

# Tk mediterranea™ Sea<sub>18</sub> New Generation HPLC Column



mediterranea sea<sub>18</sub>  
by Teknokroma™



## Introduction

The mediterranea™ sea18 column provides a performance level that, until now, has not been reached in efficiency, inertness, pH-robustness, reproducibility and reliability. mediterranea™ sea18 columns simplify and make your HPLC work more pleasant. You won't worry about the extreme basic or acidic natures of your samples with the mediterranea™ sea18 column.

The versatility of the mediterranea™ sea18 column will enable you to deal successfully with the immense variety of separations in the fields of pharmaceuticals, life sciences, environment, foods, etc.

Once every ten years, the world of chromatography experiences a revolutionary technology that surpasses all others and meets the expectations of chromatographic scientists.

Teknokroma has focused all its efforts and all its know-how, accumulated through more than 30 years of chromatographic research and development, in offering the global-best reverse phase HPLC packing mediterranea™ sea18.

While developing the mediterranea™ sea18 column we created two novel proprietary bonding & packing technologies. In order to demonstrate the global-best technology of mediterranea™ sea18, we compared chromatographic results from the world's most popular reverse-phase HPLC columns. We invite you to try our mediterranea™ sea18 when you experience less-than-satisfactory results with your favourite column.

Today there is still a consensus about the fact that the best material to use as chromatographic packing continues to be silica. The particles of this material are very physically resistant, enable multiple functions, present maximum levels of efficiency and are also compatible with practically all solvents.

Teknokroma has been concentrated on obtaining the best silica particle in the market. The silica particle on which the mediterranea™ sea18 column is based is the result of an optimisation process in which, starting off from extremely pure materials with unusual low metal content, a perfectly spherical, rigid and inert particle has been obtained. Furthermore, the "porification" process developed for these ends (Surface Enhanced Accessibility, SEA) has achieved a high surface without losing any of its properties of physical resistance while also showing a very high load capacity, ideal for preparatory scaled processes. Moreover, the obtained porous structure ensures the maximum transfer speed of the solutes between the stationary and mobile phases, resulting in a greater separation efficiency.

Let us demonstrate the superior chromatographic properties of the mediterranea™ sea18 column, so you will feel comfortable with the performance of the world's best reverse-phase HPLC column.

# mediterranea™ Sea<sub>18</sub> New Generation HPLC Column **Tk**

## Purity of Silica

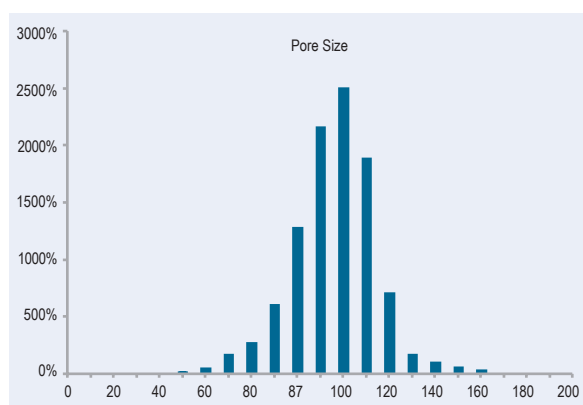
After evaluating many materials as a base for the global-best reverse phase chromatographic packing, the clear consensus is that the special characteristics of silica packings classify them as unsurpassable. No other packing material, apart from ultra-pure silica, achieves the perfect balance of physical resistance, functional use, chemical inertness, reproducibility and efficiency. Ultra-pure silica is also compatible with practically all solvents. Teknokroma concentrated on presenting the best silica particle to the HPLC market.

An essential condition for obtaining the global-best reverse phase packing is an extremely pure silica. The silica particle, on which the new mediterranea™ sea18 packing is based, is obtained from ultra-pure materials, using rigorously controlled manufacturing processes to ensure that the slightest possibility of contamination is avoided. The mediterranea™ sea18 silica required intensive optimisation of numerous processing factors to achieve a perfectly spherical, rigid and inert particle possessing unusually low metal content. The almost total absence of metals is one of the pillars over which the extraordinary properties of the mediterranea™ sea18 column reside.

## Metals Content (ppm)

Metal	Values Obtained
Al	<1ppm
Fe	<1ppm
Ti	<1ppm
Zr	<1ppm

## Porosity (Surface Enhanced Accessibility, SEA)



The pore distribution of the mediterranea™ sea18 column has been optimised by our own proprietary process called Surface Enhanced Accessibility (Sea). The Surface Enhanced Accessibility "porification" process creates high surface area without losing silica structural strength, chemical resistance, chemical inertness and high load capacity. Surface Enhanced Accessibility also ensures that practically 100% of the internal packing surface has been chemically bonded, endcapped, and is accessible to compounds being separated. Moreover, the Surface Enhanced Accessibility of mediterranea™ sea18 ensures the maximum transfer speed of the solutes between the stationary and mobile phases, resulting in a greater separation efficiency.

More than 98% of the silica surface area responsible for chromatographic separation of the sample is found inside the particle - within the pores. This explains the extreme importance of obtaining a very homogeneous pore distribution and the least possible number of nanopores. For most reverse-phase silica packings, these nanopores are not properly chemically bonded, endcapped or deactivated. So when nanopores are accessible to analytes, surface-analyte interactions frequently dominate. These surface-analyte interactions slow down the chromatographic process ("load transfer"), often resulting in decreased column efficiency. These treacherous nanopores may also negatively influence the phenomenon of dewetting which occurs with totally aqueous mobile phases.

## Multifunctional Endcapping Deactivation (MED)

The endcapping process is a critical step in obtaining a perfectly deactivated mediterranea™ sea18 column. Our proprietary Multifunctional Endcapping Deactivation (MED) technology maximizes surface-bonding, blocking practically all the active centres that may have remained on the surface of the silica after bonding the C18 chains. Thanks to our new MED technology, the mediterranea™ sea18 column enjoys an unusual low level of silanol activity - helping you to obtain symmetrical peaks from even the most basic and acidic pharmaceuticals and their metabolites. mediterranea™ sea18 bonding chemistries will help you to achieve an extraordinary resistance and column lifetime when running at extreme pH levels.

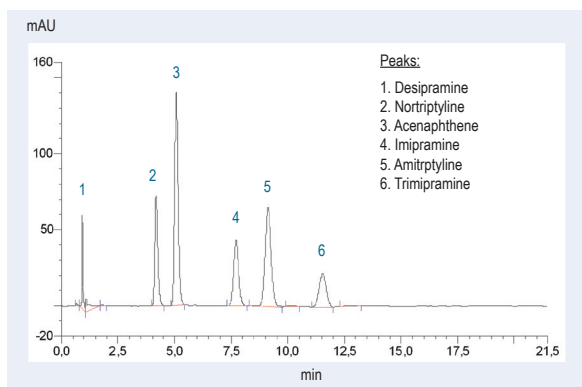
Moreover, the mediterranea™ sea18 column has been designed to show an excellent retention of polar compounds in a 100% aqueous environment without the problems of unwanted interactions which inefficiently endcapped conventional packings produce. Packing chemistry based on the new MED technology, "multifunctional endcapping deactivated", achieves levels of deactivation, resistance to extreme pH values and versatility in its chromatographic applications never reached by conventional or polar-embedded reverse phase packings. The MED technology has been rigorously developed to achieve the maximum reproducibility, with the objective that its chromatographic separations will be, column to column, exactly the same.

The obtained deactivation is shown when we make chromatograms of a group of Basic compounds in neutral pH conditions, including a neutral compound (acenaphthene) as a comparison. Of the four tested columns, the mediterranea™ sea18 is the one that shows the greatest efficiency, whether measuring with the acenaphthene or with a peak as difficult as that of amitriptylyne. The same occurs if we compare the asymmetry values of the peaks.

Column	As	Ncol	As	Ncol
	Acenaphthene	Acenaphthene	Amitriptyline	Amitriptylyne
mediterranea™ sea18 5 µm 15 x 0,46	1,06	11031	1,21	8119
Xterra MSC18 5 µm 15 x 0,39	1,36	6476	1,32	4619
Gemini C18 5 µm 15 x 0,46	1,22	9524	1,23	7490
Nucleosil 100 C18 5 µm 15 x 0,46	1,07	7815	na	na

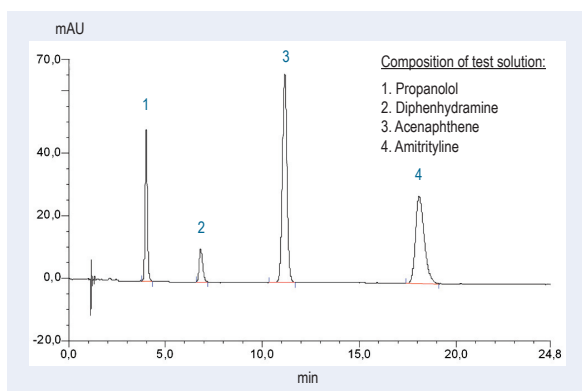
# Tk mediterranea™ Sea<sub>18</sub> New Generation HPLC Column

## Tricyclic Anti-depressants

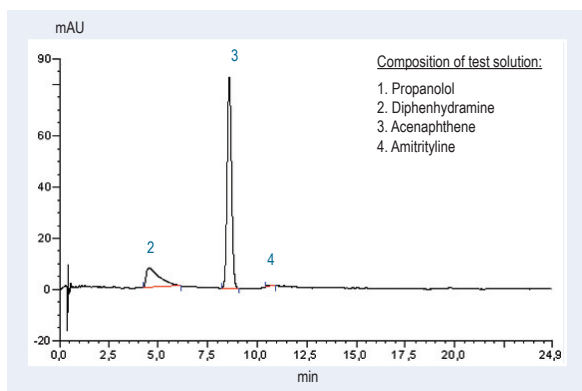


Column: **mediterranea sea 18**, 5 µm 15 x 0,46 cm  
 Eluent: Methanol/20mM K<sub>2</sub>HPO<sub>4</sub> (pH 7.0) 70:30  
 Flow: 1ml/min  
 Room Temperature  
 Detection: UV 254 nm

## Basic Compounds



Column A - mediterranea™ sea 18



Column B - The Competition

Column A: **mediterranea sea 18**, 5 µm 15 X 0,46 cm  
 Column B: **Other column from market** 5 µm 15 x 0,46 cm  
 Eluent: Methanol/0,02M K<sub>2</sub>HPO<sub>4</sub>/KH<sub>2</sub>PO<sub>4</sub> pH7,00 (75:25)  
 Room temperature  
 Flow: 1.4 ml/min  
 Detection: UV 254 nm

## Aqueous Environments

The mediterranea sea18 packing is a 100% pure reverse phase with the added advantage of showing excellent retention of polar compounds and also enables work with 100% aqueous mobile phases without any limitation.

Most chromatographers agree that polar embedded packing have an advantage over conventional packings, in that they can work in 100% aqueous environments and separate basic compounds.

Nevertheless, these advantages are achieved at the expense of less retention for polar compounds, and poor column stability. Polar-embedded packings exhibit chromatographic behavior that cannot be considered as 100% reverse phase, since secondary interaction mechanisms may co-exist due to the nature of the unspecified polar groups anchored at the base of the hydrocarbon chains.

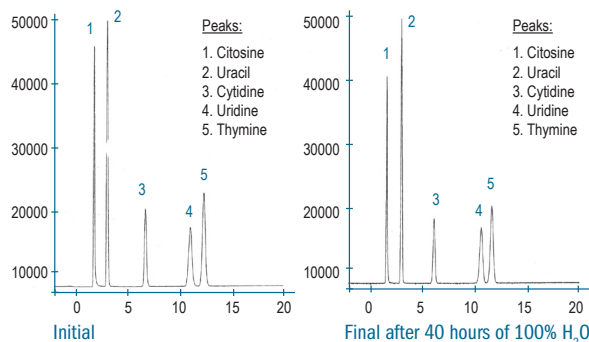
The mediterranea sea18 packing surpasses all the advantages of polar embedded packings by a wide margin and shows none of its inconveniences.

Furthermore, due to its specially optimised endcapping process (MED), the column has guaranteed pH-resistance, reproducibility and long life.

As can be seen, the chromatograms that are obtained after eluting the column with 100% water for more than 40 hours show no appreciable alteration in the retention times or in the efficiency of the chromatographed peaks.

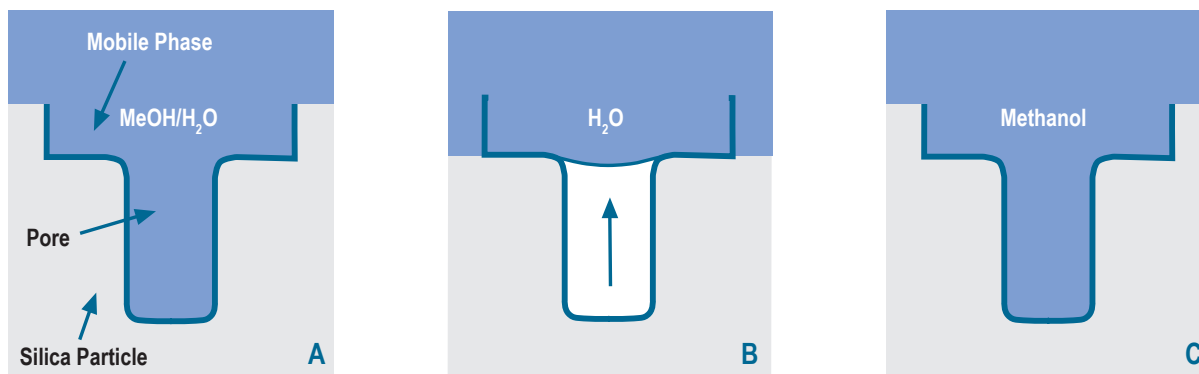
The mediterranea™ sea18 column also widely surpasses the stop flow test, designed to be able to show up the dewetting phenomenon that usually occurs in highly deactivated ODS-type columns, causing irreversible expulsion of water included in the packing pores. As can be seen in the data of five successive Stop Flow Test cycles no significant alterations are observed in the chromatographed peaks.

## Aqueous Environments



Column: **mediterranea sea18** 5 µm 15 X 0,46 cm  
 Mobil Phase: H<sub>2</sub>O  
 Flow: 1ml/min  
 Vol. Iny.:10 µl  
 Deteción: UV 254 nm

# mediterranea™ Sea<sub>18</sub> New Generation HPLC Column **Tk**

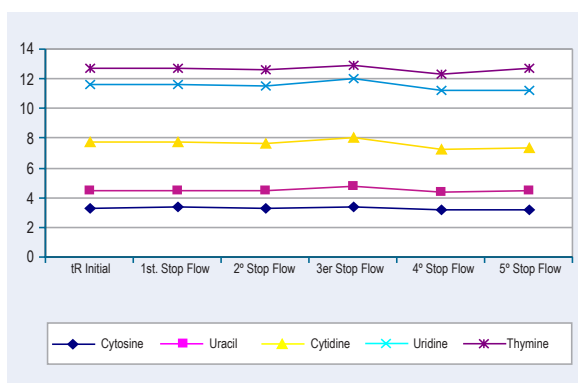


## The phenomenon of "Dewetting"

When working with mixed mobile phases of an organic phase and water, for example Methanol/H<sub>2</sub>O, the pores of the packings are totally occupied with the mobile phase (A). However, when working with 100% H<sub>2</sub>O as the mobile phase in conventional reverse-phase columns, a phenomenon occurs with the expulsion of the mobile phase from the interior of the pore (B). The chromatographic effect that will be produced is a loss of retention and resolution of the chromatographic peaks since the solutes cannot enter the interior of the pores. These chromatographic losses can occur gradually or suddenly - making it difficult to restore to its initial conditions, especially with mostly aqueous mobile phases. (C).

This phenomenon is ruled by an equation which involves the pore's radius, the surface tension, the contact angle and the pressure exercised on the mobile phase. The surface tension and contact angle depends on the density of the bonded ligands and on their chemical functionality. The Stop Flow Test reproduces chromatographic run conditions by interrupting the flow of 100% aqueous mobile phase, the pressure goes to zero and favours the expulsion of water from the interior of the pores.

The mediterranea™ sea18 column surpasses this test with ease - the retention times of the five chromatographed compounds remain practically unaltered.



## Stop Flow

Compound	tR initial	1st stop flow	2nd stop flow	3rd stop flow	4th stop flow	5th stop flow
Cytosine	3,32	3,33	3,3	3,35	3,16	3,21
Uracil	4,45	4,45	4,44	4,75	4,36	4,44
Cytidine	7,73	7,73	7,63	8,00	7,24	7,34
Uridine	11,57	11,57	11,53	12,02	11,25	11,24
Thymine	12,70	12,7	12,62	12,87	12,35	12,70

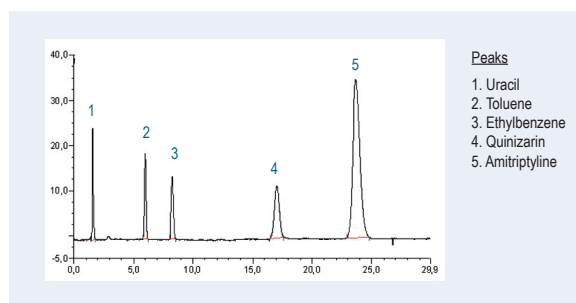
## NIST Test for HPLC Packing Characterization

The new mediterranea™ sea18 column has been subjected to the SRM870 test. This test, designed by the NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY and recently assessed by the experts committee of the USP (United States Pharmacopeia) is currently considered to be the most recommended for evaluating the most significant properties of a reverse phase column.

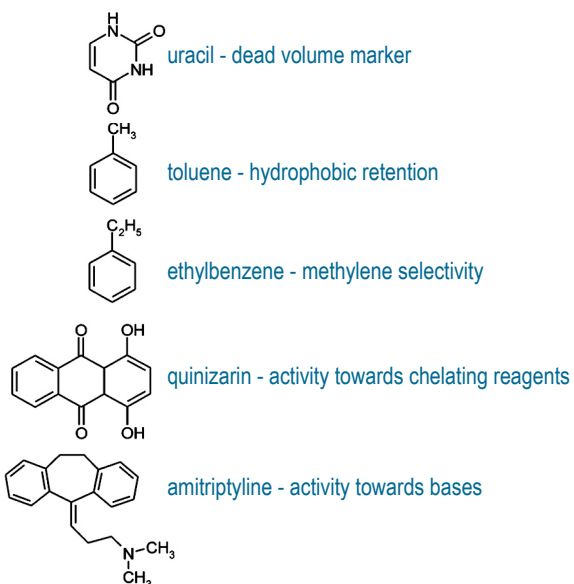
The high number of HPLC reverse phase packings available in the market and the big differences in their chromatographic behaviour has led to the need to design a characterisation and classification method for these packings.

This procedure uses a mixture of five organic components (uracil, toluene, ethylbenzene, quinizarin and amitriptyline) which are chromatographed using exact conditions of mobile phase, flow, and controlled temperatures.

The detailed analysis of the different peaks obtained will enable an objective, and more importantly, standardised evaluation of the behaviour of the chromatographic packing and therefore anticipate its suitability in normal analytical work.



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## Uracil

This compound is commonly used as an indicator of the dead volume of the column (non-retained peak).

## Toluene/Ethylbenzene

The selectivity factor between these two compounds can be used to characterise the differences between packings primarily due to solvophobic interactions. The absolute retention times of these compounds give an idea of the column reverse-phase strength. Both compounds can also be used to measure the quality of the packing through the number of theoretical plates.

## Quinizarin (1,4-dihydroanthraquinone)

Quinizarin is a chelating compound and its behaviour in a reverse phase column is a clear indicator of the presence or absence of metals. A column of low activity will deliver symmetrical peaks whereas increasing surface activity exaggerates the tailing edge of the quinizarin peak - leading to higher asymmetry values.

Quinizarin normally elutes between the ethylbenzene and amitriptyline peaks. However, when the silica packing contains embedded polar groups they will retain this peak, causing it to elute after amitriptyline. In the mediterranea™ sea<sub>18</sub> column, the quinizarin peak elutes with a perfect symmetrical form, indicating an extraordinary low level of metallic impurities.

According to quinizarin peak symmetry data obtained in our laboratories or published by the NIST (see Figure), the performance of the mediterranea™ sea<sub>18</sub> column compares well with other popular reverse-phase packings.

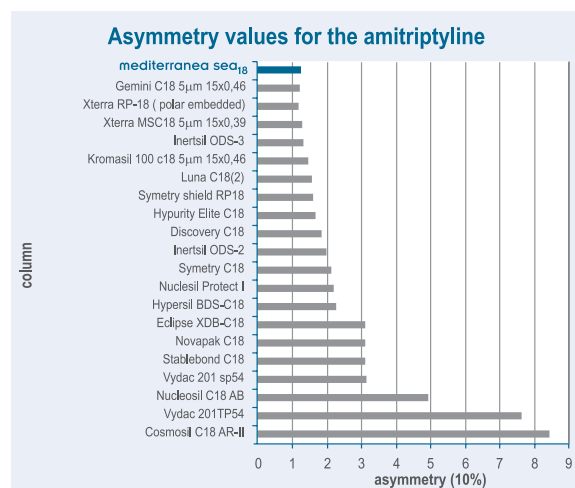
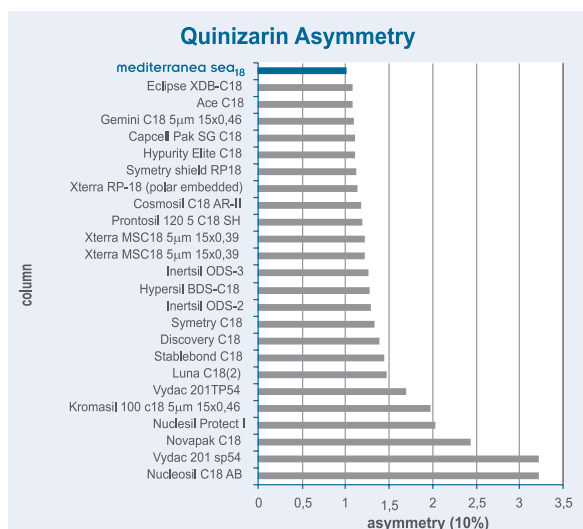
The top-positioning of the mediterranea™ sea<sub>18</sub> packing indicates the ultra-high purity of the optimized silica. Teknokroma's ultra-pure silica is your guarantee of reproducibility and of the absence of secondary (and uncontrolled) mechanisms of interaction (common to popular polar-embedded columns).

## Amitriptyline

This basic (pKa=9.4) anti-depressant is an excellent indicator of residual silica surface silanol-activity. Amitriptyline will elute as a symmetrical peak on a well-deactivated column as seen with the new mediterranea™ sea<sub>18</sub>. In comparison, many popular reverse-phase packings leave many residual silanols through insufficient endcapping; leading to widespread peak tailing or to complete disappearance from the chromatogram.

Proper amitriptyline elution is important in consideration of the number of basic compounds, particularly in the fields of pharmaceuticals and life science. In fact, it guarantees that the problems with tailing or complete peak disappearance will be almost eradicated - along with day-to-day laboratory adjustments and complex mobile phase systems designs. With mediterranea™ sea<sub>18</sub> a simple pH adjustment will serve to correctly elute the most basic and acidic substances.

The comparison of asymmetry factors for mediterranea™ sea<sub>18</sub> and other popular packings is a clear indication of deactivation. mediterranea™ sea<sub>18</sub> enters the market with a deactivation level not previously achieved by other reverse-phase packings. The proprietary Multifunctional Endcapped Deactivation produces reproducible column-to-column peak symmetry for a wider variety of pharmaceutical compounds thanks to strict silica purity and batch-to-batch reproducibility.



# mediterranea™ Sea<sub>18</sub> New Generation HPLC Column **Tk**



Packaging Sample

## Wide pH Range

A perfectly spherical particle, a totally controlled pore design, a total lack of metallic traces, a well-studied process of phase bonding and final endcapping, all combine in achieving a packing with a resistance to extreme pH values not previously reached.

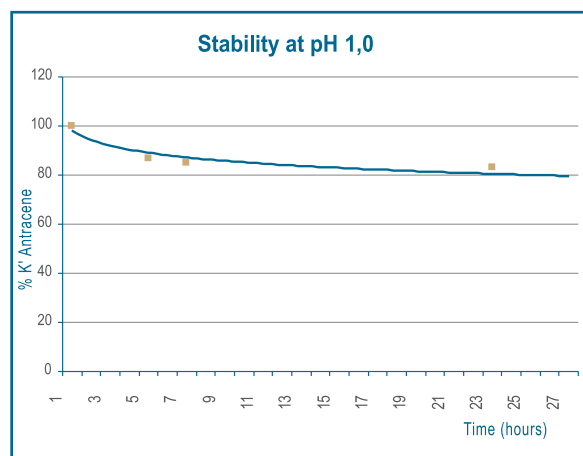
Until quite recently, silica packings were limited to working between pH 2 and pH 7 since below pH 2 the bonds between the C18 chains and the silica particle were hydrolysed, resulting in a gradual loss of retention capacity of the column. Above pH 7 the problem that arose was one of simply dissolving the silica, and therefore the pure destruction of the column.

Using mediterranea™ sea18 packing makes it possible to work with eluents from pH 1 to pH 12. Such unusual pH-resistance values have been secured as a result of phase bonding efficiency and a proprietary endcapping process which provides a protective shield that impedes acidic and basic eluents from attacking the silica surface.

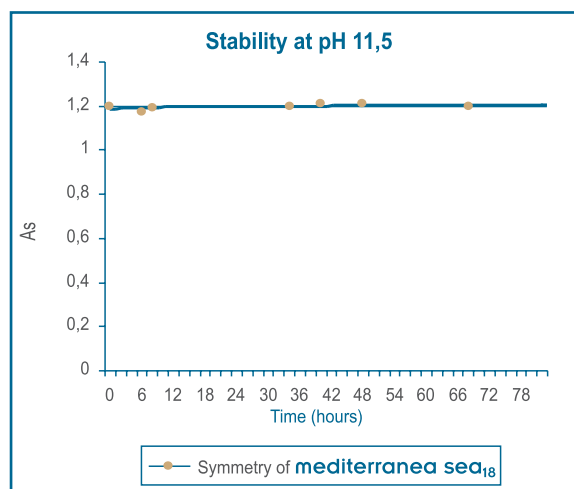
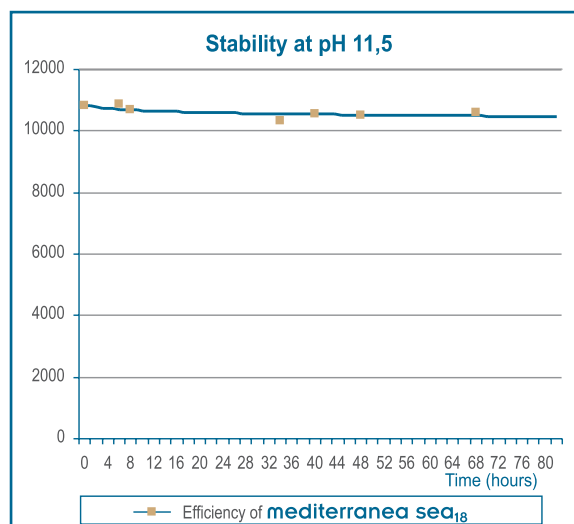
The pH stability graphs show the efficiency of the process.

Eluting the mediterranea™ sea18 column for 78 hours at pH 11.5, showed no significant deterioration in terms of both efficiency and peak symmetry for diphenhydramine..

With an eluent as acid as pH 1, the column stabilises in a short period of time so that it will even be possible to work in these extreme conditions.



An eluent of ACN/TFA1% pH 1.0 (10:90) 1ml/min 25°C is passed through the column at regular periods, checked with the reverse phase test and a retention comparison is made of the last anthracene peak.



An eluent of ACN//1- methylpyrrolidine 50mM pH 11,5 50:50, 1ml/min 25°C is passed through the column. With the same eluent 10 ml of diphenhydramine (1mg/ml dissolved in water) is injected and the efficiency and symmetry of the peak is tested.

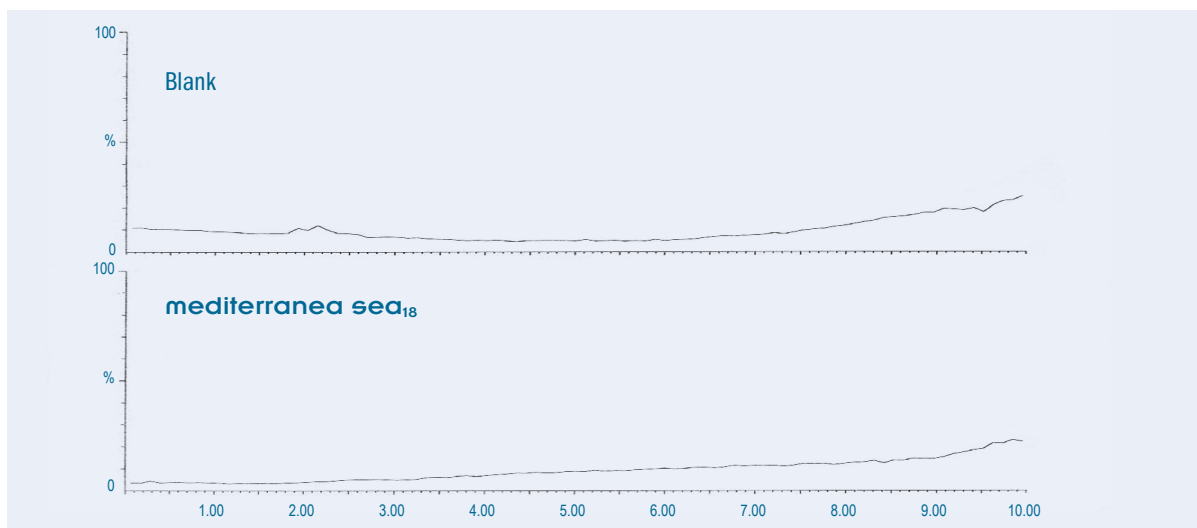
## LC-MS Mediterranea™ Sea 18 Columns

The Multifunctional Endcapping Deactivation (MED) technology guarantees extreme stability for every mediterranea™ sea18 reverse-phase column. Chromatographic stability (peak symmetry, peak retention times, and peak efficiency) under low-to-high pH (pH 1-12) conditions is required for high-speed, high-throughput LC-MS. The mediterranea™ sea18 is the ideal LC-MS reverse-phase column for stable chromatographic separation of pharmaceuticals and their metabolites.

The technological features designed into the mediterranea™ sea18 column makes it extremely useful for LC-MS applications where packing stability is demonstrated by low column bleed and consistent chromatographic results. The combination of mediterranea™ sea18 technology on a 3mm ultra-pure silica-based packing enables LC-MS separations to be made speedily and with maximum productivity.

# TK mediterranea™ Sea<sub>18</sub> New Generation HPLC Column

## Bleeding Profile Comparison



Assay by Instituto Químico de Sarrià I.Q.S. (Barcelona)

## Chromatographic Conditions

**Mobile Phase:** A: CH<sub>3</sub>CN (0,1% formic acid)  
B: Water (0,1% formic acid)  
**Elution Gradient:** 5/95(A/B) linear up to 95:5 in 8 minutes, maintaining the final composition 2 minutes.  
**Flow:** 0,5mL/min  
**Column Temperature:** 25°C

## Conditions for MS Detection

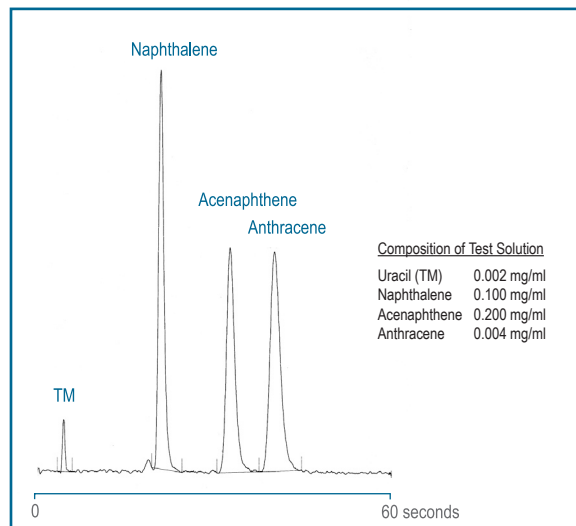
**MS Instrument:** Waters ZMD  
**Capillary Voltage:** 3kV (ESI positive)  
**Cone Voltage:** 20V  
**Source block Temp:** 100°C  
**Desolvation Temp:** 350°C  
**Gas:** 500l/h  
**Gas of cone:** 35 l/h  
**Mass Range:** 60 to 100 amu

## Ultra-Rapid Columns

Within the wide range of possible configurations, the mediterranea™ sea<sub>18</sub> columns are available with 3 mm packing with lengths of 3, 5 and 10 cm and inner diameters of 2.1, 3.0, 4.0 and 4.6 mm. By maintaining high quality control and specifications in manufacturing the mediterranea™ sea<sub>18</sub> packing, these columns enable you to do ultra-fast separations, with extremely high levels of productivity and reduced analysis times. Ultrarapid mediterranea™ sea<sub>18</sub> columns will help you optimize your instrument time and give you more time to analyze data.

With Ultra-rapid column separations, total analysis times of less than one minute are common, even when using gradient elution methods, since the high porosity of the mediterranea™ sea<sub>18</sub> packing enables rapid mobile phase equilibration times.

The combination of 3 mm mediterranea™ sea<sub>18</sub> packing with the column diameter of 2.1 mm is recommended for high sensitivity LC/MS analyses. Many of these ultra-rapid LC-MS screening analyses utilize minute sample and solvent quantities - for which, the 3 mm mediterranea™ sea<sub>18</sub> columns are ideal.



## Chromatographic Conditions

**Column:** mediterranea sea<sub>18</sub> 3 μm 3 x 0,46 cm  
**Eluant:** Acetonitrile/Water  
**Proportion:** 65/35  
**Flow:** 3.0 ml/min  
**Pressure:** 70 bars  
**Vol Injection:** 0.5 ml  
**Temperature:** Room  
**Detección:** UV 254 nm

# mediterranea™ Sea<sub>18</sub> New Generation HPLC Column **Tk**



## Preparative Columns

The mediterranea™ sea18 columns are characterized by their total inertness, by their wide range of working mobile phase pH, and by their high loading capacity - a result of the SEA process control (Surface Enhanced Accessibility).

The mediterranea™ sea18 preparative columns are the natural choice when high-service preparative columns are required, and in high-speed preparative applications as in the case of Combinatorial Chemistry.

## New Hardware Design for Mediterranea™ Column: Ultrafit™ System

The new Ultrafit™ design will make your work in the laboratory more comfortable and efficient. The Ultrafit™ system, as well as helping in the replacement of the frit at the column entrance, enables you to easily include either additional frits or a pre-column, always with the utmost simplicity and economy and in no way whatsoever is the quality of the separation affected.

In designing the Ultrafit™ column, the greatest care has been taken to cover all the aspects that may occur in the loss of efficiency of the column. As a result of all this, dead volumes have been reduced to a minimum, entered by the system by means of a high precision mechanism, with inlet and outlet holes of 0.2 mm and first-class tapers for the perfect distribution of the inlet and outlet flows, as seen in the three depicted Ultrafit™ options. The Ultrafit™ system enables a pre-column to be included without loss of efficiency, to columns as small as 30 x 4 mm packed with particles of 3 μm.

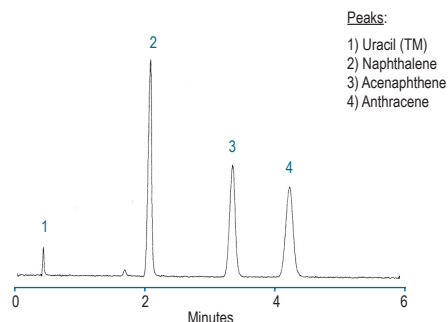
Moreover, the very best material has been selected for the construction of the column, with an ultra-shiny interior finish, of extremely low RMS, ensuring that no tube imperfection in the column will affect the quality of the separation.

## Ultrafit™ System Efficiency

Column	Efficiency (N/m)	AS (10%)
mediterranea sea18 Column 3 μm 5 x 0,46 cm Ultrafit™ System	134904	1,11
mediterranea sea18 Column 3 μm 5 x 0,46 cm with Prefilter Ultrafilter™	135042	1,05
mediterranea sea18 Column 3 μm 5 x 0,46 cm with Precolumn Ultraguard™	137819	1,07

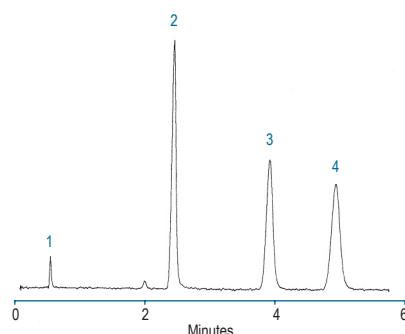
### Chromatographic Conditions:

**Column:** mediterranea™ sea18 3 mm 5 x 0,46 cm  
**Eluant:** Acetonitrile/Water 65:35  
**Flow:** 0,9 ml/min  
**Det.:** UV 254 nm  
**Temp.:** Room  
**Sample:** Acenaphthene 0.2 mg/ml

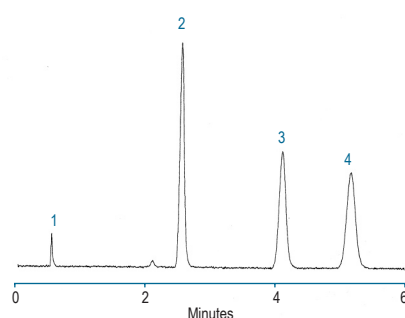


Peaks:  
 1) Uracil (TM)  
 2) Naphthalene  
 3) Acenaphthene  
 4) Anthracene

Column with Ultrafit™ System

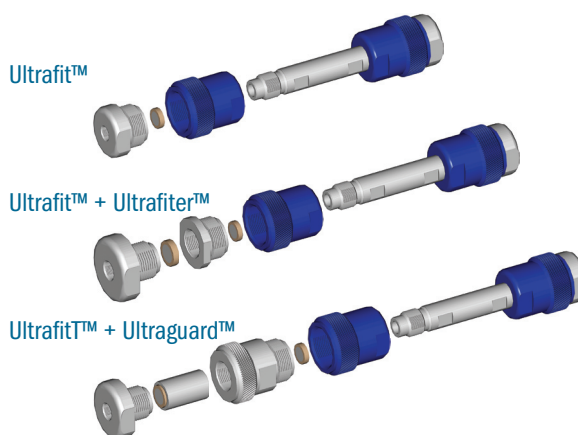


Column with Ultrafit™ System + Ultrafilter™



Column with Ultrafit™ System + Ultraguard™

## Ultrafit™ System Configuration





# TK mediterranea™ Sea<sub>18</sub> New Generation HPLC Column

## Analytical Columns 0.46 cm ID

### mediterranea™ sea<sub>18</sub> 5 µm

Packing	Funct.	Length		Diameter	Cat.Nbr.
		µm	cm	cm	
mediterranea	Sea18	5	3	0.46	TR-010000
mediterranea	Sea18	5	4	0.46	TR-010001
mediterranea	Sea18	5	5	0.46	TR-010002
mediterranea	Sea18	5	10	0.46	TR-010003
mediterranea	Sea18	5	15	0.46	TR-010004
mediterranea	Sea18	5	20	0.46	TR-010005
mediterranea	Sea18	5	25	0.46	TR-010006
mediterranea	Sea8	5	3	0.46	TR-010355
mediterranea	Sea8	5	4	0.46	TR-010356
mediterranea	Sea8	5	5	0.46	TR-010357
mediterranea	Sea8	5	10	0.46	TR-010358
mediterranea	Sea8	5	15	0.46	TR-010359
mediterranea	Sea8	5	20	0.46	TR-010360
mediterranea	Sea8	5	25	0.46	TR-010361
mediterranea	Sea4	5	3	0.46	TR-010362
mediterranea	Sea4	5	4	0.46	TR-010363
mediterranea	Sea4	5	5	0.46	TR-010364
mediterranea	Sea4	5	10	0.46	TR-010365
mediterranea	Sea4	5	15	0.46	TR-010366
mediterranea	Sea4	5	20	0.46	TR-010367
mediterranea	Sea4	5	25	0.46	TR-010368

## Analytical Columns 0.40 mm ID

### mediterranea™ sea<sub>18</sub> 5 µm

Packing	Funct.	Length		Diameter	Cat.Nbr.
		µm	cm	cm	
mediterranea	Sea18	5	3	0.40	TR-010007
mediterranea	Sea18	5	4	0.40	TR-010008
mediterranea	Sea18	5	5	0.40	TR-010009
mediterranea	Sea18	5	10	0.40	TR-010010
mediterranea	Sea18	5	15	0.40	TR-010011
mediterranea	Sea18	5	20	0.40	TR-010012
mediterranea	Sea18	5	25	0.40	TR-010013
mediterranea	Sea8	5	4	0.40	TR-410368
mediterranea	Sea8	5	5	0.40	TR-410369
mediterranea	Sea8	5	10	0.40	TR-410370
mediterranea	Sea8	5	15	0.40	TR-410371
mediterranea	Sea8	5	20	0.40	TR-410372
mediterranea	Sea8	5	25	0.40	TR-410373
mediterranea	Sea4	5	3	0.40	TR-410374
mediterranea	Sea4	5	4	0.40	TR-410375
mediterranea	Sea4	5	5	0.40	TR-410376
mediterranea	Sea4	5	10	0.40	TR-410377
mediterranea	Sea4	5	15	0.40	TR-410378
mediterranea	Sea4	5	20	0.40	TR-410379
mediterranea	Sea4	5	25	0.40	TR-410380

## Microbore Columns 0.21 cm ID

### mediterranea™ sea<sub>18</sub> 5 µm

Packing	Funct.	Length		Diameter	Cat.Nbr.
		µm	cm	cm	
mediterranea	Sea18	5	3	0.21	TR-010014
mediterranea	Sea18	5	5	0.21	TR-010015
mediterranea	Sea18	5	10	0.21	TR-010016
mediterranea	Sea18	5	15	0.21	TR-010017
mediterranea	Sea18	5	20	0.21	TR-010018
mediterranea	Sea8	5	3	0.21	TR-010381
mediterranea	Sea8	5	5	0.21	TR-010382
mediterranea	Sea8	5	10	0.21	TR-010383
mediterranea	Sea8	5	15	0.21	TR-010384
mediterranea	Sea8	5	20	0.21	TR-010385
mediterranea	Sea4	5	3	0.21	TR-010386
mediterranea	Sea4	5	5	0.21	TR-010387
mediterranea	Sea4	5	10	0.21	TR-010388
mediterranea	Sea4	5	15	0.21	TR-010389
mediterranea	Sea4	5	20	0.21	TR-010390

## Microbore Columns 0.30 cm ID

### mediterranea™ sea<sub>18</sub> 5 µm

Packing	Funct.	Length		Diameter	Cat.Nbr.
		µm	cm	cm	
mediterranea	Sea18	5	3	0.30	TR-010019
mediterranea	Sea18	5	5	0.30	TR-010020
mediterranea	Sea18	5	10	0.30	TR-010021
mediterranea	Sea18	5	15	0.30	TR-010022
mediterranea	Sea18	5	20	0.30	TR-010023
mediterranea	Sea18	5	25	0.30	TR-010024
mediterranea	Sea8	5	3	0.30	TR-010391
mediterranea	Sea8	5	5	0.30	TR-010392
mediterranea	Sea8	5	10	0.30	TR-010393
mediterranea	Sea8	5	15	0.30	TR-010394
mediterranea	Sea8	5	20	0.30	TR-010395
mediterranea	Sea8	5	25	0.30	TR-010396
mediterranea	Sea4	5	3	0.30	TR-010397
mediterranea	Sea4	5	5	0.30	TR-010398
mediterranea	Sea4	5	10	0.30	TR-010399
mediterranea	Sea4	5	15	0.30	TR-010400
mediterranea	Sea4	5	20	0.30	TR-010401
mediterranea	Sea4	5	25	0.30	TR-010402

# mediterranea™ Sea<sub>18</sub> New Generation HPLC Column **TR**

## SemiPreparative Columns

### mediterranea™ sea<sub>18</sub> 5 μm

Packing	Funct.	Length		Diameter	Cat.Nbr.
		μm	cm	cm	
mediterranea	Sea18	5	10	0.78	TR-010025
mediterranea	Sea18	5	15	0.78	TR-010026
mediterranea	Sea18	5	25	0.78	TR-010027
mediterranea	Sea18	5	10	1.00	TR-010028
mediterranea	Sea18	5	15	1.00	TR-010029
mediterranea	Sea18	5	25	1.00	TR-010030
mediterranea	Sea18	5	5	2.12	TR-010031
mediterranea	Sea18	5	10	2.12	TR-010032
mediterranea	Sea18	5	15	2.12	TR-010033
mediterranea	Sea18	5	25	2.12	TR-010034
mediterranea	Sea8	5	10	0.78	TR-010403
mediterranea	Sea8	5	15	0.78	TR-010404
mediterranea	Sea8	5	25	0.78	TR-010405
mediterranea	Sea8	5	10	1.00	TR-010406
mediterranea	Sea8	5	15	1.00	TR-010407
mediterranea	Sea8	5	25	1.00	TR-010408
mediterranea	Sea8	5	5	2.12	TR-010409
mediterranea	Sea8	5	10	2.12	TR-010410
mediterranea	Sea8	5	15	2.12	TR-010411
mediterranea	Sea8	5	25	2.12	TR-010412
mediterranea	Sea4	5	10	0.78	TR-010413
mediterranea	Sea4	5	15	0.78	TR-010414
mediterranea	Sea4	5	25	0.78	TR-010415
mediterranea	Sea4	5	10	1.00	TR-010416
mediterranea	Sea4	5	15	1.00	TR-010417
mediterranea	Sea4	5	25	1.00	TR-010418
mediterranea	Sea4	5	5	2.12	TR-010419
mediterranea	Sea4	5	10	2.12	TR-010420
mediterranea	Sea4	5	15	2.12	TR-010421
mediterranea	Sea4	5	25	2.12	TR-010422

## Novafix™ Cartridges 0.40 cm ID

### mediterranea™ sea<sub>18</sub> 5 μm

Packing	Funct.	Length		Diameter	Cat.Nbr.
		μm	cm	cm	
mediterranea	Sea18	5	7,5	0.40	TR-010035
mediterranea	Sea18	5	10	0.40	TR-010036
mediterranea	Sea18	5	15	0.40	TR-010037
mediterranea	Sea18	5	25	0.40	TR-010038
mediterranea	Sea8	5	7,5	0.40	TR-010423
mediterranea	Sea8	5	10	0.40	TR-010424
mediterranea	Sea8	5	15	0.40	TR-010425
mediterranea	Sea8	5	25	0.40	TR-010426
mediterranea	Sea4	5	7,5	0.40	TR-010427
mediterranea	Sea4	5	10	0.40	TR-010428
mediterranea	Sea4	5	15	0.40	TR-010429
mediterranea	Sea4	5	25	0.40	TR-010430

## Ultrarapid Columns 0.46 cm ID

### mediterranea™ sea<sub>18</sub> 3 μm

Packing	Funct.	Length		Diameter	Cat.Nbr.
		μm	cm	cm	
mediterranea	Sea18	3	3	0.46	TR-010039
mediterranea	Sea18	3	4	0.46	TR-010040
mediterranea	Sea18	3	5	0.46	TR-010041
mediterranea	Sea18	3	10	0.46	TR-010042
mediterranea	Sea18	3	15	0.46	TR-010043
mediterranea	Sea18	3	20	0.46	TR-010044
mediterranea	Sea18	3	25	0.46	TR-010045
mediterranea	Sea8	3	3	0.46	TR-010431
mediterranea	Sea8	3	4	0.46	TR-010432
mediterranea	Sea8	3	5	0.46	TR-010433
mediterranea	Sea8	3	10	0.46	TR-010434
mediterranea	Sea8	3	15	0.46	TR-010435
mediterranea	Sea8	3	20	0.46	TR-010436
mediterranea	Sea8	3	25	0.46	TR-010437
mediterranea	Sea4	3	3	0.46	TR-010438
mediterranea	Sea4	3	4	0.46	TR-010439
mediterranea	Sea4	3	5	0.46	TR-010440
mediterranea	Sea4	3	10	0.46	TR-010441
mediterranea	Sea4	3	15	0.46	TR-010442
mediterranea	Sea4	3	20	0.46	TR-010443
mediterranea	Sea4	3	25	0.46	TR-010444

## Ultrarapid Columns 0.40 cm ID

### mediterranea™ sea<sub>18</sub> 3 μm

Packing	Funct.	Length		Diameter	Cat.Nbr.
		μm	cm	cm	
mediterranea	Sea18	3	3	0.40	TR-010046
mediterranea	Sea18	3	4	0.40	TR-010047
mediterranea	Sea18	3	5	0.40	TR-010048
mediterranea	Sea18	3	10	0.40	TR-010049
mediterranea	Sea18	3	15	0.40	TR-010050
mediterranea	Sea18	3	20	0.40	TR-010051
mediterranea	Sea18	3	25	0.40	TR-010052
mediterranea	Sea8	3	3	0.40	TR-410431
mediterranea	Sea8	3	4	0.40	TR-410432
mediterranea	Sea8	3	5	0.40	TR-410433
mediterranea	Sea8	3	10	0.40	TR-410434
mediterranea	Sea8	3	15	0.40	TR-410435
mediterranea	Sea8	3	20	0.40	TR-410436
mediterranea	Sea8	3	25	0.40	TR-410437
mediterranea	Sea4	3	3	0.40	TR-410438
mediterranea	Sea4	3	4	0.40	TR-410439
mediterranea	Sea4	3	5	0.40	TR-410440
mediterranea	Sea4	3	10	0.40	TR-410441
mediterranea	Sea4	3	15	0.40	TR-410442
mediterranea	Sea4	3	20	0.40	TR-410443
mediterranea	Sea4	3	25	0.40	TR-410444

# TK mediterranea™ Sea<sub>18</sub> New Generation HPLC Column

## Microbore Columns 0.21 cm ID

### mediterranea™ sea<sub>18</sub> 3 µm

Packing	Funct.	Length		Diameter	Cat.Nbr.
		µm	cm	cm	
mediterranea	Sea18	3	3	0.21	TR-010053
mediterranea	Sea18	3	5	0.21	TR-010054
mediterranea	Sea18	3	10	0.21	TR-010055
mediterranea	Sea18	3	15	0.21	TR-010056
mediterranea	Sea18	3	20	0.21	TR-010057
mediterranea	Sea8	3	3	0.21	TR-010445
mediterranea	Sea8	3	5	0.21	TR-010446
mediterranea	Sea8	3	10	0.21	TR-010447
mediterranea	Sea8	3	15	0.21	TR-010448
mediterranea	Sea8	3	20	0.21	TR-010449
mediterranea	Sea4	3	3	0.21	TR-010450
mediterranea	Sea4	3	5	0.21	TR-010451
mediterranea	Sea4	3	10	0.21	TR-010452
mediterranea	Sea4	3	15	0.21	TR-010453
mediterranea	Sea4	3	20	0.21	TR-010454

## Microbore Columns 0.30 cm ID

### mediterranea™ sea<sub>18</sub> 3 µm

Packing	Funct.	Length		Diameter	Cat.Nbr.
		µm	cm	cm	
mediterranea	Sea18	3	3	0.30	TR-010058
mediterranea	Sea18	3	5	0.30	TR-010059
mediterranea	Sea18	3	10	0.30	TR-010060
mediterranea	Sea18	3	15	0.30	TR-010061
mediterranea	Sea18	3	20	0.30	TR-010062
mediterranea	Sea8	3	3	0.30	TR-010455
mediterranea	Sea8	3	5	0.30	TR-010456
mediterranea	Sea8	3	10	0.30	TR-010457
mediterranea	Sea8	3	15	0.30	TR-010458
mediterranea	Sea8	3	20	0.30	TR-010459
mediterranea	Sea4	3	3	0.30	TR-010460
mediterranea	Sea4	3	5	0.30	TR-010461
mediterranea	Sea4	3	10	0.30	TR-010462
mediterranea	Sea4	3	15	0.30	TR-010463
mediterranea	Sea4	3	20	0.30	TR-010464

## Novafix™ Cartridges 0.40 cm ID

### mediterranea™ sea<sub>18</sub> 3 µm

Packing	Funct.	Length		Diameter	Cat.Nbr.
		µm	cm	cm	
mediterranea	Sea18	3	7,5	0.40	TR-010063
mediterranea	Sea18	3	10	0.40	TR-010064
mediterranea	Sea18	3	15	0.40	TR-010065
mediterranea	Sea18	3	25	0.40	TR-010066
mediterranea	Sea8	3	7,5	0.40	TR-010465
mediterranea	Sea8	3	10	0.40	TR-010466
mediterranea	Sea8	3	15	0.40	TR-010467
mediterranea	Sea8	3	25	0.40	TR-010468
mediterranea	Sea4	3	7,5	0.40	TR-010469
mediterranea	Sea4	3	10	0.40	TR-010470
mediterranea	Sea4	3	15	0.40	TR-010471
mediterranea	Sea4	3	25	0.40	TR-010472

## Other Products

### mediterranea™ sea<sub>18</sub>

Product	Description	Cat.Nbr.
Ultrafilter™	Ultrafit prefilter adaptor (frit not included)	TR-010067
	Frits of 0.5 µm pore (10 units)	TR-010069
	Frits of 2.0 µm pore (10 units)	TR-010070



Ultraguard™, Ultrafit Guardcolumn adaptor  
(guard column not included)



Guard Column	Sea18 10 x 3.2 mm (5 units)	TR-010071
Guard Column	Sea8 10 x 3.2 mm (5 units)	TR-010073
Guard Column	Sea4 10 x 3.2 mm (5 units)	TR-010074