHs are found in compendia for air, drinking water, waste water, solid waste, and food analysis. Many of these methods specify HPLC, usually with UV or fluorescence detection, as recommended analytical procedure.

## Properties

The YMC PAH columns provide narrow symmetrical peak shapes and its resolving ability leads to an easy identification and quantification for PAHs. The optimised selectivity of YMC PAH columns results in a separation with enough space for wavelength changes by the use of fluorescence detectors.

### 16 PAH according to EPA 610\*



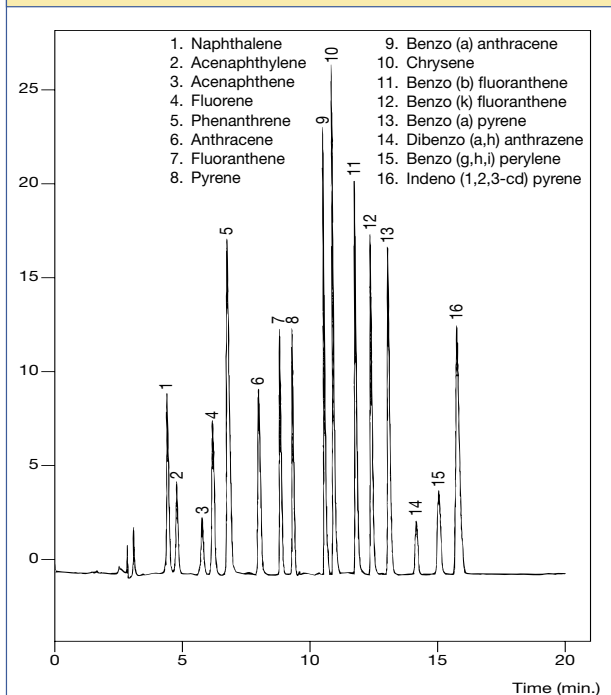
Column: YMC PAH (3  $\mu\text{m}$ ) 50 x 4.0 mm i.d.  
 Eluent: A) methanol / water (80/20)  
 B) acetonitrile  
 Flow rate: 2.0 ml/min  
 Temperature: 24 °C  
 Detection: UV at 254 nm

Gradient Time [min]	A	B
0.0	90%	10%
0.5	90%	10%
1.0	0%	100%
4.0	0%	100%



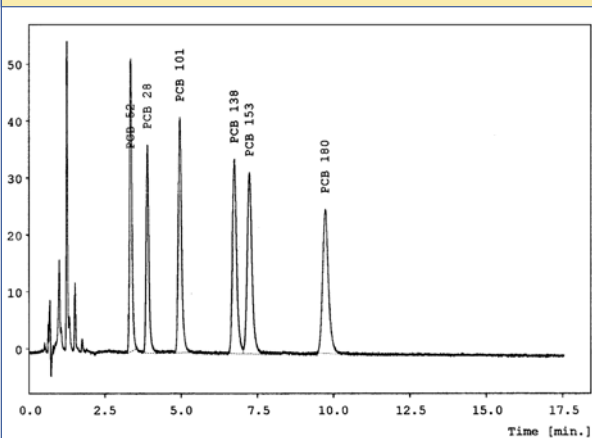
# YMC PAH

## 16 PAH according to EPA 610\*



Column: YMC PAH (5  $\mu$ m) 250 x 3.0 mm i.d.  
 Eluent: A) MeOH / water (80/20) / B) acetonitrile  
 Flow rate: 0.43 ml/min  
 Temperature: 30 °C  
 Detection: UV at 254 nm

## PCB separation according EPA\*

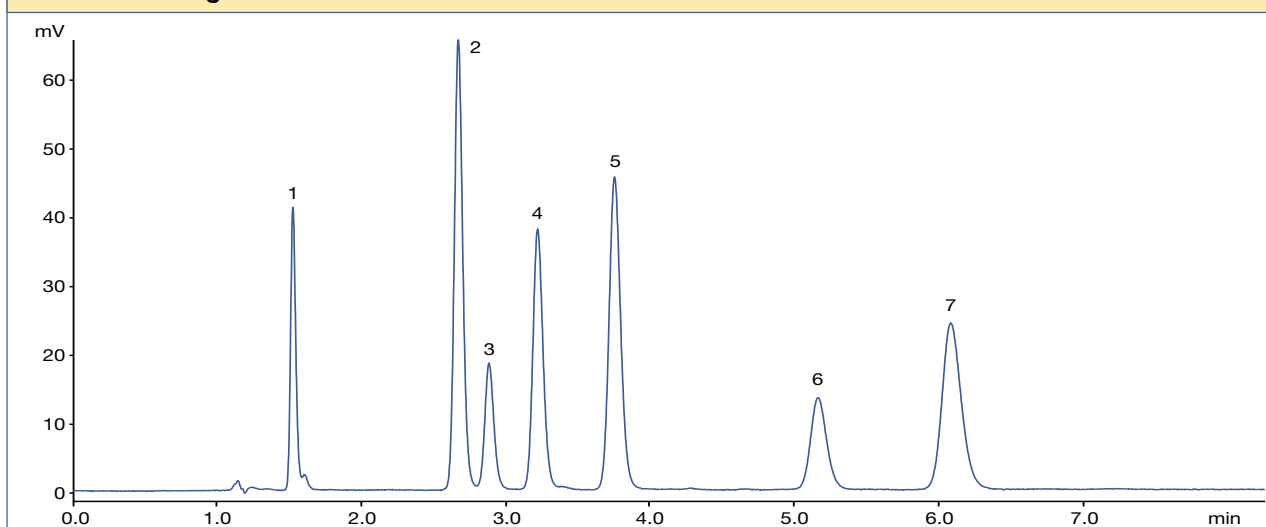


Column: YMC PAH (3  $\mu$ m) 100 x 3.0 mm i.d.  
 Eluent: CH<sub>2</sub>CN / water (75/25) (v/v)  
 Flow rate: 0.6 ml/min  
 Temperature: 30 °C  
 Detection: UV at 220 nm

Polynuclear Aromatic Hydrocarbons (PAHs) are ubiquitous xenobiotics which are known or suspected carcinogens. According to the German Trinkwasserverordnung (TVO) six PAH have to be quantified. Moreover Perylene, which is often present in the samples under investigation, has to be fully resolved in order to avoid coelutions and therefore questionable results.

The chromatogram below shows the successful separation of all seven substances with a YMC PAH column as stationary and an acetonitrile/methanol mixture as a simple isocratic mobile phase. The elution time has been reduced to approximately six minutes with excellent resolution without the need for gradient elution.

## 7 PAH according to EPA 610\*



Column: YMC PAH (5  $\mu$ m) 125 x 4.0 mm i.d.  
 Eluent: acetonitrile / methanol (95/5)  
 Flow rate: 1.0 ml/min  
 Temp.: 25 °C  
 Detection: UV at 254 nm  
 Inj.-vol.: 5  $\mu$ l

1. Fluoranthene  
 2. Benzo[b]fluoranthene  
 3. Perylene  
 4. Benzo[k]fluoranthene  
 5. Benzo[a]pyrene  
 6. Benzo[ghi]perylene  
 7. Indeno[1,2,3-cd]pyrene

# J'sphere ODS



- high quality RP columns
- high surface silica, 8 nm, 4 μm
- polarity range created solely by C18 bonding density
- metabolite recognition
- high siloxane content
- additional selectivity through H-bonding

a selectivity concept designed for

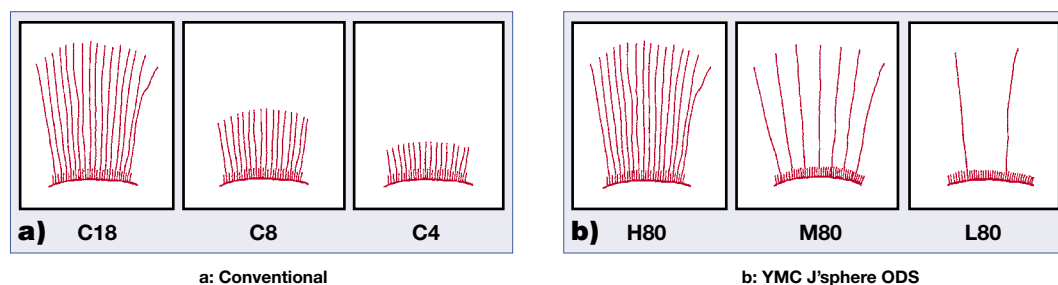
- quality control
- pharmaceuticals
- organic intermediates
- hormones, steroids



J'sphere ODS	JH	JM	JL
Particle size / μm	4	4	4
Pore size / nm	8	8	8
Surface area / m <sup>2</sup> g <sup>-1</sup>	510	510	510
Carbon content / %	22	14	9
Recommended pH range	1.0 - 9.0	2.0 - 7.5	2.0 - 7.5

## General

Alkyl chains of different lengths, including C18, C8 and C4, are commonly used for bonding during the synthesis of conventional reversed stationary phases of different polarity. YMC however, have applied another approach for creating divergent polarities and improving the consistency in the synthesis of reversed phase packings. With J'sphere ODS, the alkyl chain length is kept constant (as C18), but the content of C18 groups on the silica surface is varied to produce the three different J'sphere ODS packings with graduated hydrophobicity (see figure below).



Schematic comparison of reversed phases of different polarity.

## Physico-Chemical Properties

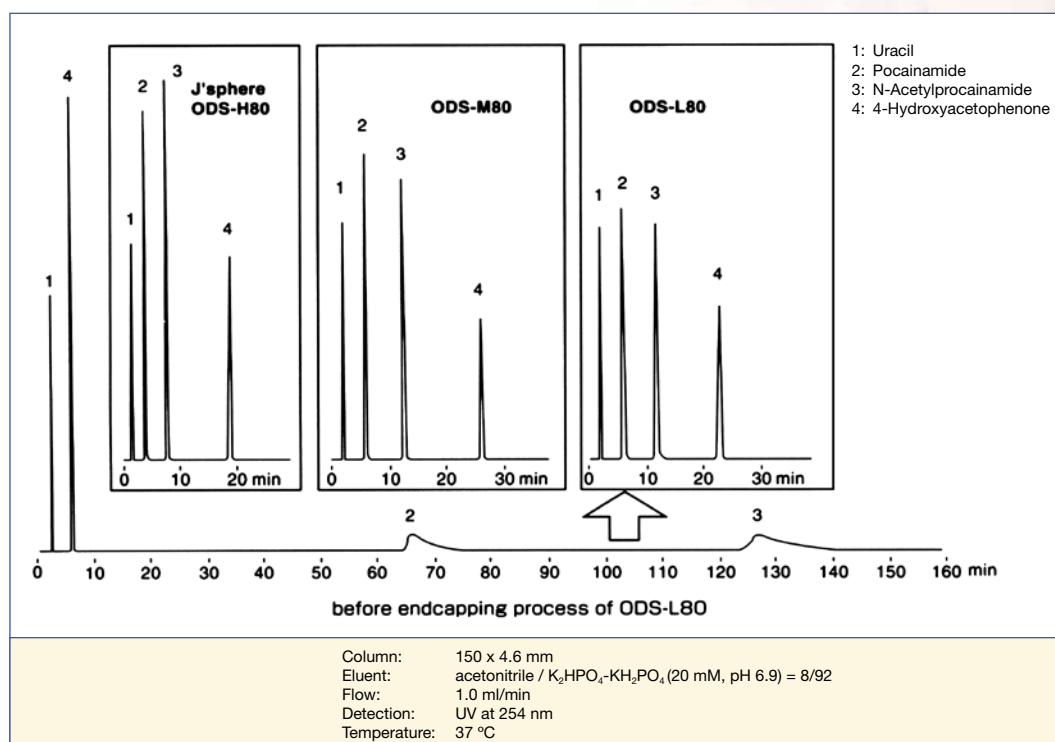
J'sphere ODS packings are based on a spherical, ultra pure, high surface area silica with a mean pore diameter of 80 Å and a mean particle diameter of 4 μm.

J'sphere silica has a very homogeneous surface providing additional siloxane groups. They are almost of the same nature as ether groups and they are able to form H-bonding which is of great importance for the retentivity and selectivity of J'sphere ODS bonded phases.



# J'sphere ODS

An elaborate endcapping process is applied to react the remaining silanols to effectively suppress the undesired non-specific interactions (see figure below).



Source: Courtesy of YMC Co., Ltd.

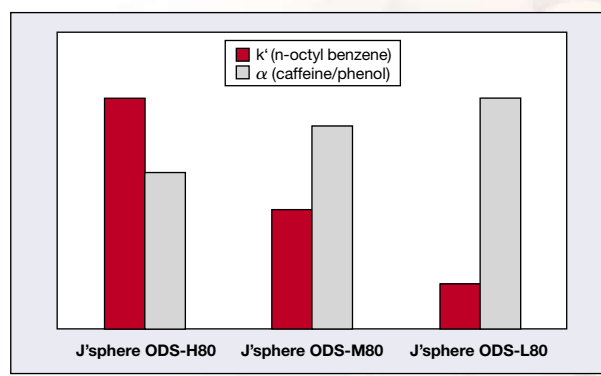
Three types of ODS are processed by endcapping technology to minimize the effect of residual silanol as much as possible.

The stepwise decrease of hydrophobicity in the J'sphere ODS-H80, M80 and L80 series is accompanied by a corresponding increase in the H-bonding capacity (see figure right). If a sample molecule is susceptible to H-bonding, the resulting interaction represents additional retention and enhances the selectivity in RP separations.

## Selectivity Data

The exclusive use of C18 groups makes the hydrophobic interaction identical for all three types of J'sphere ODS packings; only the degree of hydrophobicity, i.e. the polarity, is varied.

In addition to the hydrophobic interaction, the surface siloxane groups of J'sphere ODS packings provide a pronounced H-bonding capacity contributing additional selectivity. The ability to interact strongly via H-bonding, creates the opportunity to make use of an additional degree of freedom in selectivity. The "controlled hydrogen bonding capacity" of YMC J'sphere ODS packings represents an efficient tool for the chromatographic discrimination of closely related compounds presenting only minor molecular differences.



Hydrophobicity (indicated by  $k'$  for n-octyl benzene) and H-bonding capacity (indicated by  $\alpha$  of caffeine/phenol) of J'sphere ODS columns.

# J'sphere ODS

## Applications

### J'sphere ODS-H80

J'sphere ODS-H80 is the most hydrophobic stationary phase in this series. It is densely covered with polymeric bonded C18 groups yielding a high carbon content and providing a strong, dominant, lipophilic interaction with the nonpolar sites of the sample molecules. However, the ability to form H-bonding gives additional selectivity, which is essential for difficult separations, such as drug and corresponding metabolite discrimination. Even stereoisomers can be separated by J'sphere ODS-H80 columns.

### J'sphere ODS-M80

The lower coverage of C18 monomeric bonded groups in J'sphere ODS-M80 provides moderate hydrophobicity. As the lipophilic character is decreased, the H-bonding capacity becomes more and more important. J'sphere ODS-M80 has a pronounced balanced polarity which is extraordinary flexible and allows application to a wide variety of separation problems. Depending on the separation, J'sphere ODS-M80 columns can be operated over a very broad range of eluent polarity. J'sphere ODS-M80 columns are a very adaptable tool in various fields in analytical HPLC including drug analysis and QC.

### J'sphere ODS-L80

J'sphere ODS-L80 has a low polymeric bonded C18 coverage, providing only minor hydrophobic retention. The extremely high H-bonding capacity makes J'sphere ODS-L80 very useful for the separation of polar compounds. Such compounds frequently have molecular sites which are susceptible to H-bonding and hence, are easily separated by a H-bonding mechanism.

## Conclusion

By using the graduated properties of J'sphere ODS columns, a great variety of chemical and pharmaceutical applications can be achieved. YMC J'sphere ODS analytical columns are a good choice for the analysis of pharmaceuticals, organic intermediates, metabolites etc., due to their concept of fine-tuned approach by using different H-bonding capacities.

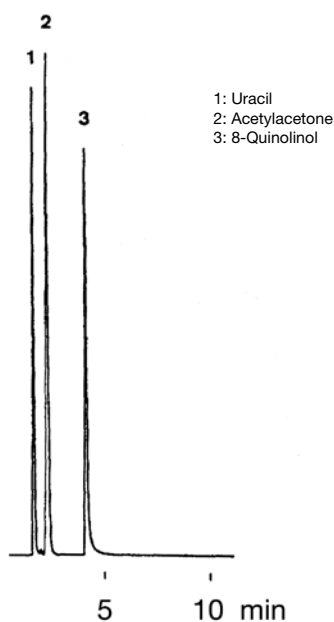
## Quality Specifications

Based on the experience in high performance analytical selectivities and large scale silicas synthesis and bonded phases, the long term availability of high quality analytical J'sphere ODS columns is guaranteed. Sophisticated selectivity tests for quality control ensure reproducible separations. These quality control tests guarantee the customer long term reproducible performance, which is essential for the validated analytical HPLC methods.

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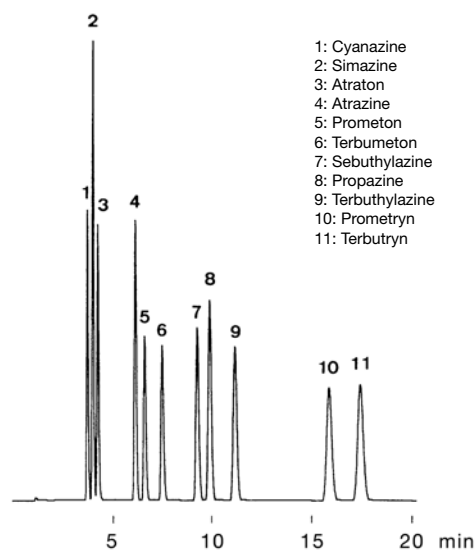
# J'sphere ODS-H80

## Elution profile of complexing agents



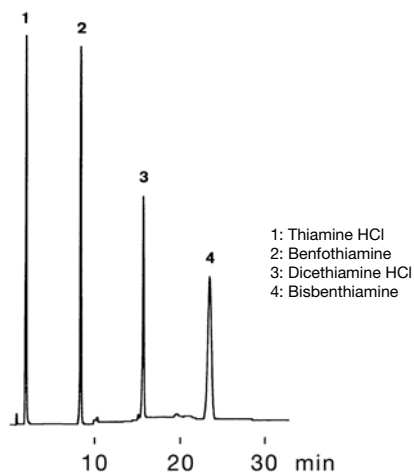
Column: J'sphere ODS-H80 (8 nm, 4  $\mu$ m) 150 x 4.6 mm i.d.  
Eluent:  $K_2HPO_4$ - $KH_2PO_4$  (20 mM, pH 6.9) / methanol = 40/60  
Flow: 1.0 ml/min  
Detection: UV at 254 nm  
Temperature: 37  $^{\circ}$ C

## Triazine herbicides



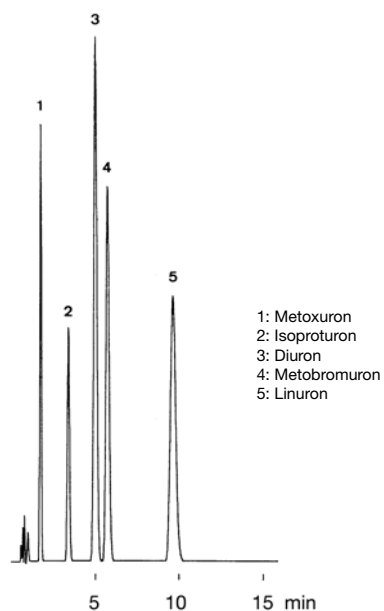
Column: J'sphere ODS-H80 (8 nm, 4  $\mu$ m) 150 x 4.6 mm i.d.  
Eluent: acetonitrile /  $NH_4H_2PO_4$  (50 mM) = 45/55  
Flow: 1.0 ml/min  
Detection: UV at 230 nm  
Temperature: 37  $^{\circ}$ C

## Thiamine and derivatives



Column: J'sphere ODS-H80 (8 nm, 4  $\mu$ m) 75 x 4.6 mm i.d.  
Eluent: A:  $(NH_4)_2HPO_4$  (50 mM)  
B: methanol /  $(NH_4)_2HPO_4$  (50 mM) = 60/40  
Gradient: 10-100% B (0-15 min, linear), 100% B (15-30 min)  
Flow: 1.0 ml/min  
Detection: UV at 260 nm  
Temperature: 37  $^{\circ}$ C

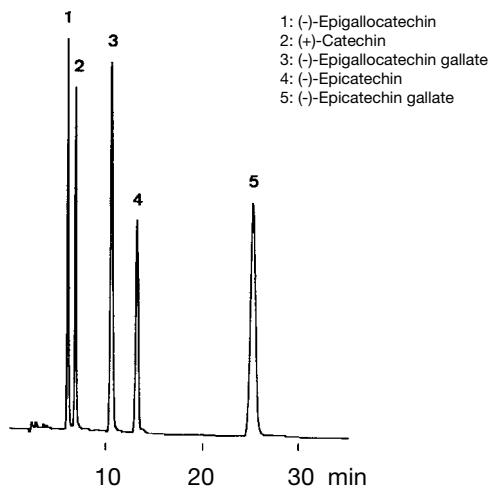
## Urea herbicides



Column: J'sphere ODS-H80 (8 nm, 4  $\mu$ m) 150 x 4.6 mm i.d.  
Eluent: THF /  $H_2O$  = 30/70  
Flow: 1.0 ml/min  
Detection: UV at 260 nm  
Temperature: 37  $^{\circ}$ C

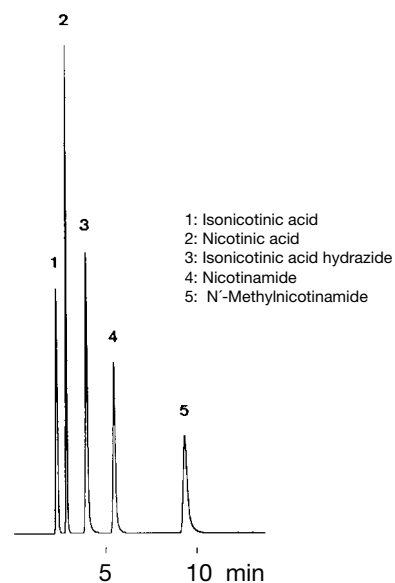
# J'sphere ODS-M80

## Catechins



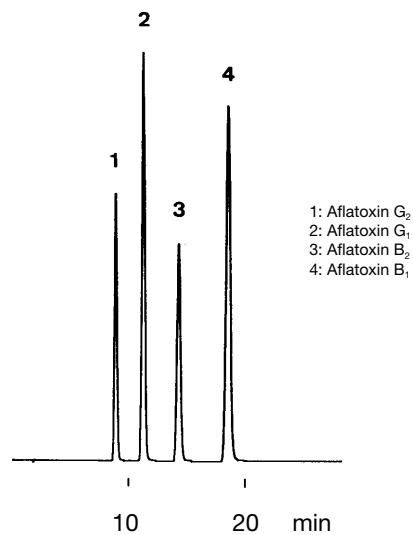
Column: J'sphere ODS-M80 (8 nm, 4  $\mu$ m) 150 x 4.6 mm i.d.  
Eluent:  $\text{KH}_2\text{PO}_4\text{-H}_3\text{PO}_4$  (pH 2.4) / methanol = 75/25  
Flow: 0.8 ml/min  
Detection: UV at 280 nm  
Temperature: 37  $^\circ\text{C}$

## Nicotinic acid analogues



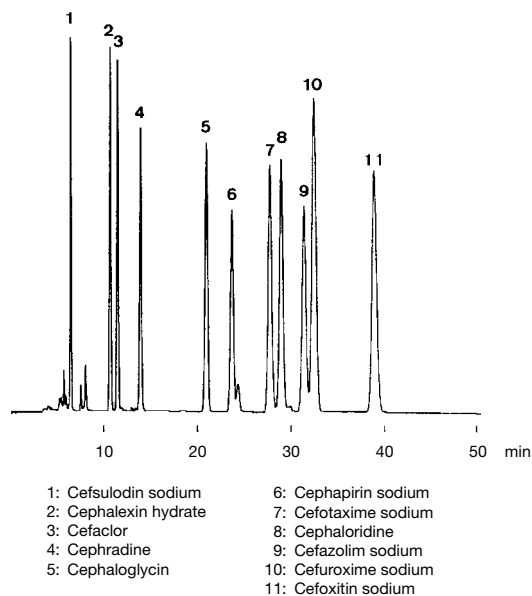
Column: J'sphere ODS-M80 (8 nm, 4  $\mu$ m) 150 x 4.6 mm i.d.  
Eluent: acetonitrile /  $\text{KH}_2\text{PO}_4$  (20 mM) = 5/95  
Flow: 1.0 ml/min  
Detection: UV at 260 nm  
Temperature: 30  $^\circ\text{C}$

## Aflatoxins



Column: J'sphere ODS-M80 (8 nm, 4  $\mu$ m) 150 x 4.6 mm i.d.  
Eluent: methanol / water = 40/60  
Flow: 1.0 ml/min  
Detection: UV at 365 nm  
Temperature: 37  $^\circ\text{C}$

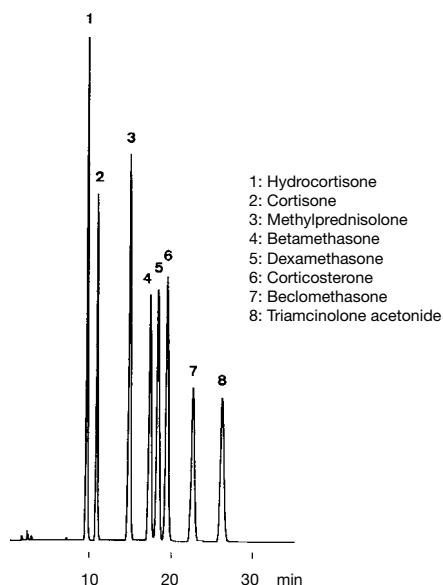
## Cephalosporin antibiotics



Column: J'sphere ODS-M80 (8 nm, 4  $\mu$ m) 250 x 4.6 mm i.d.  
Eluent: acetonitrile /  $\text{KH}_2\text{PO}_4$  (100 mM) = 10/90  
Flow: 0.8 ml/min  
Detection: UV at 260 nm  
Temperature: 37  $^\circ\text{C}$

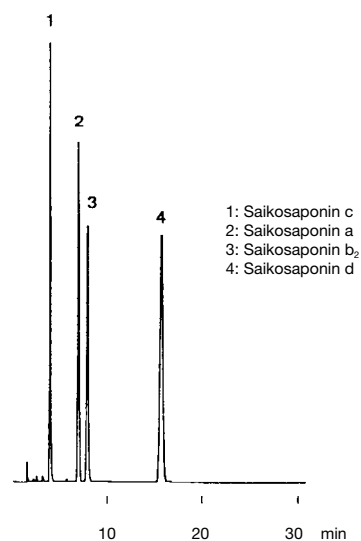
# J'sphere ODS-L80

## Adrenocorticosteroids



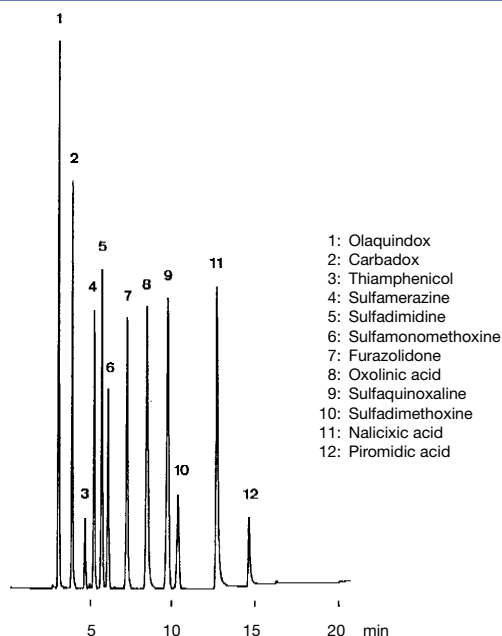
Column: J'sphere ODS-L80 (8 nm, 4  $\mu$ m) 150 x 4.6 mm i.d.  
 Eluent: acetonitrile / water = 27/73  
 Flow: 1.0 ml/min  
 Detection: UV at 260 nm  
 Temperature: 37 °C

## Saikosaponins



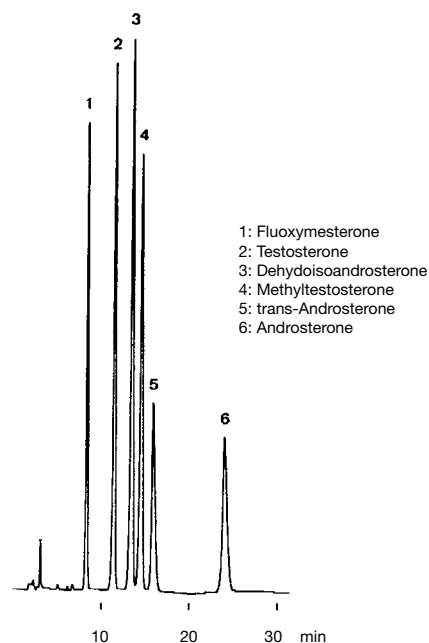
Column: J'sphere ODS-L80 (8 nm, 4  $\mu$ m) 150 x 4.6 mm i.d.  
 Eluent: acetonitrile / water = 38/62  
 Flow: 1.0 ml/min  
 Detection: UV at 210 nm  
 Temperature: 37 °C

## Antibacterial agents



Column: J'sphere ODS-L80 (8 nm, 4  $\mu$ m) 250 x 4.6 mm i.d.  
 Eluent: A: acetonitrile /  $\text{NH}_4\text{H}_2\text{PO}_4$  (50 mM) = 10/90  
 B: acetonitrile /  $\text{NH}_4\text{H}_2\text{PO}_4$  (50 mM) = 80/20  
 Gradient: 25% B (0-5 min), 25-100% B (5-15 min), 100% B (15-20 min)  
 Flow: 1.0 ml/min  
 Detection: UV at 240 nm  
 Temperature: 37 °C

## Androgens



Column: J'sphere ODS-L80 (8 nm, 4  $\mu$ m) 150 x 4.6 mm i.d.  
 Eluent: methanol / acetonitrile / water = 45/15/40  
 Flow: 0.8 ml/min  
 Detection: UV at 210 nm  
 Temperature: 30 °C

# Ordering Information



## YMC30, 3 µm



Column i.d. (mm)	Column length (mm)					Guard cartridges with 10 mm length (pack of 5)
	33	50	100	150	250	
2.1	CT99S030302QT	CT99S030502QT	CT99S031002QT	CT99S031502QT	CT99S032502QT	CT99S030102
3.0	CT99S030303QT	CT99S030503QT	CT99S031003QT	CT99S031503QT	CT99S032503QT	CT99S030103
4.0	CT99S030304QT	CT99S030504QT	CT99S031004QT	CT99S031504QT	CT99S032504QT	CT99S030104
4.6	CT99S030346QT	CT99S030546QT	CT99S031046QT	CT99S031546QT	CT99S032546QT	CT99S030104



For other dimensions please refer to page 241

## YMC30, 5 µm



Column i.d. (mm)	Column length (mm)					Guard cartridges with 10 mm length (pack of 5)
	33	50	100	150	250	
2.1	CT99S050302QT	CT99S050502QT	CT99S051002QT	CT99S051502QT	CT99S052502QT	CT99S050102
3.0	CT99S050303QT	CT99S050503QT	CT99S051003QT	CT99S051503QT	CT99S052503QT	CT99S050103
4.0	CT99S050304QT	CT99S050504QT	CT99S051004QT	CT99S051504QT	CT99S052504QT	CT99S050104
4.6	CT99S050346QT	CT99S050546QT	CT99S051046QT	CT99S051546QT	CT99S052546QT	CT99S050104



For other dimensions please refer to page 241

## YMC PAH, 3 µm



Column i.d. (mm)	Column length (mm)					Guard cartridges with 10 mm length (pack of 5)
	33	50	100	150	250	
2.1	YP99S030302QT	YP99S030502QT	YP99S031002QT	YP99S031502QT	YP99S032502QT	YP99S030102
3.0	YP99S030303QT	YP99S030503QT	YP99S031003QT	YP99S031503QT	YP99S032503QT	YP99S030103
4.0	YP99S030304QT	YP99S030504QT	YP99S031004QT	YP99S031504QT	YP99S032504QT	YP99S030104
4.6	YP99S030346WT	YP99S030546WT	YP99S031046WT	YP99S031546WT	YP99S032546WT	YP99S030104



For other dimensions please refer to page 241

## YMC PAH, 5 µm



Column i.d. (mm)	Column length (mm)					Guard cartridges with 10 mm length (pack of 5)
	33	50	100	150	250	
2.1	YP99S050302QT	YP99S050502QT	YP99S051002QT	YP99S051502QT	YP99S052502QT	YP99S050102
3.0	YP99S050303QT	YP99S050503QT	YP99S051003QT	YP99S051503QT	YP99S052503QT	YP99S050103
4.0	YP99S050304QT	YP99S050504QT	YP99S051004QT	YP99S051504QT	YP99S052504QT	YP99S050104
4.6	YP99S050346WT	YP99S050546WT	YP99S051046WT	YP99S051546WT	YP99S052546WT	YP99S050104



For other dimensions please refer to page 241

# Ordering Information

## J'sphere ODS-H80, 8 nm, 4 $\mu$ m

Column i.d. (mm)	Column length (mm)					Guard cartridges with 10 mm length (pack of 5)
	33	50	100	150	250	
2.1	JH08S040302QT	JH08S040502QT	JH08S041002QT	JH08S041502QT	JH08S042502QT	JH08S040102
3.0	JH08S040303QT	JH08S040503QT	JH08S041003QT	JH08S041503QT	JH08S042503QT	JH08S040103
4.0	JH08S040304QT	JH08S040504QT	JH08S041004QT	JH08S041504QT	JH08S042504QT	JH08S040104
4.6	JH08S040346WT	JH08S040546WT	JH08S041046WT	JH08S041546WT	JH08S042546WT	JH08S040104

For other dimensions please refer to page 241



## J'sphere ODS-M80, 8 nm, 4 $\mu$ m

Column i.d. (mm)	Column length (mm)					Guard cartridges with 10 mm length (pack of 5)
	33	50	100	150	250	
2.1	JM08S040302QT	JM08S040502QT	JM08S041002QT	JM08S041502QT	JM08S042502QT	JM08S040102
3.0	JM08S040303QT	JM08S040503QT	JM08S041003QT	JM08S041503QT	JM08S042503QT	JM08S040103
4.0	JM08S040304QT	JM08S040504QT	JM08S041004QT	JM08S041504QT	JM08S042504QT	JM08S040104
4.6	JM08S040346WT	JM08S040546WT	JM08S041046WT	JM08S041546WT	JM08S042546WT	JM08S040104

For other dimensions please refer to page 241



## J'sphere ODS-L80, 8 nm, 4 $\mu$ m

Column i.d. (mm)	Column length (mm)					Guard cartridges with 10 mm length (pack of 5)
	33	50	100	150	250	
2.1	JL08S040302QT	JL08S040502QT	JL08S041002QT	JL08S041502QT	JL08S042502QT	JL08S040102
3.0	JL08S040303QT	JL08S040503QT	JL08S041003QT	JL08S041503QT	JL08S042503QT	JL08S040103
4.0	JL08S040304QT	JL08S040504QT	JL08S041004QT	JL08S041504QT	JL08S042504QT	JL08S040104
4.6	JL08S040346WT	JL08S040546WT	JL08S041046WT	JL08S041546WT	JL08S042546WT	JL08S040104

For other dimensions please refer to page 241



**Note:** For your first order on guard cartridges, please add one guard cartridge holder per system to your order list: integral guard cartridge holder for columns with 2.1–4.0 mm i.d. **XPGCS-Q1** or universal guard cartridge holder for columns with 4.6 mm i.d. **XPGCH-Q1**. The holder can continuously be re-used and, thus it is not required for repeat orders.

# Ordering Information

## 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 or leakages, irrespective



of the column brand, when connecting different columns to an 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. This guarantees 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. 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 3.0-4.6	0.13 0.18	SFS2005 SFS2007	SFD2005 SFD2007

\* Other versions available on request

# Ordering Information

The previous product listing represents commonly used standard column dimension. In order to identify any specific product version and order number, please see the example and the table below.

## Full listing of all chemistries and dimensions

Gel Code							Hardware Code						
Chemistry code		Pore size [nm]		Particle shape		Particle size [µm]		Length [mm]		Inner diameter [mm]		Column Type	
YMC30	CT	6	06	spherical	S	3	03	10	01	0.05	E5	Quick Seal	QT
Pro C18	AS	8	08			4	04	20	02	0.075			
Pro C18 RS	RS	12	12	spherical	S	5	05	33	03	0.1	F0	Waters type	WT
Hydrosphere C18	HS	20	20			6	06	50	05	0.2			
ODS-A	AA	30	30	spherical	S	10	11	75	L5	0.3	H0		
ODS-AM	AM	100	A0					15	16	125			
ODS-AQ	AQ	proprietary	99	spherical	S	20	21	150	15	1.0	O1		
J'sphere ODS-H80	JH	non-porous	00					50	50	250			
J'sphere ODS-M80	JM			spherical	S	75	75	300	30	3.0	O3		
J'sphere ODS-L80	JL									4.0			
ODS-AL	AL			spherical	S	63/210	A4	500	50	4.6	46		
PAH	YP									150			
PolymerC18	PC			spherical	S	150	A5	1000	A0	8.0	O8		
Pro C8	OS									10			
C8 (Octyl)	OC			spherical	S	150	A5	1000	A0	20	O20		
YMbasic	BA									30			
Ph (Phenyl)	PH			spherical	S	150	A5	1000	A0	50 (2000 psi)	52		
Pro C4	BS									70 (2000 psi)			
C4 (Butyl)	BU			spherical	S	150	A5	1000	A0	100 (2000 psi)	A2		
Protein-RP	PR									150 (2000 psi)			
TMS (C1)	TM			spherical	S	150	A5	1000	A0	200 (2000 psi)	C2		
PVA-Sil	PV												
Polyamine II	PB			spherical	S	150	A5	1000	A0				
NH <sub>2</sub> (Amino)	NH												
CN (Cyano)	CN			spherical	S	150	A5	1000	A0				
Diol	DL												
SIL (Silica)	SL			spherical	S	150	A5	1000	A0				
BioPro-QA	QA												
BioPro-SP	SP			spherical	S	150	A5	1000	A0				
BioPro-QA-F	QF												
BioPro-SP-F	SF			spherical	S	150	A5	1000	A0				
Chiral NEA (R)	NR												
Chiral NEA (S)	NS			spherical	S	150	A5	1000	A0				
Chiral CD BR α	DA												
Chiral CD BR β	DB			spherical	S	150	A5	1000	A0				
Chiral CD BR γ	DG												
Chiral Prep CD ST	ST			spherical	S	150	A5	1000	A0				
Chiral Prep CD PM	PM												

### Example

Choose your column and fill in the "Gel and Hardware Code" or detailed description (The part number consists of the "Gel Code" and the "Hardware Code").

YMC-Pack ODS-A	12 nm	spherical	3 µm	250 mm	1.0 mm	Quick Seal
<b>AA</b>	<b>12</b>	<b>S</b>	<b>03</b>	<b>25</b>	<b>01</b>	<b>QT</b>

Your column part number: **AA12S032501QT (Example)**

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 or from our homepage [www.ymc.de](http://www.ymc.de).

### For more details



contact your local distributor or

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Fax +49 (0) 2064 / 427-222, e-mail: [info@ymc.de](mailto:info@ymc.de), homepage: [www.ymc.de](http://www.ymc.de)