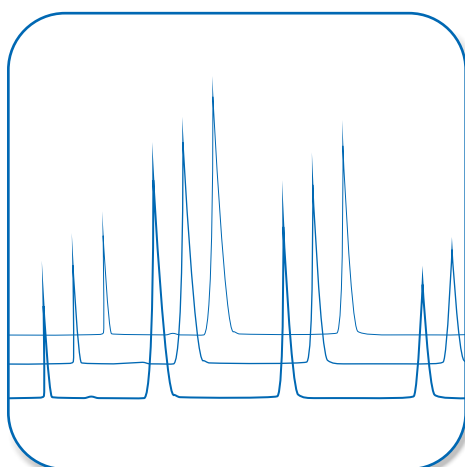




YMC
RP-Classics



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HPLC Columns YMC RP-Classics

Introduction

HPLC Columns for Reversed Phase Chromatography

In order to succeed in HPLC, the choice of the optimal selectivity is essential to establish efficient separation conditions.

The best suited packing material depends significantly on the characteristics of the separation conditions, which should be thoroughly considered.

For this purpose YMC offers a wide variety of selectivities applicable to HPLC from nano-scale analysis to large scale isolation. Within this chapter the world renowned YMC-Pack ODS-Series (YMC-Pack ODS-AQ, YMC-Pack ODS-A, YMC-Pack ODS-AM, YMC-Pack ODS-AL) and other phases are described.

YMC-Pack ODS-AQ

- *“hydrophilic” C18*
- *balanced surface chemistry*
- *polar recognition*
- *metabolite recognition*

Specifications	YMC-Pack ODS-AQ	
Particle size / μm	3; 5	3; 5
Pore size / nm	12	20
Surface area / m^2g^{-1}	330	175
Carbon content / %	14	10
Recommended pH range	2.0 – 7.5	2.0 – 7.5

General

YMC-Pack ODS-AQ is a C18 reversed phase silica based HPLC packing material specifically designed for use in 100% aqueous eluents. As a result of the proprietary derivatisation process, YMC-Pack ODS-AQ exhibits a different

selectivity to that of traditional C18 stationary phases. This difference in selectivity of YMC-Pack ODS-AQ can be used to advantage for HPLC separations, which are difficult to achieve with conventional C18 columns.

Selectivity Data

The proprietary YMC derivatisation process creates the different selectivity of YMC-Pack ODS-AQ, where:

1. The activity of acidic unreacted silanols is reduced, allowing moderately basic compounds to be eluted with little or no peak tailing.
2. The balanced hydrophilic/lipophilic nature of the YMC-Pack ODS-AQ stationary phase leads to strong retentions of polar sample solutes even in aqueous eluents.

These properties of YMC-Pack ODS-AQ are beneficial for

separations of polar organic compounds, which tend not to be retained or are unresolved when conventional C18 columns are used.

Many conventional ODS packings lose their ability to retain polar compounds in these high aqueous content mobile phases as shown opposite. They appear less lipophilic with densely folded C18 chains. However, in similar mobile phases, YMC-Pack ODS-AQ maintains its brush-like C18 chain structure and its lipophilic properties and provides excellent retention of polar compounds.

Applications

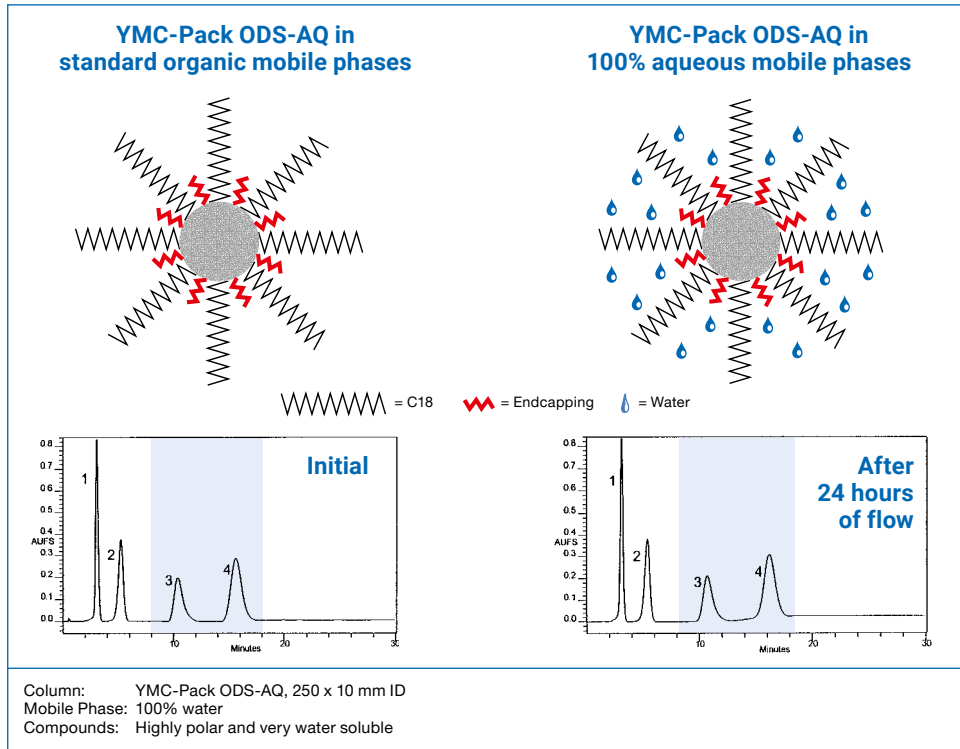
YMC-Pack ODS-AQ is able to resolve compounds with minor differences in polarity from closely related chemical structures. As a result, YMC-Pack ODS-AQ is an excellent tool for the separation of drugs and corresponding metabolites, pesticides and degradation products, or peptides and protein digests etc. This capability of “polar recognition” opens up a broad application range for YMC-Pack ODS-AQ in life sciences and pharmacology.

Genuine linear scale-up from analytical to large scale separations is easily achievable with YMC products such as YMC-Pack ODS-AQ, where particle sizes from 3 to 50 μm are available in large lot sizes up to several hundred kilograms, if needed. This, together with the outstanding selectivity of YMC-Pack ODS-AQ, make it an essential tool to enhance the productivity of large scale chromatographic processes.

YMC-Pack ODS-AQ

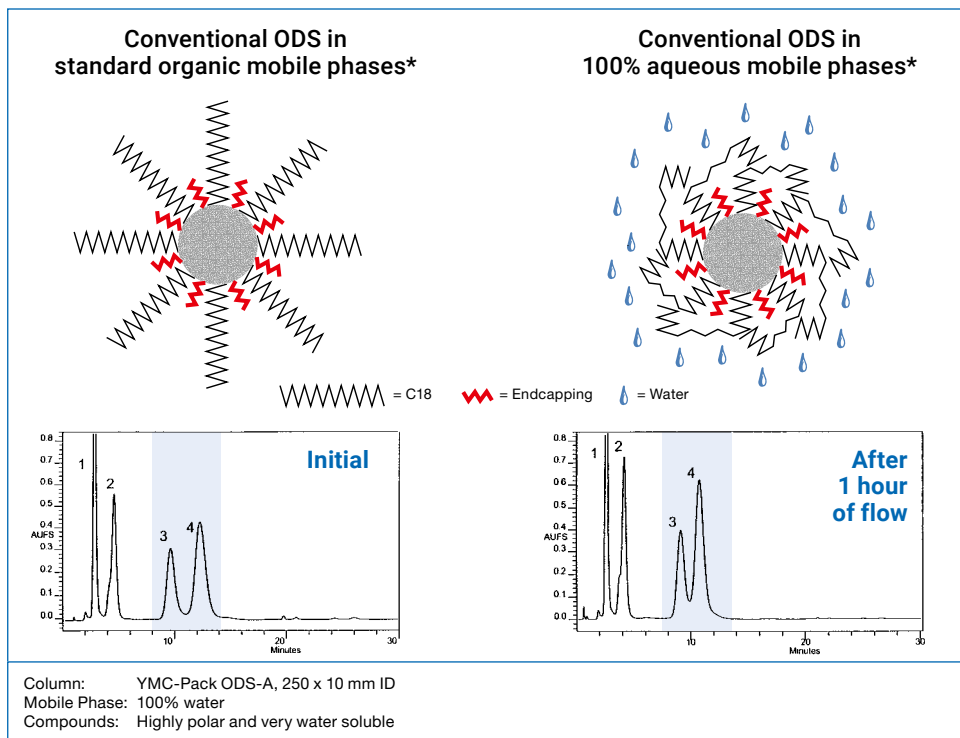
Comparison of ODS-AQ vs. Conventional ODS

Stable retention time!



YMC-Pack ODS-AQ:

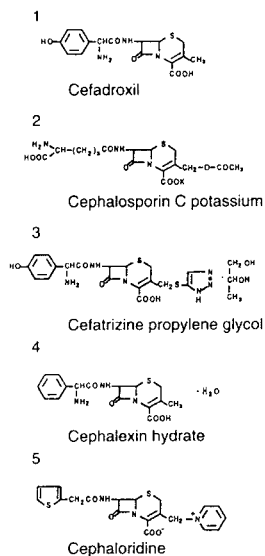
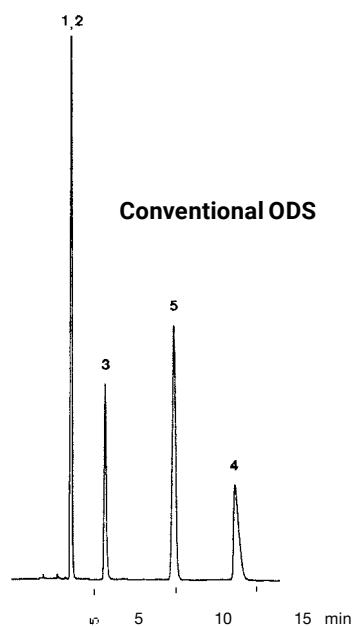
Retention time loss!



Conventional ODS-Column:

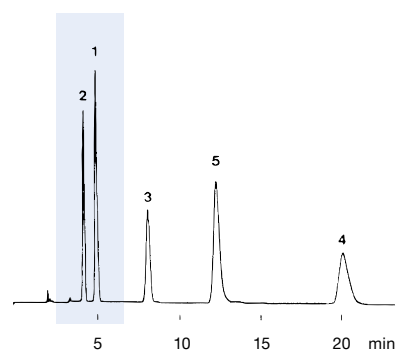
YMC-Pack ODS-AQ

Exceptional performance for the separation of polar compounds



*polar
recognition*

YMC-Pack ODS-AQ

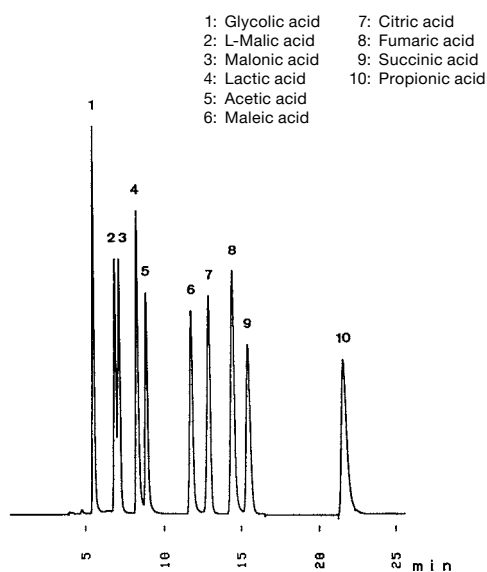


Cephalosporin antibiotics

Column: YMC-Pack ODS-AM (5 µm, 12 nm) 150 x 4.6 mm ID
Part No.: AM12S05-1546WT
Eluent: methanol / water / acetic acid (10/85/5)
Flow: 1.0 mL/min
Detection: UV at 260 nm, 0.16 AUFS
Temperature: 37 °C

Column: YMC-Pack ODS-AQ (5 µm, 12 nm) 150 x 4.6 mm ID
Part No.: AQ12S05-1546WT
Eluent: methanol / water / acetic acid (10/85/5)
Flow: 1.0 mL/min
Detection: UV at 260 nm, 0.16 AUFS
Temperature: 37 °C

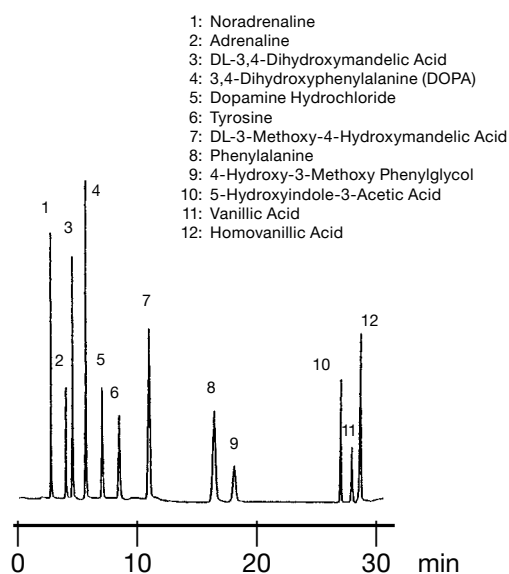
Strong retention in aqueous eluents



Crude drugs

Column: YMC-Pack ODS-AQ (5 µm, 12 nm) 250 x 4.6 mm ID
Part No.: AQ12S05-2546WT
Eluent: 20 mM H₃PO₄-NaH₂PO₄ (pH 2.8)
Flow: 0.7 mL/min
Detection: UV at 220 nm, 0.08 AUFS
Temperature: 30 °C
Injection: 10 µL (0.007 ~ 1.8 mg/mL)

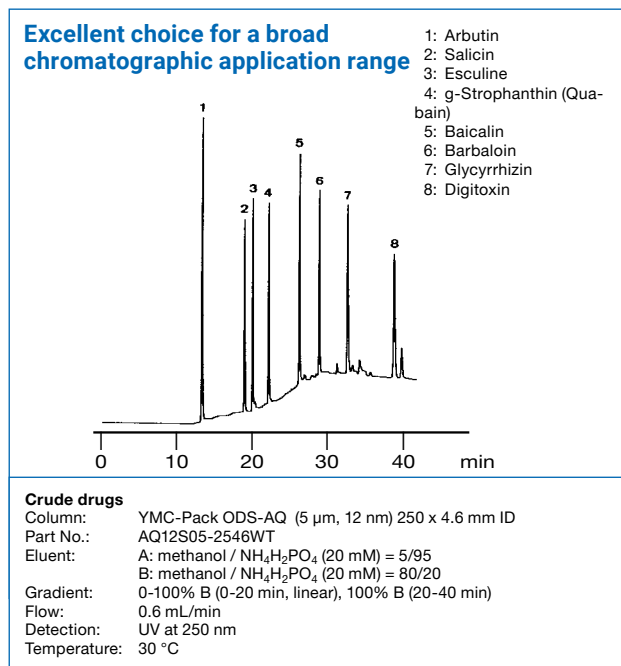
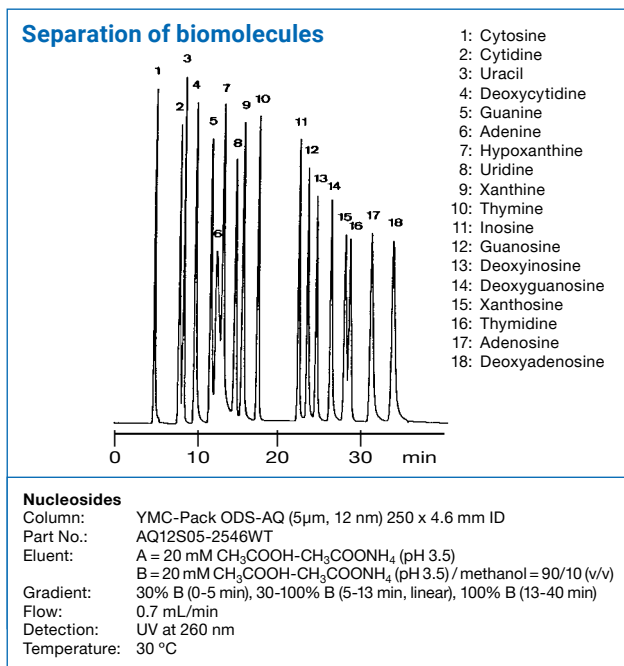
No need for ion pair reagents



Catecholamines

Column: YMC-Pack ODS-AQ (5 µm, 12 nm) 250 x 4.6 mm ID
Part No.: AQ12S05-2546WT
Eluent: A: phosphate puffer (100 mM, pH 3.0) B: acetonitrile
Gradient: 99% A (0-20 min), 85% A (20-25 min)
Flow: 1.5 mL/min
Detection: UV at 210 nm
Temperature: Room temperature

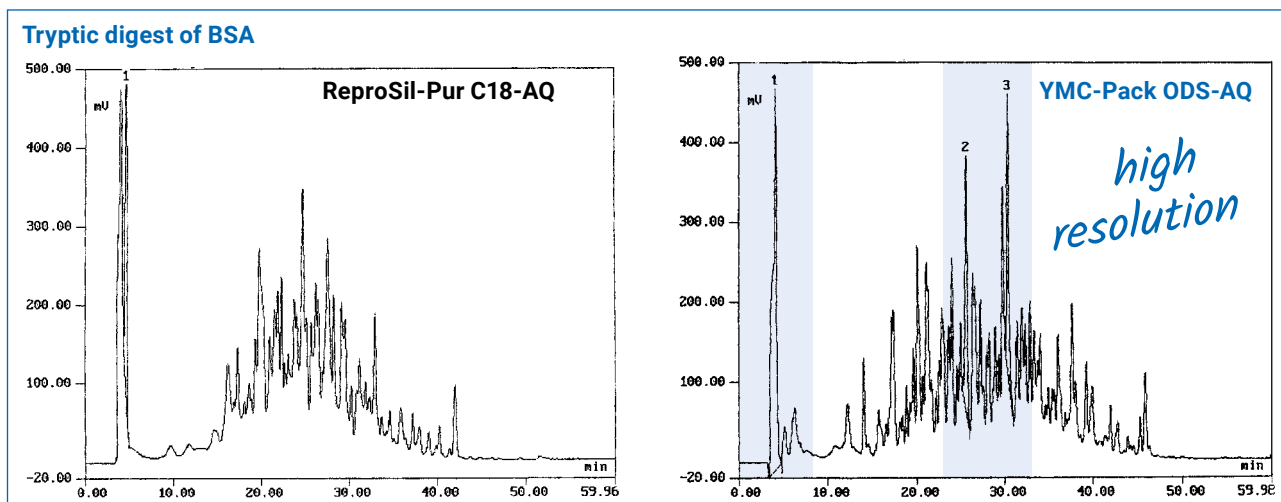
YMC-Pack ODS-AQ



Comparison of YMC-Pack ODS-AQ with competitive products

Since 1985, YMC-Pack ODS-AQ has consistently increased its popularity due to its novel selectivity pattern towards polar compounds and its ability to withstand 100% aqueous conditions. Today, more than 30 (!) years later, many new analytical and preparative methods are still being developed on YMC-Pack ODS-AQ chemistry despite various AQ-type products being introduced by our competitors; phases with

supposedly "identical" selectivity or with exotic bonding techniques designed to generate performance characteristics similar to those of YMC-Pack ODS-AQ. However, genuine YMC-Pack ODS-AQ still represents today a fully competitive state-of-the-art high performance stationary phase, despite the complementary YMC innovations, namely YMC-Triart C18 and Hydrosphere, C18 as potential in-house competitors.



By courtesy of Dr. Manfred Raida, IPF Hannover

For more applications please refer to our "Application Data Collections" or contact us directly.

Column care

The recommended pH range for YMC-Pack ODS-AQ is 2.0 – 7.5 in up to 100% aqueous systems and a maximum of 50 °C. Remove acid and buffer salts before storage. Store the column in methanol / water = 70/30. Clogged inlet frits

often can be cleaned by changing the flow direction. For detailed information please refer to the "Column Care and Use Instructions" which can be downloaded from www.ymc.eu/download-library.html

YMC-Pack ODS-A

- *fully endcapped C18 material*
- *highly versatile ODS phase*
- *for polar to moderately nonpolar pharmaceuticals, organic chemicals, biologicals and natural products*

Specifications	YMC-Pack ODS-A		
Particle size / μm	3; 5	3; 5	5
Pore size / nm	12	20	30
Surface area / m^2g^{-1}	330	175	100
Carbon content / %	17	12	7
Recommended pH range	2.0 – 7.5	2.0 – 7.5	2.0 – 7.5

General

YMC-Pack ODS-A, YMC's classical reversed phase packing material, is renowned worldwide because of its unique performance and reproducibility. Due to the high quality, YMC-Pack ODS-A is widely used for the validation of analytical HPLC methods and for long-term reproducible preparative HPLC processes.

Properties

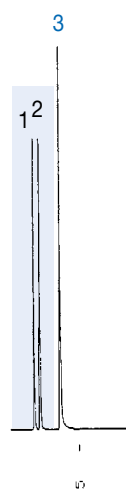
The production of the base silica for YMC-Pack ODS-A and its subsequent derivatisation are performed in large bulk batches. Exhaustive endcapping reduces reliably the activity of silanol groups and minimises nonspecific secondary interaction.

In addition to standard methods, like determination of adsorption isotherms, particle size distribution and carbon content (see table above), YMC uses an extensive range of analytical methods to ensure constant and reproducible selectivity of the reversed phase packings.

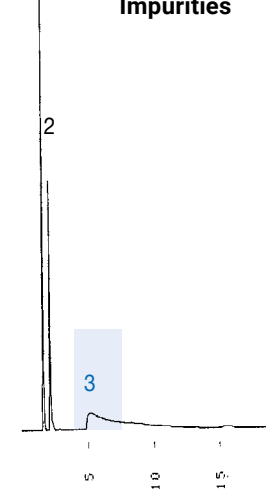
The base of YMC-Pack ODS-A is YMC's high purity silica. This premium silica contains only very low levels of metal contaminants and so prevents significant tailing of sample molecules such as 8-hydroxyquinoline or acetyl acetone, which easily form coordinating complexes with metal ions on the silica surface. As coordinating functional groups are frequent structural components in pharmaceutical compounds, high purity packings such as YMC-Pack ODS-A are needed for reproducible separation of these compounds without secondary retention or tailing.

YMC-Pack ODS-A is also available in preparative particle sizes.

YMC-Pack ODS-A



Silica Base with Metal Impurities

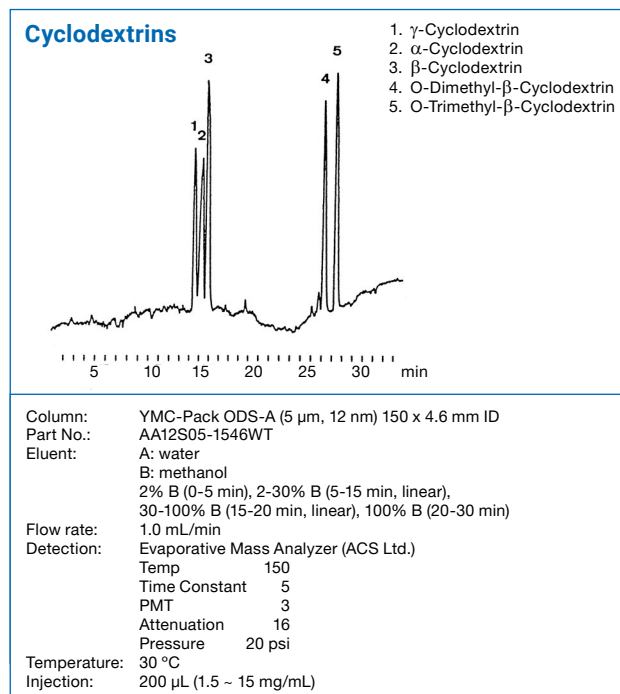
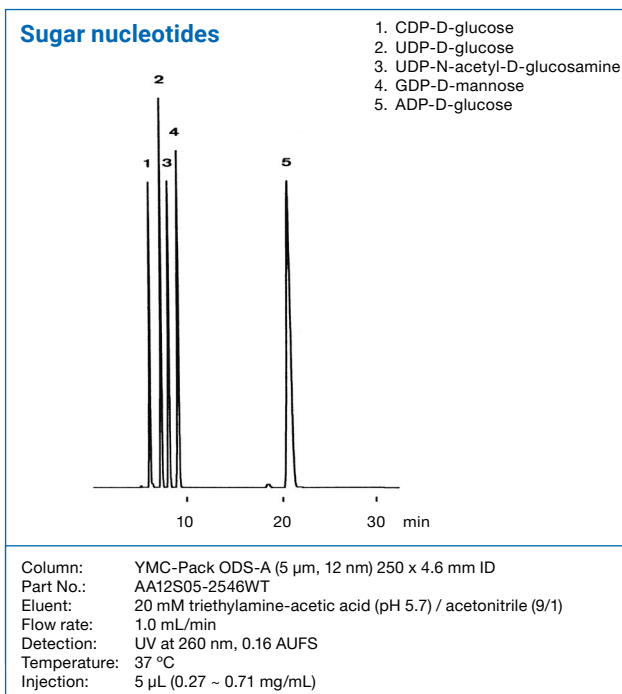
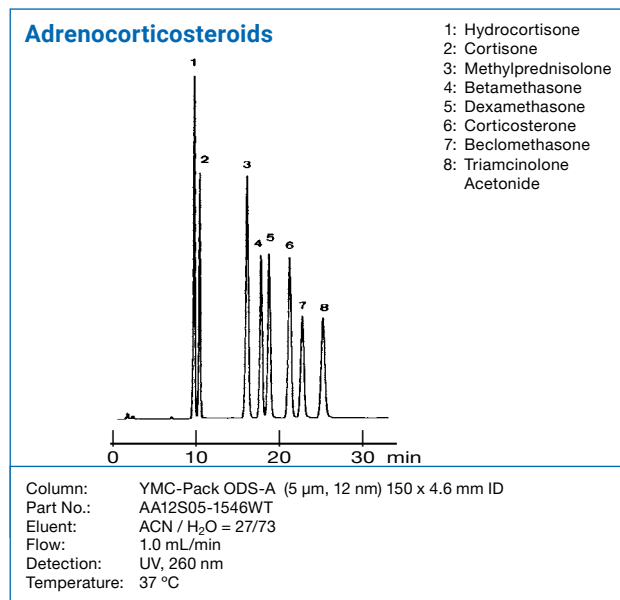
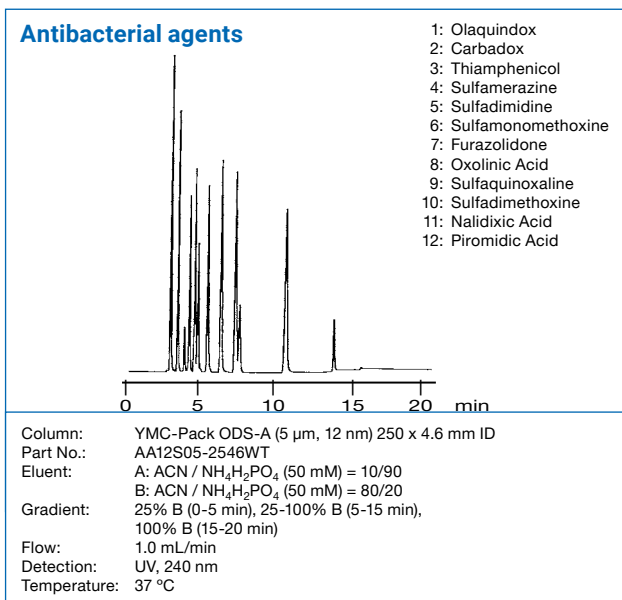


Column: YMC-Pack ODS-A (12 nm, 5 μm) 150 x 4.6 mm ID
 Eluent: KH_2PO_4 (20 mM, pH 7.6) / methanol = 40/60
 Flow: 1.0 mL/min
 Detection: UV, 254 nm
 Temperature: 37 °C
 Substances: 1. Uracil
 2. Acetylacetone
 3. 8-Hydroxyquinoline

YMC-Pack ODS-A

Applications

YMC-Pack ODS-A is frequently used for pharmaceutical, biochemical and environmental applications as well as for separations in the field of food technology. YMC-Pack ODS-A is available in particle sizes from 3 to 50 μm . As the selectivity is identical throughout the whole range, these phases are ideal for scale-up from analytical to preparative process scale.



Column care

The recommended pH range for using YMC-Pack ODS-A columns is 2.0-7.5. Remove acid and buffer salts before storage. Store the column in methanol/water = 50/50. If columns are affected by undesired contaminants or clogged inlet frits which cause back pressure increases

flush the column with THF in the opposite flow direction. For detailed information please refer to the "Column Care and Use Instructions" which can be downloaded from www.ymc.eu/download-library.html

YMC-Pack ODS-AM

- *high quality analytical C18*
- *tightly specified*
- *long term reproducibility*
- *for method validation*
- *for method registration*

Specifications	YMC-Pack ODS-AM
Particle size / μm	3; 5
Pore size / nm	12
Surface area / m^2g^{-1}	330
Carbon content / %	17
Recommended pH range	2.0 – 7.5

General

Validation and registration of analytical HPLC methods require the long term reproducibility of the entire analytical process. The high consistency in the quality of HPLC packings and columns plays a key role for validated HPLC analysis.

Therefore, YMC created ODS-AM, a high quality reversed phase C18 HPLC packing material to meet the most stringent demands for validated analytical HPLC processes.

Properties

YMC-Pack ODS-AM is produced in large lots using high purity YMC silica as a base material and a multi stage synthesis process. For the derivatisation, monomeric bonding chemistry is applied followed by an extensive endcapping process to reduce the silanol activity.

The resulting YMC-Pack ODS-AM packing is extensively tested to ensure compliance with specifications set for very low variations in physicochemical properties.

In addition, YMC-Pack ODS-AM packings and columns have to pass numerous proprietary chromatographic tests to meet the narrow quality specification range with regard to:

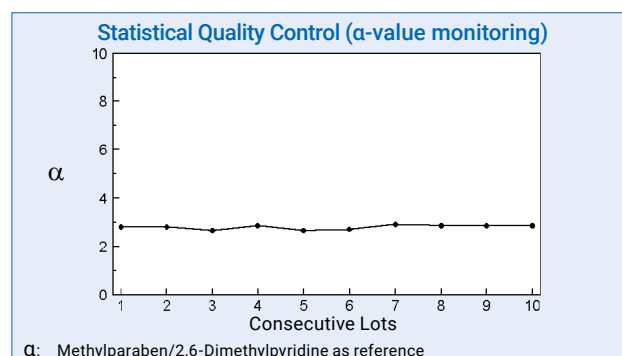
- selectivity pattern
- column resolution
- absolute retention
- peak symmetry

YMC applies various tests to perform statistical quality control for reversed phase HPLC packings. The α -value test of methylparaben and 2,6-dimethylpyridine for instance, is very sensitive and is routinely used to monitor the retention and the selectivity properties of YMC-Pack ODS-AM.

Methylparaben is a moderately polar, inert compound. It is retained solely by a RP mechanism, with minimal secondary

interactions with residual silanol groups. 2,6-dimethylpyridine, however, represents a lipophilic amine compound which has a high potential of unspecific interaction with unreacted acidic silanols. An increase in retention of 2,6-dimethylpyridine and hence lower α -values would indicate incomplete C18 bonding and/or ineffective endcapping. YMC specifies for ODS-AM that the statistical α -value of methylparaben and 2,6-dimethylpyridine be 2.77 ± 0.20 .

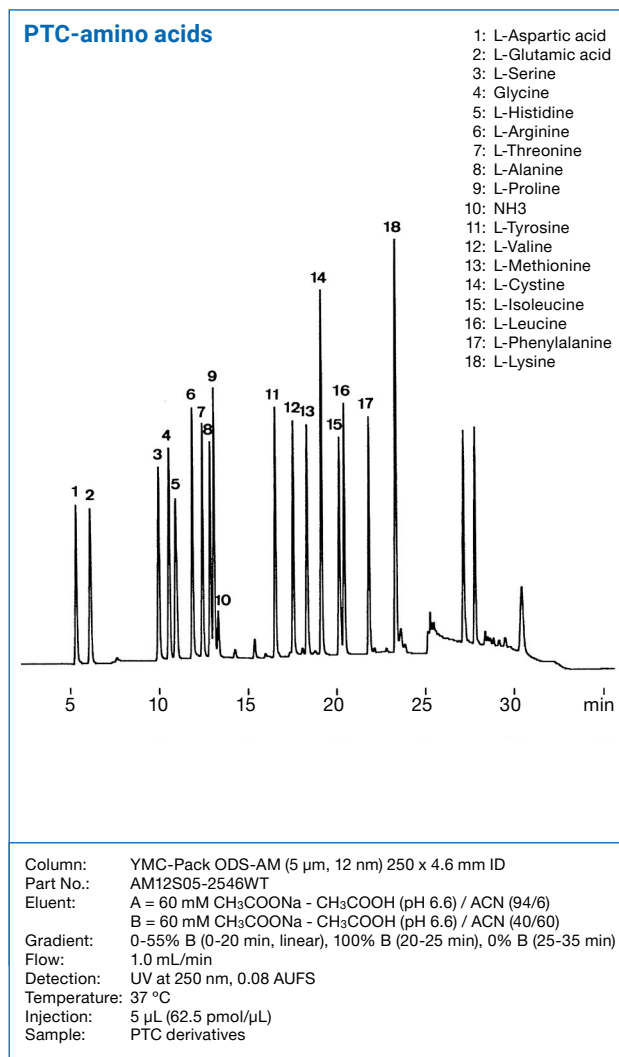
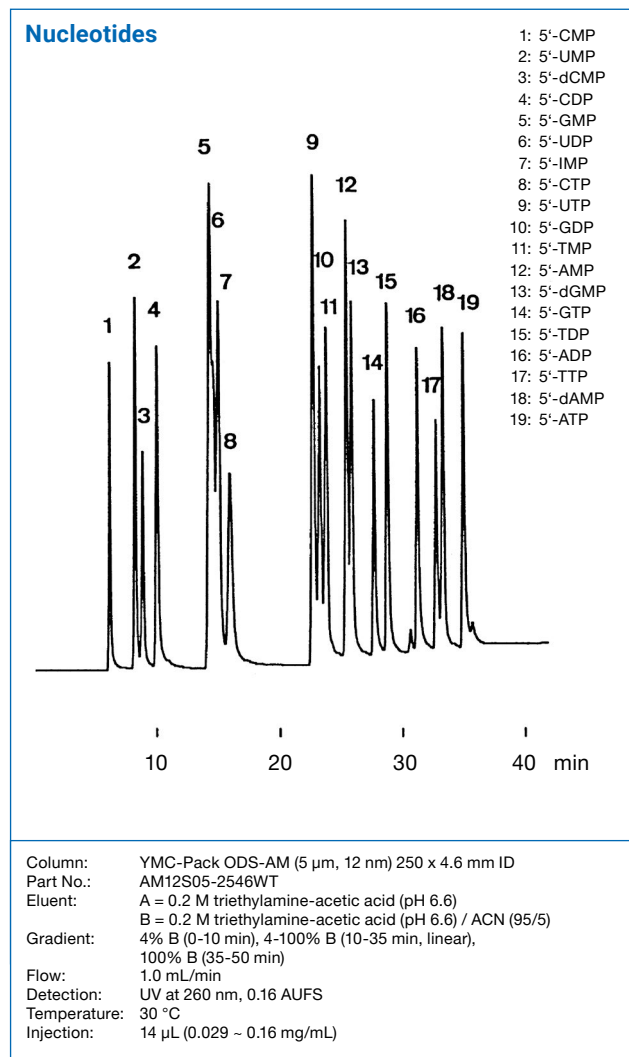
The rigorous quality control and the quality assurance system applied by YMC minimises the variation in retention and selectivity of YMC-Pack ODS-AM columns. Due to the guaranteed long term reproducibility, YMC-Pack ODS-AM columns often are the final choice for establishing validated HPLC analysis.



YMC-Pack ODS-AM

Applications

ODS-AM has an appropriate selectivity for polar to moderately nonpolar pharmaceuticals, organic intermediates, biological and natural products found in the chemical and pharmaceutical industry.



Column Care

The recommended pH range for using YMC-Pack ODS-AM columns is 2.0-7.5. Remove acid and buffer salts before storage. Store the column in methanol/water = 50/50. If columns are affected by undesired contaminants or clogged inlet frits

which cause back pressure increases, flush the column with THF in the opposite flow direction. For detailed information please refer to the "Column Care and Use Instructions" which can be downloaded from www.ymc.eu/download-library.html

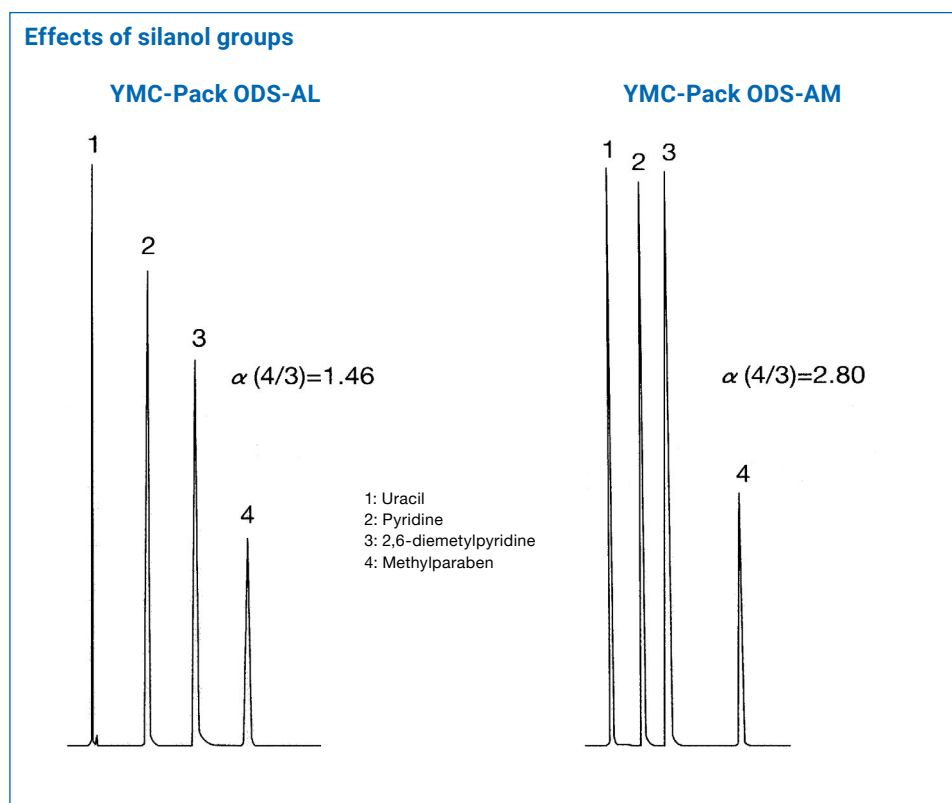
YMC-Pack ODS-AL

- residual silanols for mixed-mode separations
- same high ligand density as other YMC ODS phases
- unique selectivity for polar compounds
- not endcapped

Specifications	YMC-Pack ODS-AL
Particle size / μm	5
Pore size / nm	12
Surface area / m^2g^{-1}	330
Carbon content / %	17
Recommended pH range	2.0 – 7.5

General

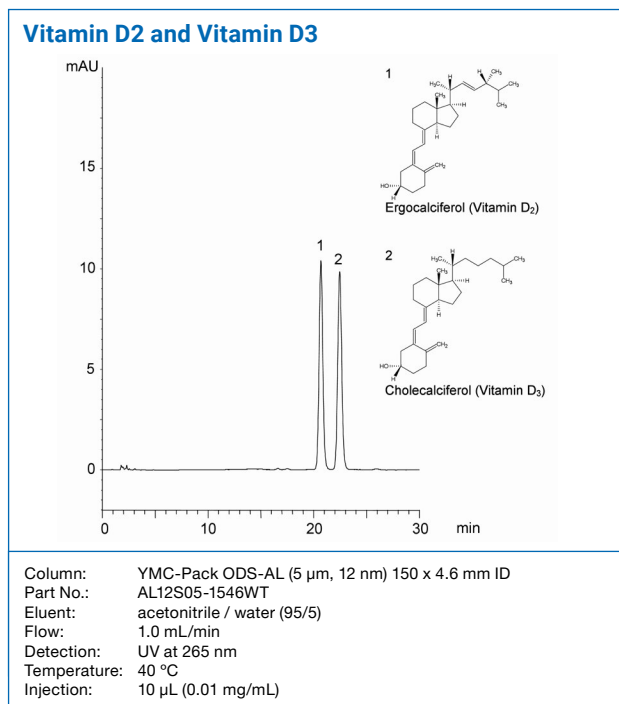
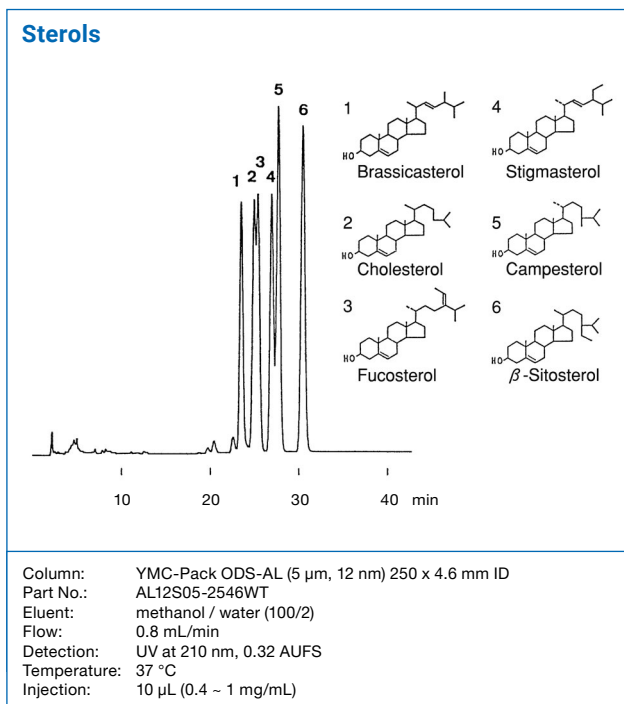
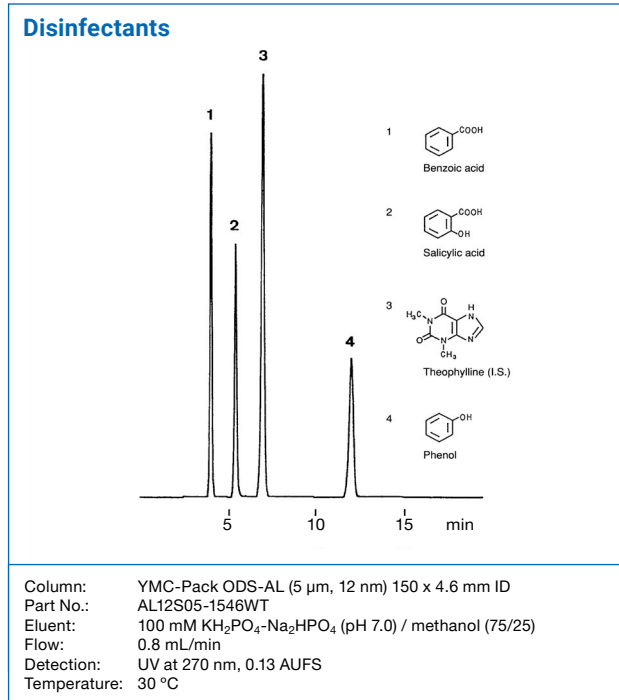
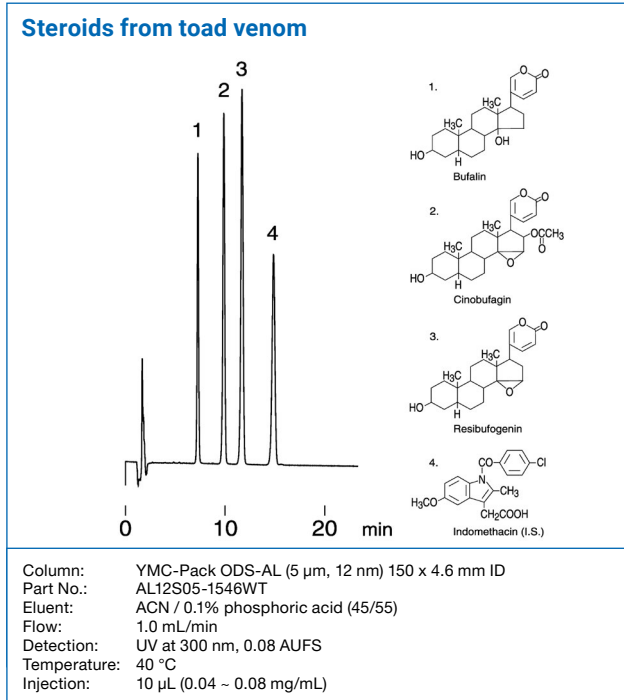
YMC-Pack ODS-AL uses not only hydrophobic interaction but also secondary interactions with reactive residual silanol groups to affect separation. This results in a different selectivity from conventional ODS columns. When ionic interactions are involved, it is preferable to use a buffer in the mobile phase to achieve reproducible separations.



The separation factor (α) of internal standards methylparaben / 2,6-dimethylpyridine for YMC-Pack ODS-AL, which is not endcapped is different to that of YMC-Pack ODS-AM. Due to the residual silanol groups, YMC-Pack ODS-AL shows higher retention of pyridines.

YMC-Pack ODS-AL

Applications



Column Care

The recommended pH range for using YMC-Pack ODS-AL columns is 2.0-7.5. Remove acid and buffer salts before storage. Store the column in methanol/water = 50/50. If columns are affected by undesired contaminants or clogged inlet frits which cause back pressure increases,

flush the column with THF in the opposite flow direction. For detailed information please refer to the "Column Care and Use Instructions" which can be downloaded from www.ymc.eu/download-library.html

YMC-Pack Polymer C18

- *hydrophilic polymethacrylate support*
- *excellent reproducibility of C18 chemistry integral to polymer matrix*
- *no silanol or metal contaminants*
- *pH stable from pH 2–13*
- *compatible with all standard reversed phase solvents*

Specifications	YMC-Pack Polymer C18
Particle size / μm	6
Pore size / nm	proprietary
Surface area / m^2g^{-1}	n/a
Carbon content / %	10
Recommended pH range	2.0 – 13.0

General

YMC-Pack Polymer C18 is a reversed phase liquid chromatography packing which provides a broad range of solvent choices and a pH range from 2.0–13. YMC-Pack Polymer C18 is manufactured from a hydrophilic methacrylate polymer which is cross-linked with C18 ligand-containing

reagents. YMC-Pack Polymer C18 offers a maximum application range: a wide variety of compounds such as organic acids, organic amines, peptides, pharmaceuticals and proteins can be separated using YMC-Pack Polymer C18.

Properties

YMC-Pack Polymer C18 is prepared from a hydrophilic methacrylate polymer bonded with a hydro-phobic octadecylsilane reagent to make the C18 functionality an integral part of the polymeric structure. This gives a three-dimensional polymer matrix which is not based on a silica gel support.

As such, it has no residual silanols or metal impurities to interfere with the separation of basic organic compounds. YMC-Pack Polymer C18 is compatible with all common reversed phase eluents such as water, methanol, acetonitrile and THF. Virtually all aqueous buffers and acid modifiers, such as TFA and phosphoric acid, as well as base modifiers such as sodium hydroxide and ammonium hydroxide can be used. Since it resists shrinking and swelling, YMC-Pack Polymer C18 can be used with eluents ranging in compo-

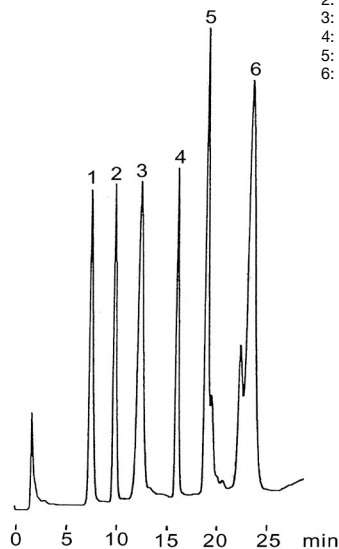
sition from 100% aqueous to 100% organic component. In addition, YMC-Pack Polymer C18 can easily be sterilised by flushing with 0.1M NaOH in 20% acetonitrile/water. The selectivity and retention of YMC-Pack Polymer C18 is similar to standard ODS phases, due to its hydrophobic bonding on a hydrophilic support. Consequently, its selectivity is closer to that of silica-based C18 supports than to styrene/DVB-based supports.

It should be noted that interactions between aromatic or conjugated systems and the methacrylate backbone provides slightly greater retention when compared to silica-based ODS columns, whereas highly aliphatic compounds show greater retention on silica-based ODS supports. YMC-Pack Polymer C18 is also available in preparative particle sizes.

YMC-Pack Polymer C18

Applications

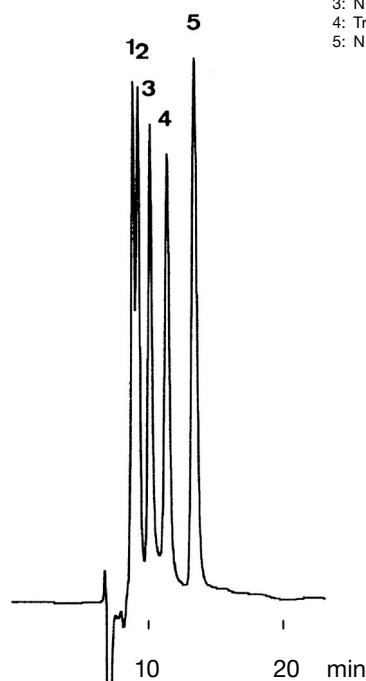
Peptides and proteins



- 1: Met-Enkephalin
- 2: Leu-Enkephalin
- 3: BSA
- 4: α -Mating factor
- 5: Insulin
- 6: Ovalbumin

Column: YMC-Pack Polymer C18 150 x 4.6 mm ID
 Part No.: PC99S06-1546WT
 Eluent: A = acetonitrile / water / TFA (20/80/0.05)
 B = acetonitrile / water / TFA (45/55/0.05)
 0-100% B (0-30 min, linear)
 Flow: 1.0 mL/min
 Detection: UV at 220 nm, 0.32 AUFS
 Temperature: 30 °C
 Injection: 30 μ L

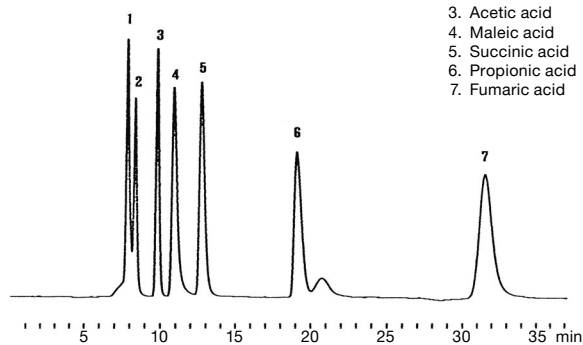
Aminoalcohols



- 1: Ethanolamine
- 2: Diethanolamine
- 3: N-Methylethanolamine
- 4: Triethanolamine
- 5: N,N-Dimethylethanolamine

Column: YMC-Pack Polymer C18 250 x 6.0 mm ID
 Part No.: PC99S06-2506WT
 Eluent: 100 mM Na_2HPO_4 / 100 mM NaOH (60/40, pH 12.0)
 Flow: 0.6 mL/min
 Detection: UV at 215 nm, 0.32 AUFS
 Temperature: 20 °C
 Injection: 50 μ L (0.2 ~ 3.0 mg/mL)

Organic acids



- 1: L-Malic acid
- 2: Lactic acid
- 3: Acetic acid
- 4: Maleic acid
- 5: Succinic acid
- 6: Propionic acid
- 7: Fumaric acid

Column: YMC-Pack Polymer C18 250 x 4.6 mm ID
 Part No.: PC99S06-2546WT
 Eluent: 0.1% TFA
 Flow: 0.5 mL/min
 Detection: UV at 220 nm, 0.08 AUFS
 Temperature: 30 °C
 Injection: 10 μ L (0.016 ~ 2.2 mg/mL)

Column Care

YMC-Pack Polymer C18 is stable towards hydrolysis between pH 2.0–13.0. Remove acid and buffer salts before storage. Store the column in methanol / water = 70/30. If columns are affected by undesired contaminants or clogged inlet frits which cause back pressure increases,

flush the column with THF in the opposite flow direction. For detailed information please refer to the "Column Care and Use Instructions" which can be downloaded from www.ymc.eu/download-library.html

YMCbasic

- *alternative bonding approach to reduce peak tailing of basic pharmaceuticals*
- *no need for ion pair reagents or amine modifiers*
- *complementing selectivity to C8 and C18 materials*

Specifications	YMCbasic
Particle size / μm	3; 5
Pore size / nm	20
Surface area / m^2g^{-1}	175
Carbon content / %	7.0
Recommended pH range	2.0 – 7.5

General

The proprietary derivatisation procedure for YMCbasic allows YMC to produce a material with controlled surface coverage, which shows excellent lot-to-lot reproducibility as a result of closely monitoring both the production of the silica support and the bonding process.

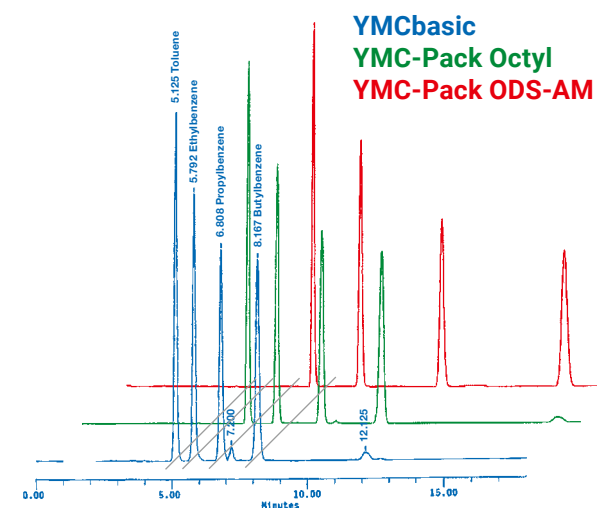
The resulting YMCbasic material shows a different hydrophobicity to C8 or C18 phases as shown in the diagram on this page. Finally, it represents an interesting alternative to short chain selectivities.

Applications

The result is a phase with true reversed phase characteristics, high resolution and excellent peak symmetry for basic compounds without the need for ion pair reagents or amine modifiers (see separation of anilines using acetonitrile / water eluent). Unlike many base-deactivated phases, YMCbasic is also suitable for separation of acidic compounds, showing slight retention of highly polar acid compounds such as maleate. YMCbasic provides a complementing selectivity seen with conventional C8 and C18 materials, but without peak tailing for basic compounds.

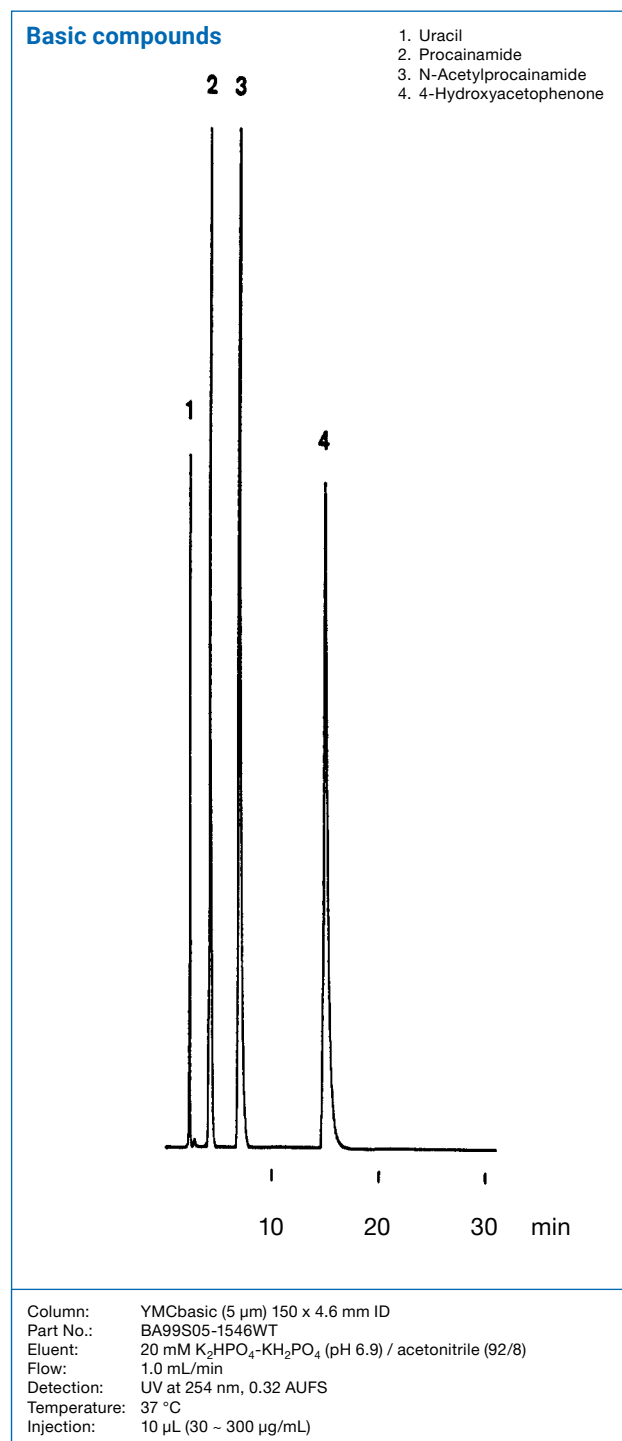
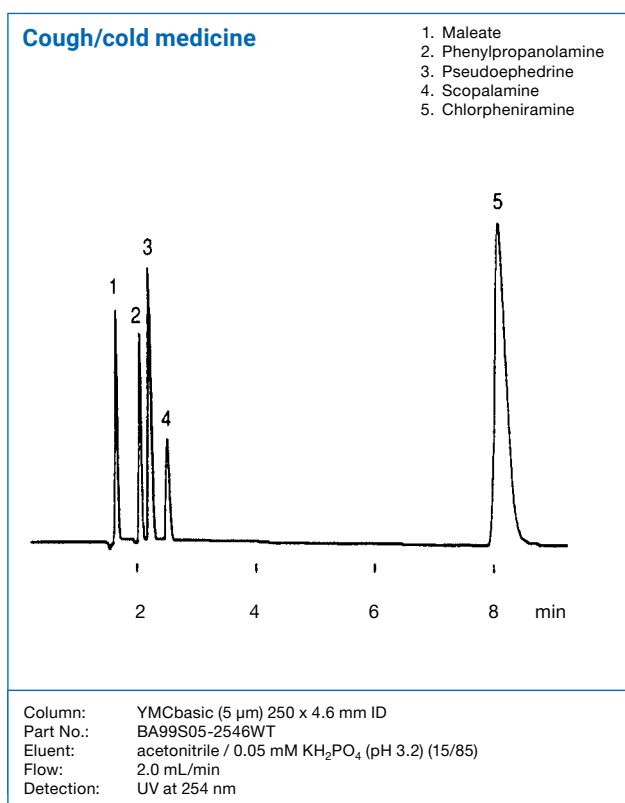
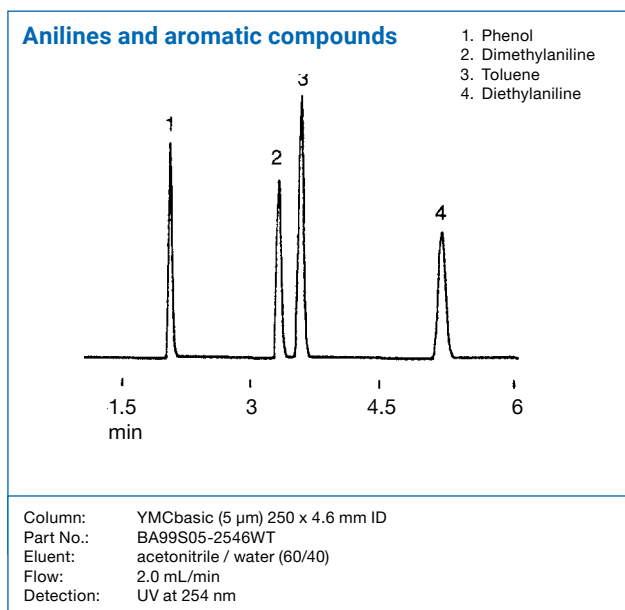
YMCbasic is also available in preparative particle sizes.

Hydrophobicity of YMCbasic versus YMC-Pack Octyl and YMC-Pack ODS-AM



Column: 250 x 4.6 mm ID
 Eluent: acetonitrile / water (75/25)
 Flow: 1.0 mL/min
 Detection: UV at 254 nm

YMCbasic



Column Care

The recommend pH range for YMCbasic is 2.0–7.5. Remove acid and buffer salts before storage. Store the column in methanol/ water = 70/30. Clogged inlet frits often can be cleaned by changing the flow direction or replacement.

For detailed information please refer to the "Column Care and Use Instructions" which can be downloaded from www.ymc.eu/download-library.html

YMC-Pack C₈

- *alternative phase to C18 with moderate hydrophobicity*
- *fully endcapped, high coverage monomeric bonded chemistry*
- *ideal for method development and routine separations*
- *excellent retention for all types of organic molecules, especially peptides, proteins and pharmaceuticals*

Specifications	YMC-Pack C ₈		
Particle size / μm	3; 5	5	5
Pore size / nm	12	20	30
Surface area / m^2g^{-1}	330	175	100
Carbon content / %	10	7	4
Recommended pH range	2.0 - 7.5	2.0 - 7.5	2.0 - 7.5

General

YMC-Pack C₈ is one of YMC's most commonly used bonded phases and an excellent alternative to C18 selectivities. Due to its moderate hydrophobicity, retention times tend to be shorter than those for ODS phases.

YMC-Pack C₈ is suitable for a wide range of sample types including pharmaceuticals and biologicals with a relatively high hydrophobicity.

Properties

YMC-Pack C₈ is prepared by exhaustive bonding of a monomeric octylsilane to totally spherical and porous silica gel. The bonded phase is then treated with an exhaustive endcapping process to ensure a high surface coverage leading to a moderate 10% carbon loading on the standard 12 nm pore material. Compared to C18 phases, retention times for hydrophobic molecules will be shorter on C8 material due to the reduced carbon load.

YMC-Pack C₈ is ideally suited for the separation of many compounds that are too strongly retained on C18 phases or which require greater retention than provided by C4 materials.

It is one of the most versatile reversed phase materials and should be considered for the development of new methods. Available in three porosities, YMC-Pack C₈ material will separate many classes of compounds including pharmaceuticals, organic chemicals, peptides, protein and other biological molecules. For preparative applications, choose the smallest pore size which provides adequate retention and resolution. This is because sample loading is generally proportional to surface area. Smaller porosity media provide greater surface area and hence greater loadability. YMC-Pack C₈ is also available in preparative particle sizes.

Column care

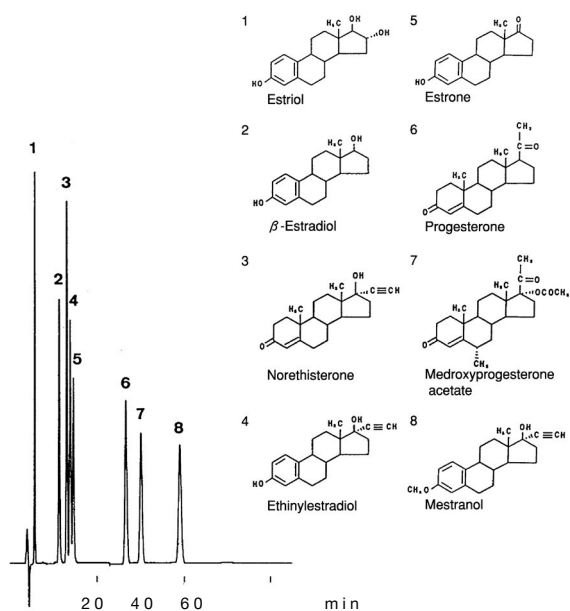
YMC-Pack C₈ is stable towards hydrolysis between pH 2.0-7.5. Remove acid and buffer salts before storage. Store the column in methanol / water = 70/30. If columns are affected by undesired contaminants or clogged inlet

frits which cause back pressure increases, flush the column with THF in the opposite flow direction. For detailed information please refer to the "Column Care and Use Instructions" which can be downloaded from www.ymc.eu.

YMC-Pack C₈

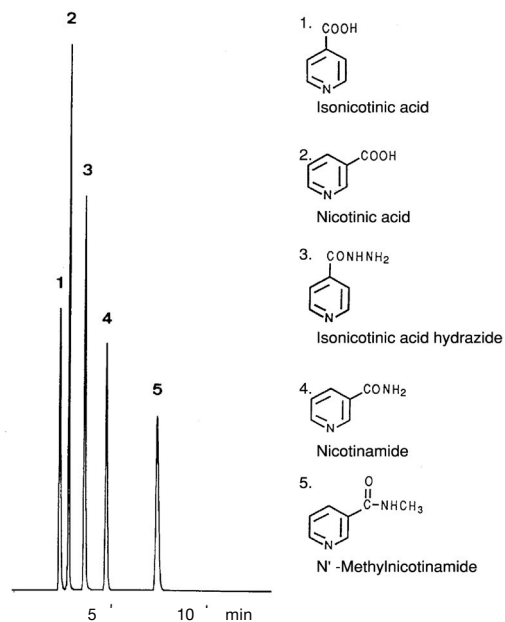
Applications

Estrogens and progestins



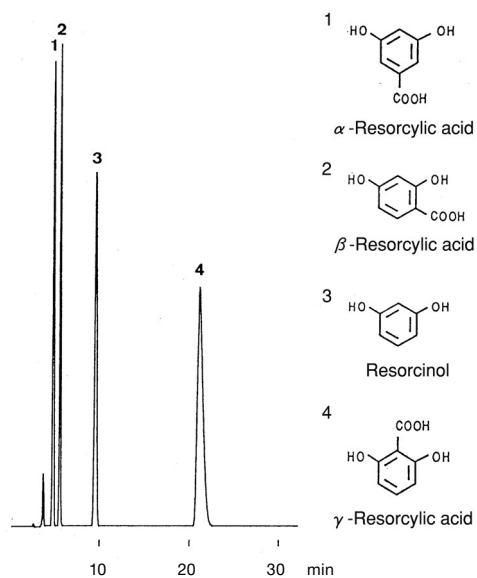
Column: YMC-Pack C₈ (Octyl) (5 μ m, 12 nm) 250 x 4.6 mm ID
 Part No.: OC12S05-2546WT
 Eluent: acetonitrile / THF / water (46/4/50)
 Flow: 0.7 mL/min
 Detection: UV at 230 nm, 0.16 AUFS
 Temperature: 30 °C
 Injection: 7 μ L (0.1 mg/mL)

Nicotinic acid analogues



Column: YMC-Pack C₈ (Octyl) (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: OC12S05-1546WT
 Eluent: acetonitrile / 20 mM KH₂PO₄ (5/95)
 Flow: 1.0 mL/min
 Detection: UV at 260 nm, 0.64 AUFS
 Temperature: 30 °C
 Injection: 13 μ L (0.2 mg/mL)

Resorcylic acid isomers



Column: YMC-Pack C₈ (Octyl) (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: OC12S05-1546WT
 Eluent: methanol / 100 mM KH₂PO₄ (10/90)
 Flow: 0.8 mL/min
 Detection: UV at 285 nm, 0.16 AUFS
 Temperature: 37 °C

YMC-Pack Ph

- *fully endcapped, monomeric phenyl phase directly bonded*
- *unique selectivity due to π - π interactions*
- *preferential retention of aromatic compounds*
- *alternative selectivity to C18, C8 or C4 bonded phases for the analysis of peptides and other biomolecules*

Specifications	YMC-Pack Ph	
Particle size / μm	3; 5	5
Pore size / nm	12	30
Surface area / m^2g^{-1}	330	100
Carbon content / %	9	3
Recommended pH range	2.0 – 7.5	2.0 – 7.5

General

YMC-Pack Ph is a high density bonded phase (9% carbon load on 12 nm silica) which is fully endcapped. This results in a superior bonded phase with proven performance and exceptional lifetime for a phenyl reversed phase column.

Properties

YMC-Pack Ph provides a unique selectivity when compared to aliphatic straight chain reversed phases such as C18, C8 or C4. The π -electrons of the phenyl groups can interact with aromatic residues of an analyte molecule in addition to hydrophobic interactions to increase retention relative to non-aromatic species.

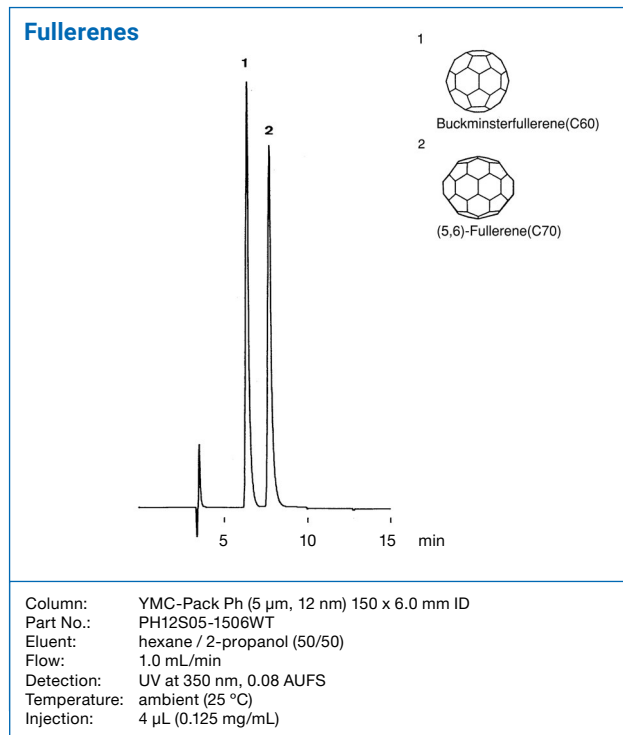
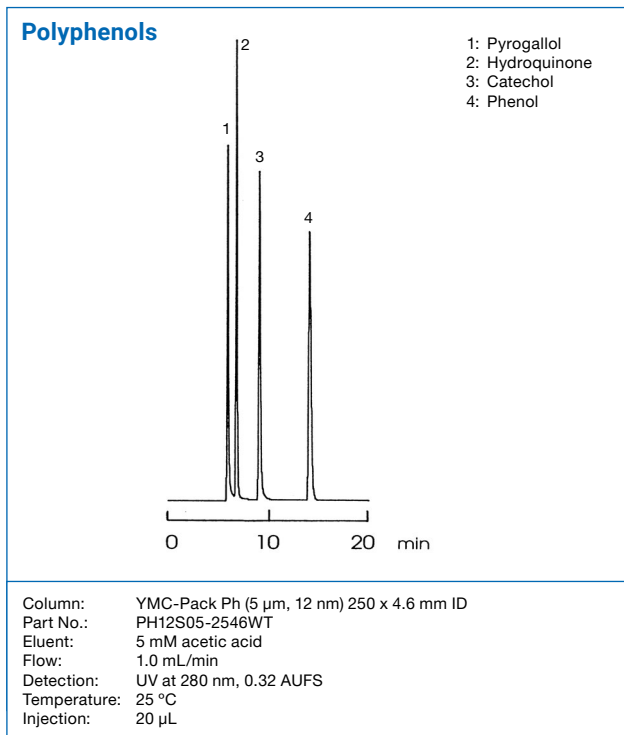
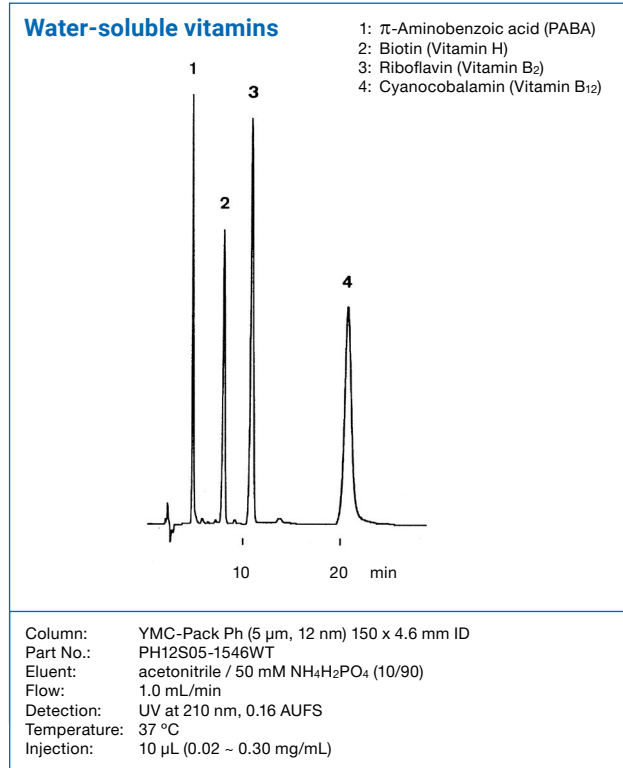
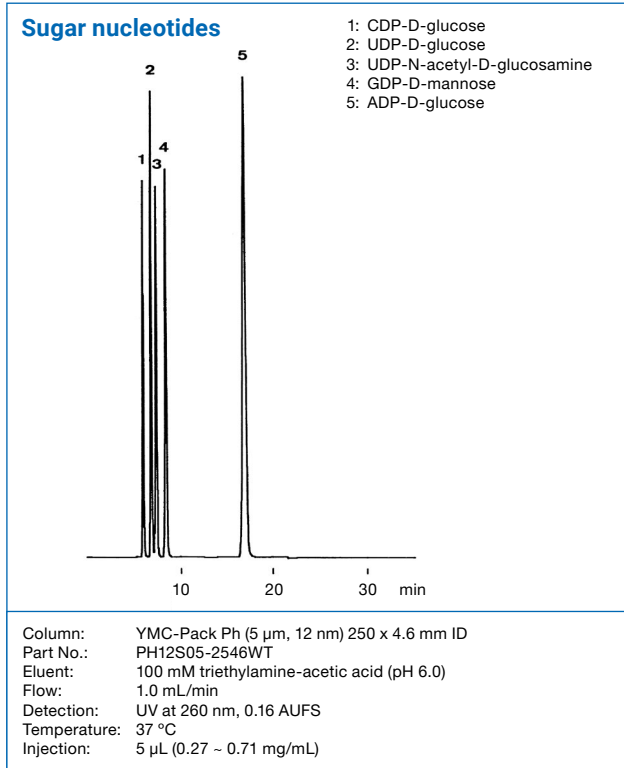
Phenyl phases are convenient for the separation of aromatic compounds and also provide a useful alternative

to C18 or C4 phases for the separation of peptides and proteins on both small pore (12 nm) and wide pore (30 nm) materials. Retention is decreased on wide pore phenyl phases relative to 12 nm phenyl material due to the lower surface area of the wide pore material.

YMC-Pack Ph is also available in preparative particle sizes.

YMC-Pack Ph

Applications



Column care

YMC-Pack Ph is stable towards hydrolysis between pH 2.0–7.5. Remove acid and buffer salts before storage. Store the column in methanol/water = 70/30. If columns are affected by undesired contaminants or clogged inlet frits which cause

back pressure increases, flush the column with THF in the opposite flow direction. For detailed information please refer to the "Column Care and Use Instructions" which can be downloaded from www.ymc.eu/download-library.html

YMC-Pack C₄

- *low hydrophobicity material*
- *high coverage monomeric bonded chemistry*
- *ideally suited for separation of biological materials*

Specifications	YMC-Pack C ₄		
Particle size / μm	3; 5	5	5
Pore size / nm	12	20	30
Surface area / m^2g^{-1}	330	175	100
Carbon content / %	47	5	3
Recommended pH range	2.0 - 7.5	2.0 - 7.5	2.0 - 7.5

General

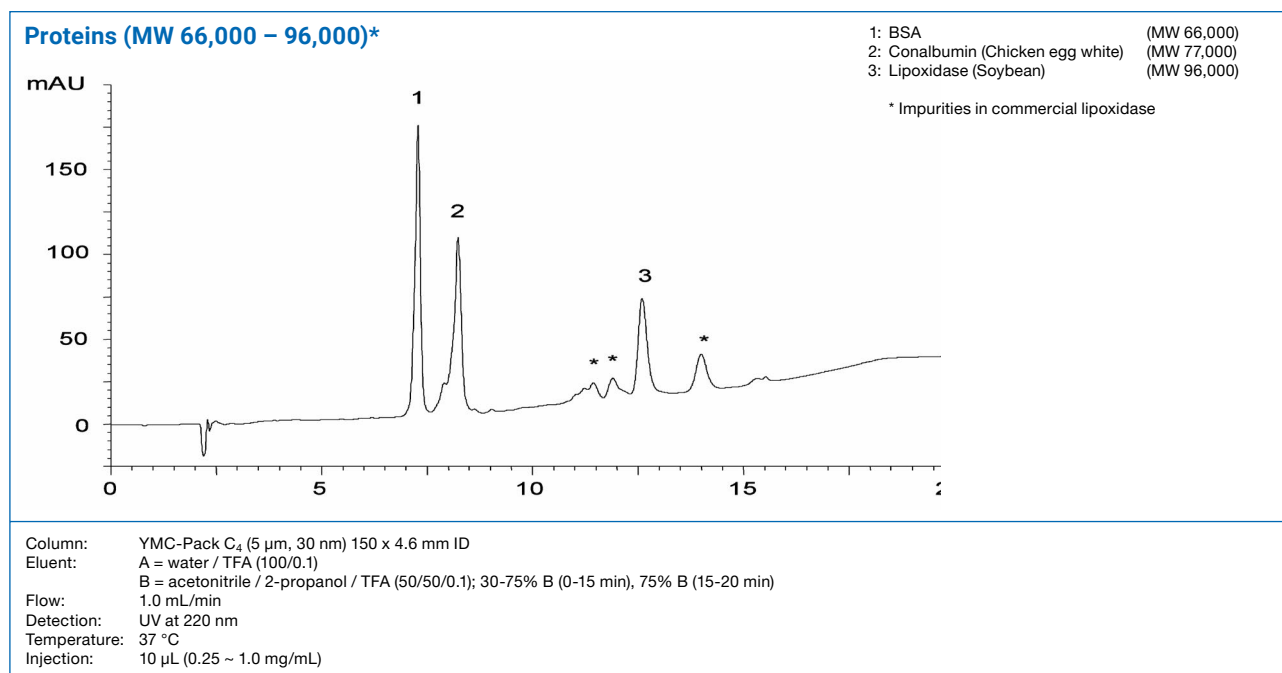
Due to shorter alkyl chains YMC-Pack C₄ has a lower hydrophobicity than both C18 and C8 phases. Therefore retention times of non-polar samples tend to be shorter

on YMC-Pack C₄, making it an ideal choice for faster separations.

Properties

YMC-Pack C₄ phases are less hydrophobic and generally require more aqueous buffer than C8 or C18 phases. When compared to C8 or C18 packings using the same eluent, YMC-Pack C₄ shows significantly shorter retention times for nonpolar compounds. Retention of polar compounds, however, is not significantly affected.

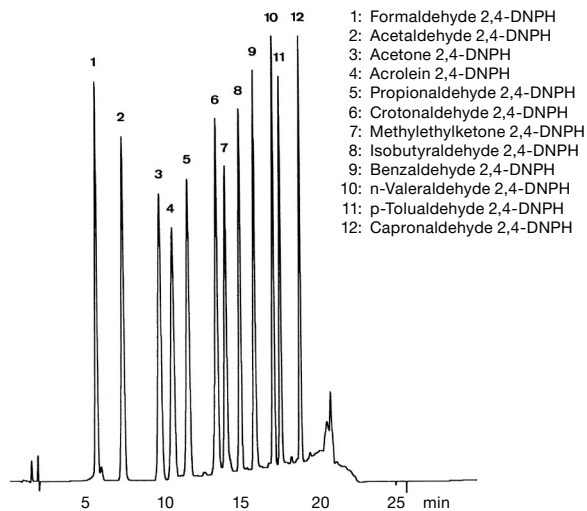
Therefore, mixtures with a wide range of component polarity are best separated by YMC-Pack C₄. This is because the butyl bonded phase gives shorter retention times while still maintaining high resolution when compared to longer chain bonded chemistries.



YMC-Pack C₄

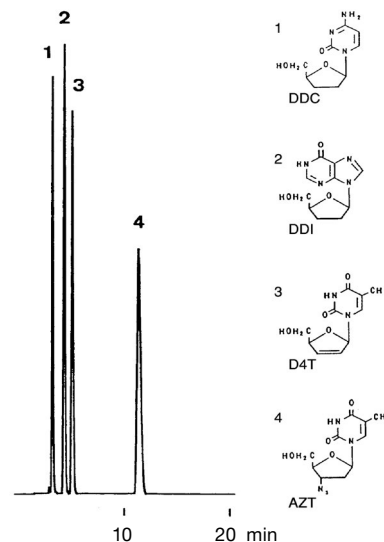
Applications

2,4-Dinitrophenylhydrazones of aldehydes and ketones



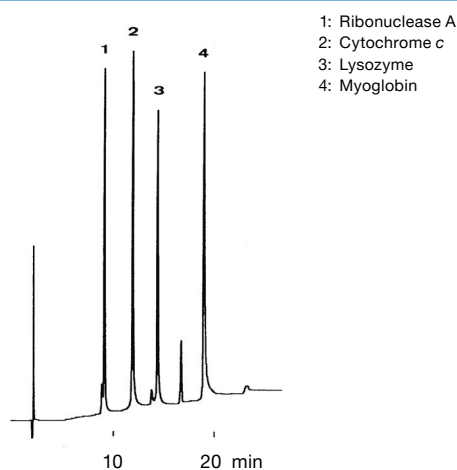
Column: YMC-Pack C₄ (5 μm, 12 nm) 150 x 4.6 mm ID
 Part No.: BU12S05-1546WT
 Eluent: A = tetrahydrofuran / water (10/90)
 B = acetonitrile; 35% B (0-7 min), 35-65% B (7-18 min, linear),
 Gradient: 100% B (18-19 min), 35% B (19-35 min)
 Flow: 1.5 mL/min
 Detection: UV at 360 nm, 0.01 AUFS
 Temperature: 30 °C
 Injection: 11 μL (0.0025 mg/mL)

Anti-human immunodeficiency virus (HIV) agents



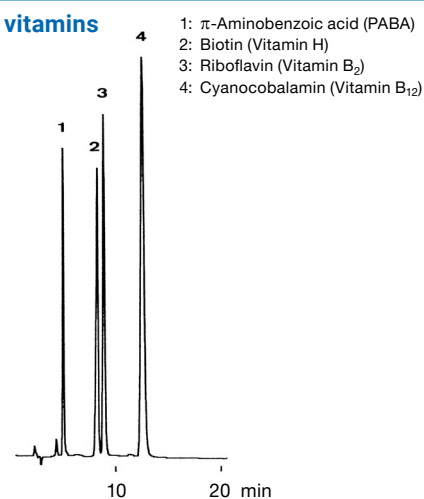
Column: YMC-Pack C₄ (5 μm, 12 nm) 150 x 4.6 mm ID
 Part No.: BU12S05-1546WT
 Eluent: methanol / 10 mM KH₂PO₄ (10/60)
 Flow: 1.0 mL/min
 Detection: UV at 254 nm, 0.16 AUFS
 Temperature: 37 °C
 Injection: 7 μL (0.125 mg/mL)

Proteins



Column: YMC-Pack C₄ (5 μm, 30 nm) 150 x 4.6 mm ID
 Part No.: BU30S05-1546WT
 Eluent: A) acetonitrile / water / TFA (5/95/0.1)
 B) acetonitrile / water / TFA (60/40/0.1)
 Flow: 1.0 mL/min
 Detection: UV at 220 nm, 0.32 AUFS
 Temperature: 37 °C
 Injection: 16 μL (0.16 ~ 0.33 mg/mL)

Water-soluble vitamins



Column: YMC-Pack C₄ (5 μm, 12 nm) 150 x 4.6 mm ID
 Part No.: BU12S05-1546WT
 Eluent: acetonitrile / 50 mM NH₄H₂PO₄ (10/90)
 Flow: 1.0 mL/min
 Detection: UV at 210 nm, 0.16 AUFS
 Temperature: 37 °C
 Injection: 10 μL (0.02 ~ 0.30 mg/mL)

Column care

YMC-Pack C₄ is stable towards hydrolysis between pH 2.0–7.5. Remove acid and buffer salts before storage. Store the column in methanol / water = 70/30. If columns are affected by undesired contaminants or clogged inlet frits which cause back pressure increases, flush the col-

umn with THF in the opposite flow direction. For detailed information please refer to the "Column Care and Use Instructions" which can be downloaded from www.ymc.eu/download-library.html

YMC-Pack TMS

- *stationary phase with the lowest hydrophobicity among reversed phase packing materials*
- *intermediate polarity between normal phase silica and other alkyl bonded reversed phases*
- *for fast separations of highly hydrophobic compounds*
- *alternative to C18 for the separation of hydrophilic compounds*

Specifications	YMC-Pack TMS
Particle size / μm	3; 5
Pore size / nm	12
Surface area / m^2g^{-1}	330
Carbon content / %	4
Recommended pH range	2.0 – 7.5

General

YMC-Pack TMS is a bonded phase suitable for samples that exhibit strong retention characteristics and are difficult or impossible to separate on conventional reversed phase or normal phase columns.

Properties

YMC-Pack TMS is bonded with trimethylmonochlorosilane to create a phase with intermediate polarity for separation of extremely hydrophobic compounds using conventional reversed phase solvents and of highly polar compounds using normal phase solvents.

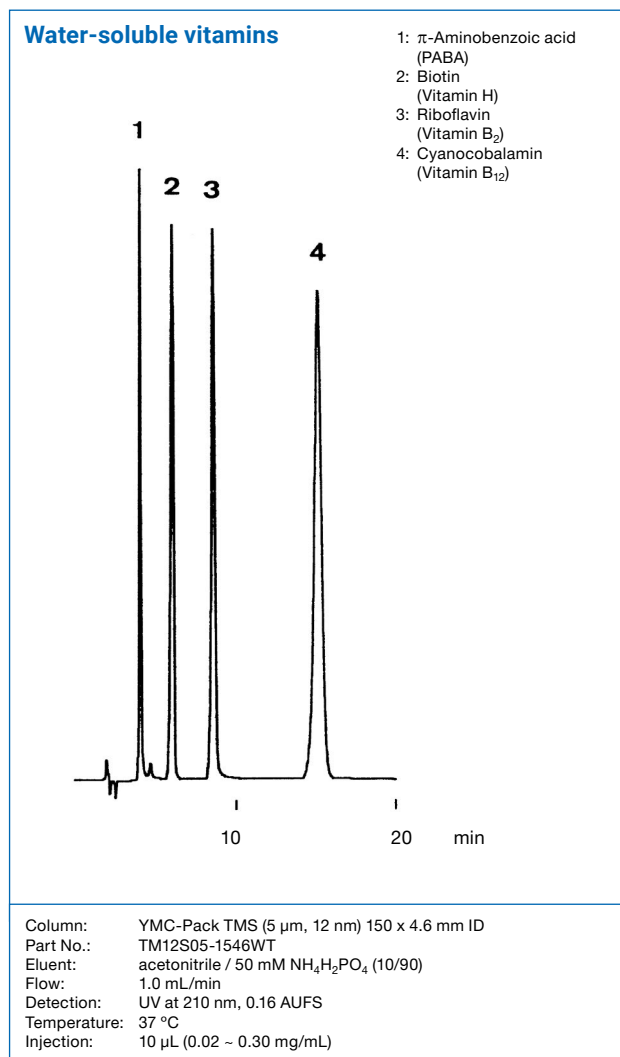
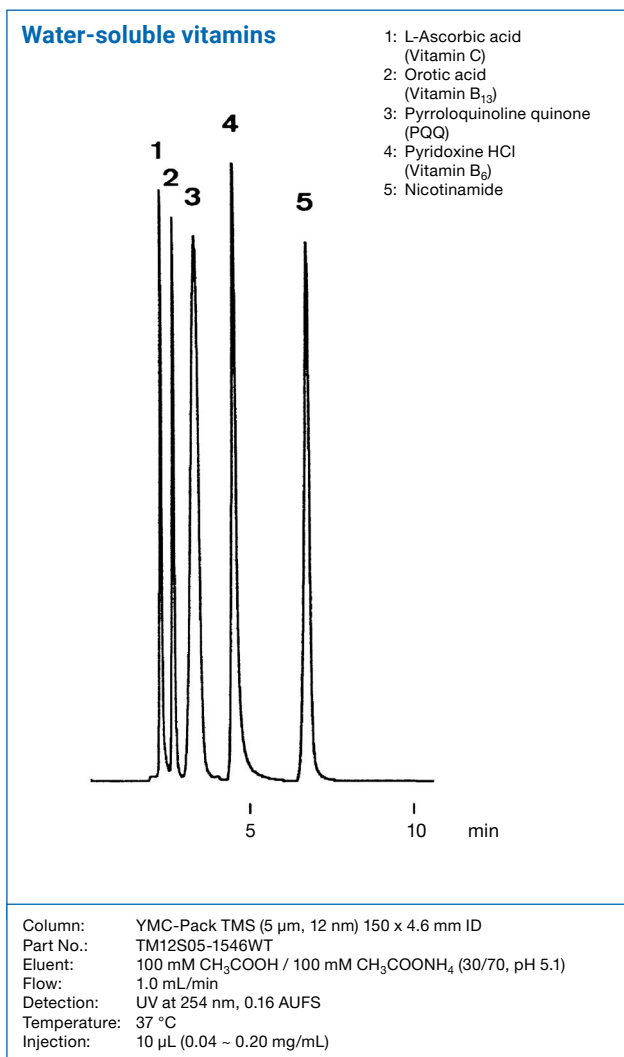
The chemistry of YMC-Pack TMS (C1) is also well-suited

for the analysis of multifunctional compounds. Selectivity characteristics of a C1 bonded phase can be unique, and samples must be tested to determine the suitability of the phase.

YMC-Pack TMS is also available in preparative particle sizes.

YMC-Pack TMS

Applications



Column Care

YMC-Pack TMS is stable towards hydrolysis between pH 2.0–7.5. Remove acid and buffer salts before storage. Store the column in methanol / water = 70/30. If columns are affected by undesired contaminants or clogged inlet frits which cause back pressure increases,

flush the column with THF in the opposite flow direction. For detailed information please refer to the "Column Care and Use Instructions" which can be downloaded from www.ymc.eu/download-library.html

YMC-Pack CN

- *for normal, reversed phase and HILIC applications*
- *silica gel with cyanopropyl groups*
- *faster column equilibration than normal silica gel*
- *most polar reversed phase column*

Specifications	YMC-Pack CN	
Particle size / μm	3; 5	5
Pore size / nm	12	30
Surface area / m^2g^{-1}	330	100
Carbon content / %	7	3
Recommended pH range	2.0 – 7.5	2.0 – 7.5

General

In reversed phase mode, cyano (nitrile) phases are the most polar and least retentive of all reversed phase supports. Extremely hydrophobic compounds, which do not elute on standard C18 and C8 columns with typical reversed phase

eluent, can be separated using cyano phases. Separations using reversed and normal phase and HILIC mechanisms can be carried out using this material.

Properties

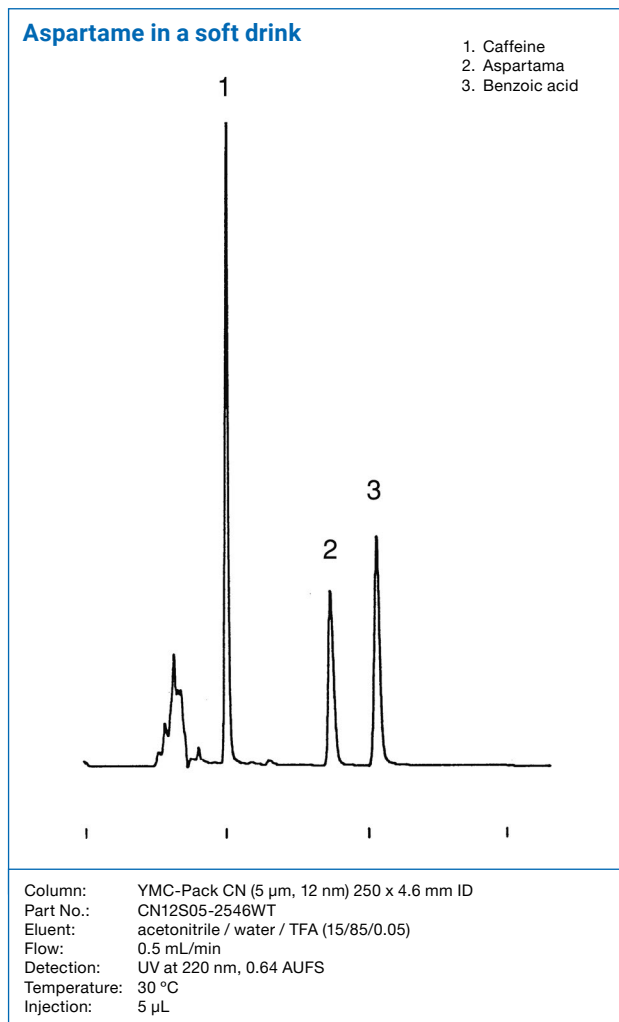
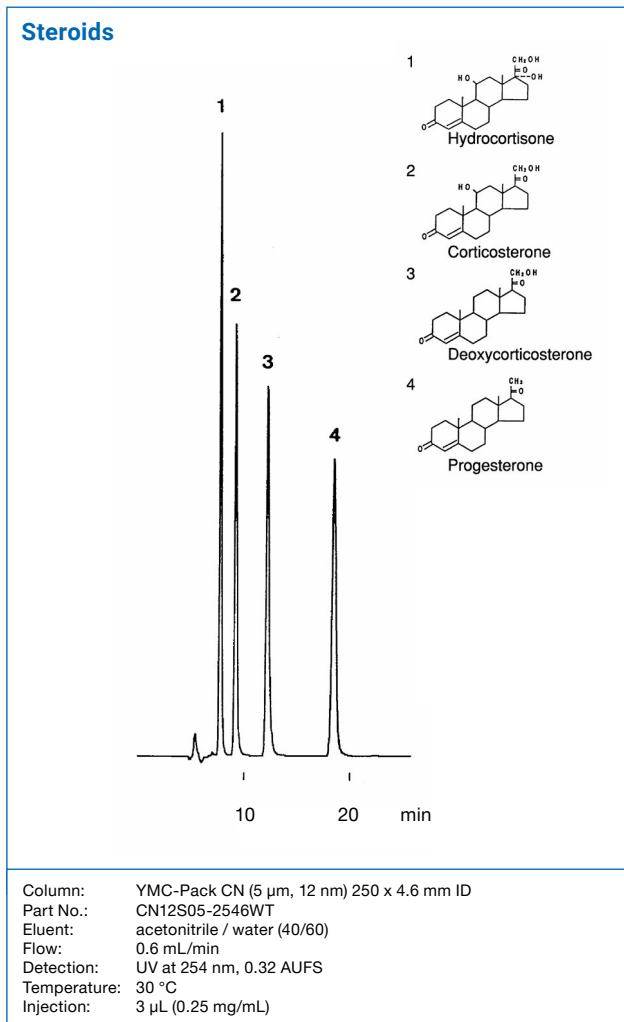
The cyano chemistry of YMC-Pack CN provides a different selectivity from both phenyl and standard aliphatic (C18, C8 or C4) reversed phases. It is useful for quick and simple analysis of compounds that differ greatly in hydrophobicity, without the need to use gradient elution chromatography. Cyano packings also provide an alternative to silica material in normal phase chromatography, where bonded

normal phase packings have the advantage of faster equilibration, more uniform surface activity and increased resistance to dissolution.

To extend column lifetime continued switching between normal and reversed phase solvents should be avoided. YMC-Pack CN is also available in preparative particle sizes.

YMC-Pack CN

Applications



Column Care

YMC-Pack CN is stable towards hydrolysis between pH 2.0–7.5. Remove acid and buffer salts before storage. For detailed information please refer to the "Column Care and Use Instructions" which can be downloaded from www.ymc.eu/download-library.html

Ordering Information

12 nm, 3 µm HPLC columns (Waters type hardware, WT)

Phase	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length (pack of 5)
		50	100	150	250	
YMC-Pack ODS-AQ	2.0	AQ12S03-0502WT	AQ12S03-1002WT	AQ12S03-1502WT	AQ12S03-2502WT	AQ12S03-01Q1GC
	2.1	AQ12S03-05Q1WT	AQ12S03-10Q1WT	AQ12S03-15Q1WT	AQ12S03-25Q1WT	AQ12S03-01Q1GC
	3.0	AQ12S03-0503WT	AQ12S03-1003WT	AQ12S03-1503WT	AQ12S03-2503WT	AQ12S03-0103GC
	4.0	AQ12S03-0504WT	AQ12S03-1004WT	AQ12S03-1504WT	AQ12S03-2504WT	AQ12S03-0104GC
	4.6	AQ12S03-0546WT	AQ12S03-1046WT	AQ12S03-1546WT	AQ12S03-2546WT	AQ12S03-0104GC
YMC-Pack ODS-A	2.0	AA12S03-0502WT	AA12S03-1002WT	AA12S03-1502WT	AA12S03-2502WT	AA12S03-01Q1GC
	2.1	AA12S03-05Q1WT	AA12S03-10Q1WT	AA12S03-15Q1WT	AA12S03-25Q1WT	AA12S03-01Q1GC
	3.0	AA12S03-0503WT	AA12S03-1003WT	AA12S03-1503WT	AA12S03-2503WT	AA12S03-0103GC
	4.0	AA12S03-0504WT	AA12S03-1004WT	AA12S03-1504WT	AA12S03-2504WT	AA12S03-0104GC
	4.6	AA12S03-0546WT	AA12S03-1046WT	AA12S03-1546WT	AA12S03-2546WT	AA12S03-0104GC
YMC-Pack ODS-AM	2.0	AM12S03-0502WT	AM12S03-1002WT	AM12S03-1502WT	AM12S03-2502WT	AM12S03-01Q1GC
	2.1	AM12S03-05Q1WT	AM12S03-10Q1WT	AM12S03-15Q1WT	AM12S03-25Q1WT	AM12S03-01Q1GC
	3.0	AM12S03-0503WT	AM12S03-1003WT	AM12S03-1503WT	AM12S03-2503WT	AM12S03-0103GC
	4.0	AM12S03-0504WT	AM12S03-1004WT	AM12S03-1504WT	AM12S03-2504WT	AM12S03-0104GC
	4.6	AM12S03-0546WT	AM12S03-1046WT	AM12S03-1546WT	AM12S03-2546WT	AM12S03-0104GC
YMC-Pack C8	2.0	OC12S03-0502WT	OC12S03-1002WT	OC12S03-1502WT	OC12S03-2502WT	OC12S03-01Q1GC
	2.1	OC12S03-05Q1WT	OC12S03-10Q1WT	OC12S03-15Q1WT	OC12S03-25Q1WT	OC12S03-01Q1GC
	3.0	OC12S03-0503WT	OC12S03-1003WT	OC12S03-1503WT	OC12S03-2503WT	OC12S03-0103GC
	4.0	OC12S03-0504WT	OC12S03-1004WT	OC12S03-1504WT	OC12S03-2504WT	OC12S03-0104GC
	4.6	OC12S03-0546WT	OC12S03-1046WT	OC12S03-1546WT	OC12S03-2546WT	OC12S03-0104GC
YMC-Pack C4	2.0	BU12S03-0502WT	BU12S03-1002WT	BU12S03-1502WT	BU12S03-2502WT	BU12S03-01Q1GC
	2.1	BU12S03-05Q1WT	BU12S03-10Q1WT	BU12S03-15Q1WT	BU12S03-25Q1WT	BU12S03-01Q1GC
	3.0	BU12S03-0503WT	BU12S03-1003WT	BU12S03-1503WT	BU12S03-2503WT	BU12S03-0103GC
	4.0	BU12S03-0504WT	BU12S03-1004WT	BU12S03-1504WT	BU12S03-2504WT	BU12S03-0104GC
	4.6	BU12S03-0546WT	BU12S03-1046WT	BU12S03-1546WT	BU12S03-2546WT	BU12S03-0104GC
YMC-Pack Ph	2.0	PH12S03-0502WT	PH12S03-1002WT	PH12S03-1502WT	PH12S03-2502WT	PH12S03-01Q1GC
	2.1	PH12S03-05Q1WT	PH12S03-10Q1WT	PH12S03-15Q1WT	PH12S03-25Q1WT	PH12S03-01Q1GC
	3.0	PH12S03-0503WT	PH12S03-1003WT	PH12S03-1503WT	PH12S03-2503WT	PH12S03-0103GC
	4.0	PH12S03-0504WT	PH12S03-1004WT	PH12S03-1504WT	PH12S03-2504WT	PH12S03-0104GC
	4.6	PH12S03-0546WT	PH12S03-1046WT	PH12S03-1546WT	PH12S03-2546WT	PH12S03-0104GC
YMC-Pack TMS	2.0	TM12S03-0502WT	TM12S03-1002WT	TM12S03-1502WT	TM12S03-2502WT	TM12S03-01Q1GC
	2.1	TM12S03-05Q1WT	TM12S03-10Q1WT	TM12S03-15Q1WT	TM12S03-25Q1WT	TM12S03-01Q1GC
	3.0	TM12S03-0503WT	TM12S03-1003WT	TM12S03-1503WT	TM12S03-2503WT	TM12S03-0103GC
	4.0	TM12S03-0504WT	TM12S03-1004WT	TM12S03-1504WT	TM12S03-2504WT	TM12S03-0104GC
	4.6	TM12S03-0546WT	TM12S03-1046WT	TM12S03-1546WT	TM12S03-2546WT	TM12S03-0104GC
YMC-Pack CN	2.0	CN12S03-0502WT	CN12S03-1002WT	CN12S03-1502WT	CN12S03-2502WT	CN12S03-01Q1GC
	2.1	CN12S03-05Q1WT	CN12S03-10Q1WT	CN12S03-15Q1WT	CN12S03-25Q1WT	CN12S03-01Q1GC
	3.0	CN12S03-0503WT	CN12S03-1003WT	CN12S03-1503WT	CN12S03-2503WT	CN12S03-0103GC
	4.0	CN12S03-0504WT	CN12S03-1004WT	CN12S03-1504WT	CN12S03-2504WT	CN12S03-0104GC
	4.6	CN12S03-0546WT	CN12S03-1046WT	CN12S03-1546WT	CN12S03-2546WT	CN12S03-0104GC

20 nm, 3 µm HPLC columns (Waters type hardware, WT)

Phase	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length (pack of 5)
		50	100	150	250	
YMC-Pack ODS-AQ	2.0	AQ20S03-0502WT	AQ20S03-1002WT	AQ20S03-1502WT	AQ20S03-2502WT	AQ20S03-01Q1GC
	2.1	AQ20S03-05Q1WT	AQ20S03-10Q1WT	AQ20S03-15Q1WT	AQ20S03-25Q1WT	AQ20S03-01Q1GC
	3.0	AQ20S03-0503WT	AQ20S03-1003WT	AQ20S03-1503WT	AQ20S03-2503WT	AQ20S03-0103GC
	4.0	AQ20S03-0504WT	AQ20S03-1004WT	AQ20S03-1504WT	AQ20S03-2504WT	AQ20S03-0104GC
	4.6	AQ20S03-0546WT	AQ20S03-1046WT	AQ20S03-1546WT	AQ20S03-2546WT	AQ20S03-0104GC
YMC-Pack ODS-A	2.0	AA20S03-0502WT	AA20S03-1002WT	AA20S03-1502WT	AA20S03-2502WT	AA20S03-01Q1GC
	2.1	AA20S03-05Q1WT	AA20S03-10Q1WT	AA20S03-15Q1WT	AA20S03-25Q1WT	AA20S03-01Q1GC
	3.0	AA20S03-0503WT	AA20S03-1003WT	AA20S03-1503WT	AA20S03-2503WT	AA20S03-0103GC
	4.0	AA20S03-0504WT	AA20S03-1004WT	AA20S03-1504WT	AA20S03-2504WT	AA20S03-0104GC
	4.6	AA20S03-0546WT	AA20S03-1046WT	AA20S03-1546WT	AA20S03-2546WT	AA20S03-0104GC
YMCbasic	2.0	BA99S03-0502WT	BA99S03-1002WT	BA99S03-1502WT	BA99S03-2502WT	BA99S03-01Q1GC
	2.1	BA99S03-05Q1WT	BA99S03-10Q1WT	BA99S03-15Q1WT	BA99S03-25Q1WT	BA99S03-01Q1GC
	3.0	BA99S03-0503WT	BA99S03-1003WT	BA99S03-1503WT	BA99S03-2503WT	BA99S03-0103GC
	4.0	BA99S03-0504WT	BA99S03-1004WT	BA99S03-1504WT	BA99S03-2504WT	BA99S03-0104GC
	4.6	BA99S03-0546WT	BA99S03-1046WT	BA99S03-1546WT	BA99S03-2546WT	BA99S03-0104GC

*Guard cartridge holder required, part no. XPGCH-Q1

Ordering Information

12 nm, 5 µm HPLC columns (Waters type hardware, WT)

Phase	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length (pack of 5)
		50	100	150	250	
YMC-Pack ODS-AQ	2.0	AQ12S05-0502WT	AQ12S05-1002WT	AQ12S05-1502WT	AQ12S05-2502WT	AQ12S05-01Q1GC
	2.1	AQ12S05-05Q1WT	AQ12S05-10Q1WT	AQ12S05-15Q1WT	AQ12S05-25Q1WT	AQ12S05-01Q1GC
	3.0	AQ12S05-0503WT	AQ12S05-1003WT	AQ12S05-1503WT	AQ12S05-2503WT	AQ12S05-0103GC
	4.0	AQ12S05-0504WT	AQ12S05-1004WT	AQ12S05-1504WT	AQ12S05-2504WT	AQ12S05-0104GC
	4.6	AQ12S05-0546WT	AQ12S05-1046WT	AQ12S05-1546WT	AQ12S05-2546WT	AQ12S05-0104GC
YMC-Pack ODS-A	2.0	AA12S05-0502WT	AA12S05-1002WT	AA12S05-1502WT	AA12S05-2502WT	AA12S05-01Q1GC
	2.1	AA12S05-05Q1WT	AA12S05-10Q1WT	AA12S05-15Q1WT	AA12S05-25Q1WT	AA12S05-01Q1GC
	3.0	AA12S05-0503WT	AA12S05-1003WT	AA12S05-1503WT	AA12S05-2503WT	AA12S05-0103GC
	4.0	AA12S05-0504WT	AA12S05-1004WT	AA12S05-1504WT	AA12S05-2504WT	AA12S05-0104GC
	4.6	AA12S05-0546WT	AA12S05-1046WT	AA12S05-1546WT	AA12S05-2546WT	AA12S05-0104GC
YMC-Pack ODS-AM	2.0	AM12S05-0502WT	AM12S05-1002WT	AM12S05-1502WT	AM12S05-2502WT	AM12S05-01Q1GC
	2.1	AM12S05-05Q1WT	AM12S05-10Q1WT	AM12S05-15Q1WT	AM12S05-25Q1WT	AM12S05-01Q1GC
	3.0	AM12S05-0503WT	AM12S05-1003WT	AM12S05-1503WT	AM12S05-2503WT	AM12S05-0103GC
	4.0	AM12S05-0504WT	AM12S05-1004WT	AM12S05-1504WT	AM12S05-2504WT	AM12S05-0104GC
	4.6	AM12S05-0546WT	AM12S05-1046WT	AM12S05-1546WT	AM12S05-2546WT	AM12S05-0104GC
YMC-Pack ODS-AL	2.0	AL12S05-0502WT	AL12S05-1002WT	AL12S05-1502WT	AL12S05-2502WT	AL12S05-01Q1GC
	2.1	AL12S05-05Q1WT	AL12S05-10Q1WT	AL12S05-15Q1WT	AL12S05-25Q1WT	AL12S05-01Q1GC
	3.0	AL12S05-0503WT	AL12S05-1003WT	AL12S05-1503WT	AL12S05-2503WT	AL12S05-0103GC
	4.0	AL12S05-0504WT	AL12S05-1004WT	AL12S05-1504WT	AL12S05-2504WT	AL12S05-0104GC
	4.6	AL12S05-0546WT	AL12S05-1046WT	AL12S05-1546WT	AL12S05-2546WT	AL12S05-0104GC
YMC-Pack C8	2.0	OC12S05-0502WT	OC12S05-1002WT	OC12S05-1502WT	OC12S05-2502WT	OC12S05-01Q1GC
	2.1	OC12S05-05Q1WT	OC12S05-10Q1WT	OC12S05-15Q1WT	OC12S05-25Q1WT	OC12S05-01Q1GC
	3.0	OC12S05-0503WT	OC12S05-1003WT	OC12S05-1503WT	OC12S05-2503WT	OC12S05-0103GC
	4.0	OC12S05-0504WT	OC12S05-1004WT	OC12S05-1504WT	OC12S05-2504WT	OC12S05-0104GC
	4.6	OC12S05-0546WT	OC12S05-1046WT	OC12S05-1546WT	OC12S05-2546WT	OC12S05-0104GC
YMC-Pack C4	2.0	BU12S05-0502WT	BU12S05-1002WT	BU12S05-1502WT	BU12S05-2502WT	BU12S05-01Q1GC
	2.1	BU12S05-05Q1WT	BU12S05-10Q1WT	BU12S05-15Q1WT	BU12S05-25Q1WT	BU12S05-01Q1GC
	3.0	BU12S05-0503WT	BU12S05-1003WT	BU12S05-1503WT	BU12S05-2503WT	BU12S05-0103GC
	4.0	BU12S05-0504WT	BU12S05-1004WT	BU12S05-1504WT	BU12S05-2504WT	BU12S05-0104GC
	4.6	BU12S05-0546WT	BU12S05-1046WT	BU12S05-1546WT	BU12S05-2546WT	BU12S05-0104GC
YMC-Pack Ph	2.0	PH12S05-0502WT	PH12S05-1002WT	PH12S05-1502WT	PH12S05-2502WT	PH12S05-01Q1GC
	2.1	PH12S05-05Q1WT	PH12S05-10Q1WT	PH12S05-15Q1WT	PH12S05-25Q1WT	PH12S05-01Q1GC
	3.0	PH12S05-0503WT	PH12S05-1003WT	PH12S05-1503WT	PH12S05-2503WT	PH12S05-0103GC
	4.0	PH12S05-0504WT	PH12S05-1004WT	PH12S05-1504WT	PH12S05-2504WT	PH12S05-0104GC
	4.6	PH12S05-0546WT	PH12S05-1046WT	PH12S05-1546WT	PH12S05-2546WT	PH12S05-0104GC
YMC-Pack TMS	2.0	TM12S05-0502WT	TM12S05-1002WT	TM12S05-1502WT	TM12S05-2502WT	TM12S05-01Q1GC
	2.1	TM12S05-05Q1WT	TM12S05-10Q1WT	TM12S05-15Q1WT	TM12S05-25Q1WT	TM12S05-01Q1GC
	3.0	TM12S05-0503WT	TM12S05-1003WT	TM12S05-1503WT	TM12S05-2503WT	TM12S05-0103GC
	4.0	TM12S05-0504WT	TM12S05-1004WT	TM12S05-1504WT	TM12S05-2504WT	TM12S05-0104GC
	4.6	TM12S05-0546WT	TM12S05-1046WT	TM12S05-1546WT	TM12S05-2546WT	TM12S05-0104GC
YMC-Pack CN	2.0	CN12S05-0502WT	CN12S05-1002WT	CN12S05-1502WT	CN12S05-2502WT	CN12S05-01Q1GC
	2.1	CN12S05-05Q1WT	CN12S05-10Q1WT	CN12S05-15Q1WT	CN12S05-25Q1WT	CN12S05-01Q1GC
	3.0	CN12S05-0503WT	CN12S05-1003WT	CN12S05-1503WT	CN12S05-2503WT	CN12S05-0103GC
	4.0	CN12S05-0504WT	CN12S05-1004WT	CN12S05-1504WT	CN12S05-2504WT	CN12S05-0104GC
	4.6	CN12S05-0546WT	CN12S05-1046WT	CN12S05-1546WT	CN12S05-2546WT	CN12S05-0104GC

*Guard cartridge holder required, part no. XPGCH-Q1

Ordering Information

20 nm, 5 µm HPLC columns (Waters type hardware, WT)

Phase	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length (pack of 5)
		50	100	150	250	
YMC-Pack ODS-AQ	2.0	AQ20S05-0502WT	AQ20S05-1002WT	AQ20S05-1502WT	AQ20S05-2502WT	AQ20S05-01Q1GC
	2.1	AQ20S05-05Q1WT	AQ20S05-10Q1WT	AQ20S05-15Q1WT	AQ20S05-25Q1WT	AQ20S05-01Q1GC
	3.0	AQ20S05-0503WT	AQ20S05-1003WT	AQ20S05-1503WT	AQ20S05-2503WT	AQ20S05-01Q3GC
	4.0	AQ20S05-0504WT	AQ20S05-1004WT	AQ20S05-1504WT	AQ20S05-2504WT	AQ20S05-01Q4GC
	4.6	AQ20S05-0546WT	AQ20S05-1046WT	AQ20S05-1546WT	AQ20S05-2546WT	AQ20S05-01Q4GC
YMC-Pack ODS-A	2.0	AA20S05-0502WT	AA20S05-1002WT	AA20S05-1502WT	AA20S05-2502WT	AA20S05-01Q1GC
	2.1	AA20S05-05Q1WT	AA20S05-10Q1WT	AA20S05-15Q1WT	AA20S05-25Q1WT	AA20S05-01Q1GC
	3.0	AA20S05-0503WT	AA20S05-1003WT	AA20S05-1503WT	AA20S05-2503WT	AA20S05-01Q3GC
	4.0	AA20S05-0504WT	AA20S05-1004WT	AA20S05-1504WT	AA20S05-2504WT	AA20S05-01Q4GC
	4.6	AA20S05-0546WT	AA20S05-1046WT	AA20S05-1546WT	AA20S05-2546WT	AA20S05-01Q4GC
YMC-Pack C8	2.0	OC20S05-0502WT	OC20S05-1002WT	OC20S05-1502WT	OC20S05-2502WT	OC20S05-01Q1GC
	2.1	OC20S05-05Q1WT	OC20S05-10Q1WT	OC20S05-15Q1WT	OC20S05-25Q1WT	OC20S05-01Q1GC
	3.0	OC20S05-0503WT	OC20S05-1003WT	OC20S05-1503WT	OC20S05-2503WT	OC20S05-01Q3GC
	4.0	OC20S05-0504WT	OC20S05-1004WT	OC20S05-1504WT	OC20S05-2504WT	OC20S05-01Q4GC
	4.6	OC20S05-0546WT	OC20S05-1046WT	OC20S05-1546WT	OC20S05-2546WT	OC20S05-01Q4GC
YMC-Pack C4	2.0	BU20S05-0502WT	BU20S05-1002WT	BU20S05-1502WT	BU20S05-2502WT	BU20S05-01Q1GC
	2.1	BU20S05-05Q1WT	BU20S05-10Q1WT	BU20S05-15Q1WT	BU20S05-25Q1WT	BU20S05-01Q1GC
	3.0	BU20S05-0503WT	BU20S05-1003WT	BU20S05-1503WT	BU20S05-2503WT	BU20S05-01Q3GC
	4.0	BU20S05-0504WT	BU20S05-1004WT	BU20S05-1504WT	BU20S05-2504WT	BU20S05-01Q4GC
	4.6	BU20S05-0546WT	BU20S05-1046WT	BU20S05-1546WT	BU20S05-2546WT	BU20S05-01Q4GC
YMC-Pack Protein RP	2.0	PR99S05-0502WT	PR99S05-1002WT	PR99S05-1502WT	PR99S05-2502WT	PR99S05-01Q1GC
	2.1	PR99S05-05Q1WT	PR99S05-10Q1WT	PR99S05-15Q1WT	PR99S05-25Q1WT	PR99S05-01Q1GC
	3.0	PR99S05-0503WT	PR99S05-1003WT	PR99S05-1503WT	PR99S05-2503WT	PR99S05-01Q3GC
	4.0	PR99S05-0504WT	PR99S05-1004WT	PR99S05-1504WT	PR99S05-2504WT	PR99S05-01Q4GC
	4.6	PR99S05-0546WT	PR99S05-1046WT	PR99S05-1546WT	PR99S05-2546WT	PR99S05-01Q4GC
YMCbasic	2.0	BA99S05-0502WT	BA99S05-1002WT	BA99S05-1502WT	BA99S05-2502WT	BA99S05-01Q1GC
	2.1	BA99S05-05Q1WT	BA99S05-10Q1WT	BA99S05-15Q1WT	BA99S05-25Q1WT	BA99S05-01Q1GC
	3.0	BA99S05-0503WT	BA99S05-1003WT	BA99S05-1503WT	BA99S05-2503WT	BA99S05-01Q3GC
	4.0	BA99S05-0504WT	BA99S05-1004WT	BA99S05-1504WT	BA99S05-2504WT	BA99S05-01Q4GC
	4.6	BA99S05-0546WT	BA99S05-1046WT	BA99S05-1546WT	BA99S05-2546WT	BA99S05-01Q4GC

*Guard cartridge holder required, part no. XPGCH-Q1

Ordering Information

30 nm, 5 µm HPLC columns (Waters type hardware, WT)

Phase	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length (pack of 5)
		50	100	150	250	
YMC-Pack ODS-A	2.0	AA30S05-0502WT	AA30S05-1002WT	AA30S05-1502WT	AA30S05-2502WT	AA30S05-01Q1GC
	2.1	AA30S05-05Q1WT	AA30S05-10Q1WT	AA30S05-15Q1WT	AA30S05-25Q1WT	AA30S05-01Q1GC
	3.0	AA30S05-0503WT	AA30S05-1003WT	AA30S05-1503WT	AA30S05-2503WT	AA30S05-0103GC
	4.0	AA30S05-0504WT	AA30S05-1004WT	AA30S05-1504WT	AA30S05-2504WT	AA30S05-0104GC
	4.6	AA30S05-0546WT	AA30S05-1046WT	AA30S05-1546WT	AA30S05-2546WT	AA30S05-0104GC
YMC-Pack C8	2.0	OC30S05-0502WT	OC30S05-1002WT	OC30S05-1502WT	OC30S05-2502WT	OC30S05-01Q1GC
	2.1	OC30S05-05Q1WT	OC30S05-10Q1WT	OC30S05-15Q1WT	OC30S05-25Q1WT	OC30S05-01Q1GC
	3.0	OC30S05-0503WT	OC30S05-1003WT	OC30S05-1503WT	OC30S05-2503WT	OC30S05-0103GC
	4.0	OC30S05-0504WT	OC30S05-1004WT	OC30S05-1504WT	OC30S05-2504WT	OC30S05-0104GC
	4.6	OC30S05-0546WT	OC30S05-1046WT	OC30S05-1546WT	OC30S05-2546WT	OC30S05-0104GC
YMC-Pack C4	2.0	BU30S05-0502WT	BU30S05-1002WT	BU30S05-1502WT	BU30S05-2502WT	BU30S05-01Q1GC
	2.1	BU30S05-05Q1WT	BU30S05-10Q1WT	BU30S05-15Q1WT	BU30S05-25Q1WT	BU30S05-01Q1GC
	3.0	BU30S05-0503WT	BU30S05-1003WT	BU30S05-1503WT	BU30S05-2503WT	BU30S05-0103GC
	4.0	BU30S05-0504WT	BU30S05-1004WT	BU30S05-1504WT	BU30S05-2504WT	BU30S05-0104GC
	4.6	BU30S05-0546WT	BU30S05-1046WT	BU30S05-1546WT	BU30S05-2546WT	BU30S05-0104GC
YMC-Pack Ph	2.0	PH30S05-0502WT	PH30S05-1002WT	PH30S05-1502WT	PH30S05-2502WT	PH30S05-01Q1GC
	2.1	PH30S05-05Q1WT	PH30S05-10Q1WT	PH30S05-15Q1WT	PH30S05-25Q1WT	PH30S05-01Q1GC
	3.0	PH30S05-0503WT	PH30S05-1003WT	PH30S05-1503WT	PH30S05-2503WT	PH30S05-0103GC
	4.0	PH30S05-0504WT	PH30S05-1004WT	PH30S05-1504WT	PH30S05-2504WT	PH30S05-0104GC
	4.6	PH30S05-0546WT	PH30S05-1046WT	PH30S05-1546WT	PH30S05-2546WT	PH30S05-0104GC
YMC-Pack CN	2.0	CN30S05-0502WT	CN30S05-1002WT	CN30S05-1502WT	CN30S05-2502WT	CN30S05-01Q1GC
	2.1	CN30S05-05Q1WT	CN30S05-10Q1WT	CN30S05-15Q1WT	CN30S05-25Q1WT	CN30S05-01Q1GC
	3.0	CN30S05-0503WT	CN30S05-1003WT	CN30S05-1503WT	CN30S05-2503WT	CN30S05-0103GC
	4.0	CN30S05-0504WT	CN30S05-1004WT	CN30S05-1504WT	CN30S05-2504WT	CN30S05-0104GC
	4.6	CN30S05-0546WT	CN30S05-1046WT	CN30S05-1546WT	CN30S05-2546WT	CN30S05-0104GC

6 µm HPLC columns (Waters type hardware, WT)

Phase	Column ID [mm]	Column length [mm]				Guard cartridges* with 10 mm length (pack of 5)
		50	100	150	250	
YMC-Pack Polymer C18	2.0	PC99S06-0502WT	PC99S06-1002WT	PC99S06-1502WT	PC99S06-2502WT	PC99S06-01Q1GC
	2.1	PC99S06-05Q1WT	PC99S06-10Q1WT	PC99S06-15Q1WT	PC99S06-25Q1WT	PC99S06-01Q1GC
	3.0	PC99S06-0503WT	PC99S06-1003WT	PC99S06-1503WT	PC99S06-2503WT	PC99S06-0103GC
	4.0	PC99S06-0504WT	PC99S06-1004WT	PC99S06-1504WT	PC99S06-2504WT	PC99S06-0104GC
	4.6	PC99S06-0546WT	PC99S06-1046WT	PC99S06-1546WT	PC99S06-2546WT	PC99S06-0104GC

*Guard cartridge holder required, part no. XPGCH-Q1

For other dimensions, please contact your YMC representative or YMC directly by phone (+49 (0)2064 427-0), by mail (info@ymc.eu) or use our online chat on our homepage (www.ymc.eu).

