

SepaChrom

— Your Specialists in Chromatography



HPLC Columns for Traditional Chinese Medicine



Your Specialists in Chromatography

Company Profile

SepaChrom is the brainchild of the founders to create a dedicated reality, unique and able to support the **Chromatography users** optimizing their challenges.

Our Core competence is the manufacturing and trading of **High-Quality** products for **Chromatography**.

SepaChrom product portfolio includes a wide range of in-house manufactured **HPLC** Columns in both **Analytical** and **Preparative** scale, **Flash** cartridges & Instruments, and **Process** scale purification.

Our offer of products for Chromatography includes consumables and accessories, for both **HPLC** and **GC** techniques.

Our brands **Robusta®**, **Adamas®**, **Vydamas®**, **TMC®**, **Purezza®**, **Sepa-Bulk®** are only few of the product lines we propose to the **Chromatographers**.

Our Mission

Decades of experience of our team, combined with a range of High Quality selected products and the most efficient technological solutions, allows **SepaChrom** to be a reference to :

- **Pharma,**
- **Biotech,**
- **Chemical,**
- **Food and Beverage,**
- **Cosmetic,**
- **Environmental,**
- **Clinical**
- **Petrochemical**

industries, at **R&D** department as well **QC** laboratories and **Production**.

Our commitment is to provide the Highest Technical Support that Chromatographers expect from

Your Specialist in Chromatography



Customers in Mind

The success of **SepaChrom** depends by the complete **satisfaction** of our customers, and consequently by their success.

SepaChrom expertise result in a High-Quality support **pre & after** sales to the Chromatographic Users.

A world-wide Distributor Network will assure the users the best in class technical and commercial support to properly approach their Chromatography challenges.

This include a **fast delivery** of your products from our warehouse to everywhere.



HPLC Columns Introduction

Choosing the Right HPLC Column

Choosing the right column for your application is very important and can be a difficult exercise. However following some simple steps will help you to make the correct choice and positively impact your chromatographic results. Here are some tips :

1. Set Your Separation Goals.

Do you need **High Resolution** or **Maximum Sensitivity**? And is our **Analysis** Time crucial? These are the main questions an HPLC user should consider in the development of a method. You also need to determine whether long column life, low operating cost, or other factors are important.

2. Packing Material.

The choice of the most appropriate media depends on the nature of your compounds and on your goals. The **Right Selectivity** of your packing to obtain a good separation in a relatively short analysis time is the base on which to select the media.

3. Column Format.

Analytical, Semi-Prep or Prep format choice depends on your application and your goals. Inner Diameter and Length will also impact the result of your separation.

Base Material

Polymer-based media such as Polystyrene DVB or Methacrylate offer higher pH stability (pH 1-14) than Silica-based material, so columns packed with these packings can be thoroughly cleaned with strong acids or bases.

However these packings are compressible and may shrink or swell with certain solvents, and they do not offer the same resolution when compared to Silica-based packings.

Silica-based media are physically much stronger and will not shrink or swell. They offer higher resolution and provide sharper peaks compared to Polymer-based material. Silica-based media are also available with a wide range of bonded phases to ensure the widest selectivity for almost any application.

Silica-Based media are compatible with a broad range of polar and non-polar mobile phases and they can be stable to a wide pH range.



Particle Shape

Silica-based media particles can be **Irregular, Spheroidal** or **Spherical** in shape.

Most modern HPLC packings are spherical. A **Spherical** shape particle offers lower back pressure, much higher performance, stability and reproducibility than irregular particles.

Irregular particles have a larger surface area, higher loadability and they are relatively less expensive. These are the reasons why they are still commonly used in prep and process scale purifications.



Spherical



Irregular

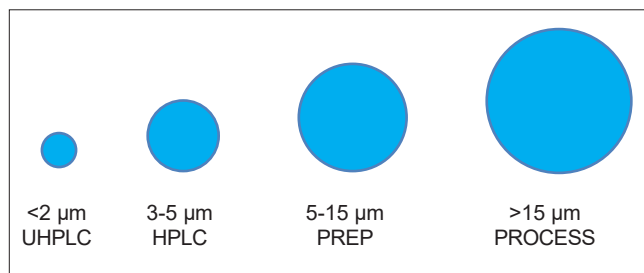
Particle Size

Smaller particle sizes give **Higher Efficiency and Resolution** than larger particle sizes but create higher back-pressure.

Larger particle sizes offer faster flow rates and lower back-pressure.

In analytical applications the typical particle sizes range is from 1.5µm to 10µm diameter, however most of the applications are performed with **3µm and 5µm**, which represent the best compromise between efficiency and back-pressure.

In Preparative applications larger particle sizes are commonly used (10µm to 30µm).

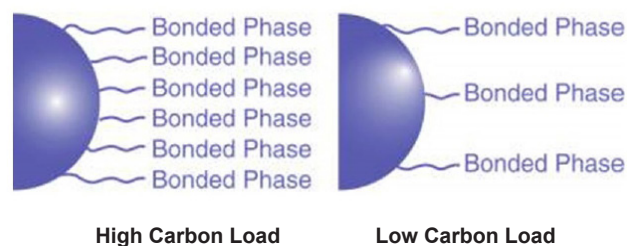


Carbon Load

For **Silica-based Reversed-Phase** packings, a carbon load percentage indicates the amount of functional bonded phase attached to the Silica-base material.

Lower amount of carbon load means that packings are more weakly hydrophobic, which may reduce retention times compared to phases with higher carbon load.

However, a higher carbon load will give higher capacity and often greater separation, especially for compounds of similar hydrophobicity.



Pore Size & Surface Area

Pore Size

Packing materials having smaller pore sizes have higher surface area and consequently a higher capacity than packings with larger pore sizes.

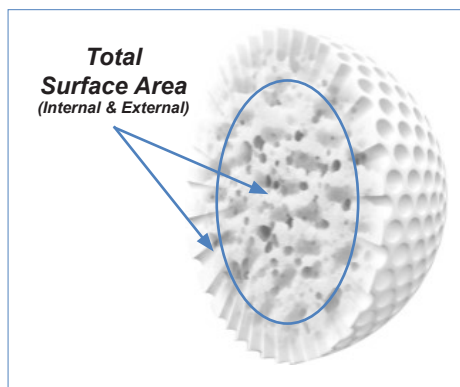
To maximize the interaction between the target molecules and the packing a correct choice of the Pore Size is critical.

In general a 100Å material provide great results for small molecule analysis. For large molecules, such as Proteins and Peptides a 300Å media is typically used.

Surface Area

The Surface Area is the total available surface, most of which is inside the pores, for interaction with the target molecules.

Typically, Small pores means a larger surface area and Large pores means a smaller surface area.



Bonding

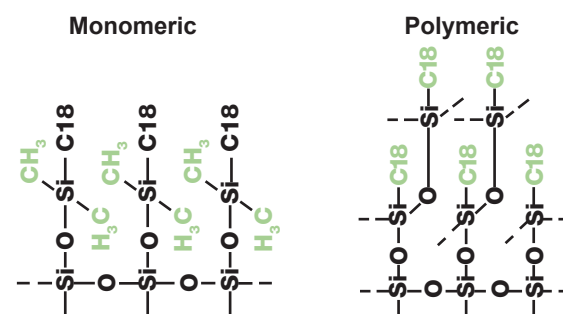
Most commercially available reverse phase HPLC packing materials are Monomeric or Polymeric bonded phases.

When a monofunctional alkylsilane reagent is used to prepare the packing material, the functional chains have a single attachment point to the silica media. These are called **Monomeric** bonded phases.

If di- or trifunctional alkylsilane reagents are used, the bonded phases have functional chains bound to the base silica particle at multiple attachment points and can involve cross-linking between chains.

These are called **Polymeric** bonded phases.

New high-purity silica phases are very stable, whether monomerically or polymerically bonded, however they differ in their selectivity.



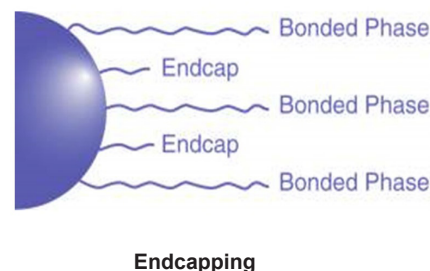
Endcapping

After the bonding procedures to obtain Silica-based reversed-phase packings, a certain amount of residual free silanol groups can remain unreacted on the silica surface.

These groups will interact with polar compounds. Endcapping the bonded phase minimizes these secondary interactions.

Partial or Total endcapping procedures are used to reduce the residual silanols on the silica surface.

Higher endcapping means less interactions with polar compounds while non-endcapped phases mean enhanced polar selectivity, for stronger retention of polar organic compounds.



HPLC Columns Introduction

HPLC Analytical Column Formats

Choosing the right column format is critical to obtain the best performance during your analysis or purification.



Analytical Columns Format

Column Length

When starting a new HPLC method development, the user has to consider the complexity of their sample and the desired run time, in order to find the best column length for their application.

Shorter column length provides faster run times and solvent saving. Usually smaller particle size media is used in shorter column which achieves good resolution in a shorter run time, however complex samples may still need longer columns, even when using smaller particle sizes.



Column Lengths Available

20-30-50mm Column Length	Fast Separations Work best with 3 μ m Particle Size
75-100-125-150mm Column Length	Standard & Hi-Resolution Separations Work best with 3-5 μ m Particle Size
200-250-300mm Column Length	Standard & Hi-Resolution Separations Work best with 5-10 μ m Particle Size

Column I.D.

Smaller internal diameter columns provide better mass sensitivity, require smaller sample size injection, and reduce solvent consumption.

Wider internal diameter columns allow for larger sample sizes and minimize the negative effects of your system's dead volume due to the higher flowrates.

2.1mmID columns work best with a microbore flow cell at your detector and an internal loop injector otherwise you have to tolerate some loss in efficiency and resolution due to system dead volumes.



Analytical Column I.D. Available

2.1mm Column I.D.	High Sensitivity and Low Sample Volume Best use with Microbore Cell and Internal Sample Loop Valve.
3.0mm Column I.D.	High Sensitivity and ideal to reduce solvent consumption Work with standard HPLC instrumentation
4.0mm Column I.D.	Standard Separations Work with standard HPLC instrumentation
4.6mm Column I.D.	Standard Separations Work with standard HPLC instrumentation

Replaceable Frit

In most well-known and popular HPLC Columns, when a backpressure increase occurs, whatever the reason, you have to replace the entire expensive column.

With all **SepaChrom** HPLC Columns you can replace the frit and significantly extend its lifetime.



Full-Guard Cartridges

How can I best protect my HPLC column?

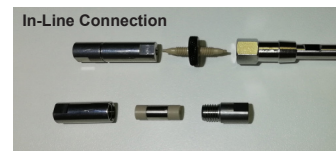
Full-Guard is the convenient protection system for your HPLC column and allows you to change the Guard Cartridge in seconds.

Select the suitable reusable Holder (In-Line or Direct Connect). They work with all Full-Guard Cartridges with following IDs :

2.1 - 3.0 - 4.0 - 4.6 mm ID

Full-Guard Holder

CD0100	Full-Guard Holder - Direct Connection
CD0101	Full-Guard Holder - In-Line Connection



HPLC Columns Introduction

HPLC Column Selection

A Comparison of Reversed - Phase Columns

Typically, chromatographers choose HPLC columns by comparing physical characteristics, such as surface area and carbon load, however quite often this does not provide enough information for adequate column selection.

In the late 1990's Dr. Lloyd Snyder initiated working on what is known as Hydrophobic Subtraction Model (HSM) which then evolved, thanks to others expertise as Dr. John Dolan, Dr. Uwe Neue, Prof. Peter Carr and Prof. Dan Marchand, in a broader understanding of selectivity in Reversed-Phase HPLC (RPLC).

The Hydrophobic Subtraction Model (HSM) has been developed to quantitatively describe the chromatographic selectivity of reversed-phase (RP) HPLC columns. Upon characterization of a given Reversed Phase packing, the HS model provide quantitative values for five parameters including the phase hydrophobicity (H), its resistance to penetration by a solute molecule (S*), the hydrogen-bond acidity & basicity (A & B) and its interaction with ionized solute molecules (C).

These parameters describe the physico-chemical nature of the stationary phase.

This chart lists some of the parameters: Hydrophobicity (H), Hydrogen-bond Acidity (A) (A) & Interaction with ionized soluted molecules (C) (at pH 7.0) (C)

Manufacturer	Column name	Hydrogen-bond acidity value A	Interaction with ionized soluted molecules value C	Hydrophobicity
Advanced Materials Technology	Halo 5 C18	A	C	1,15
Restek	Allure C18	A	C	1,13
Supelco	Ascentis Express C18	A	C	1,13
Advanced Materials Technology	Halo C18	A	C	1,10
Thermo/Hypersil	Accucore C18	A	C	1,09
Agilent Technologies	Zorbax Extend C18	A	C	1,09
Thermo/Hypersil	Accucore XL C18	A	C	1,09
Shimadzu	Shim-pack XR-ODS II	A	C	1,09
Agilent Technologies	Zorbax C18	A	C	1,08
Hichrom	Ultrasphere ODS	A	C	1,08
Grace/Alltech (Formerly)	Alltima HP C18 High Load	A	C	1,08
Waters	Cortecs C18	A	C	1,08
Agilent Technologies	Zorbax Rx-18	A	C	1,07
Supelco	Ascentis C18	A	C	1,07
Agilent Technologies	Zorbax Eclipse XDB-C18	A	C	1,07
SepaChrom	Robusta C18	A	C	1,06
SepaChrom	Adamas C18-Extreme	A	C	1,05
Grace/Vydac (Formerly)	Denali 120A C18	A	C	1,05
Grace/Grom (Formerly)	GROM Sapphire 110 C18	A	C	1,05
Waters	Symmetry C18	A	C	1,05
Kromasil by Nouryon	Kromasil 100 5 C18	A	C	1,05
Thermo/Hypersil	Hypersil 100 C18	A	C	1,04
Waters	Nova-Pak C18	A	C	1,04
ACT	ACE 5 C18-HL	A	C	1,04
SepaChrom	Adamas C18-X-Bond	A	C	1,04
Waters	Cortecs C18+	A	C	1,04
Waters	Sunfire C18	A	C	1,03
Merck KGaA (EMD Millipore)	Superspher 100 RP-18e	A	C	1,03
Restek	Pinnacle II C18	A	C	1,03
Agilent Technologies	Zorbax Eclipse Plus C18	A	C	1,03
Nacalai Tesque	COSMOSIL C18-MS-II	A	C	1,03
Grace/Grom (Formerly)	GROM-SIL 120 ODS-3 CP	A	C	1,02
Waters	DeltaPak C18 100A	A	C	1,02
Waters	HSS C18	A	C	1,02
Phenomenex	Prodigy ODS(3)	A	C	1,02
Supelco	Supelcosil LC-18	A	C	1,01
Nacalai Tesque	COSMOSIL C18-AR-II	A	C	1,01
Phenomenex	Luna C18	A	C	1,01
Shiseido	Capcell Pak C18 MGII	A	C	1,01
Restek	Pinnacle DB C18	A	C	1,01
GL Sciences	InertSustain C18	A	C	1,01

HPLC Columns Introduction

HPLC Column Selection

A Comparison of Reversed - Phase Columns

Manufacturer	Column name	Hydrogen-bond acidity value ^④	Interaction with ionized soluted molecules value ^⑤	Hydrophobicity
Shimadzu	Shim-pack XR-ODS	A	C	1,01
Phenomenex	Kinetex EVO C18	A	C	1,01
SepaChrom	Adamas C18-ClassiC	A	C	1,01
Advanced Materials Technology	Halo AQ-C18	A	C	1,00
Grace/Alltech (Formerly)	Allsphere ODS2	A	C	1,00
Merck KGaA (EMD Millipore)	LiChrospher 100 RP-18	A	C	1,00
Grace/Jones (Formerly)	Genesis C18 120A	A	C	1,00
GL Sciences	Inertsil ODS-2	A	C	1,00
Waters	XBridge C18	A	C	1,00
ACT	ACE 5 C18	A	C	1,00
Phenomenex	Luna C18(2)	A	C	1,00
Waters	Acquity UPLC BEH C18	A	C	1,00
Agilent Technologies	Zorbax StableBond 80A C18	A	C	0,99
Grace/Alltech (Formerly)	Alltima C18	A	C	0,99
Thermo/Hypersil	Hypersil BDS C18	A	C	0,99
Phenomenex	Prodigy ODS(2)	A	C	0,99
Nomura	Develosil ODS-UG-5	A	C	0,99
GL Sciences	Inertsil ODS-3	A	C	0,99
Thermo/Hypersil	Hypersil ODS-2	A	C	0,98
Grace/Alltech (Formerly)	Adsorbosphere C18	A	C	0,98
Phenomenex	Synergi Max-RP	A	C	0,98
Grace/Alltech (Formerly)	Alltima HP C18	A	C	0,98
Supelco	Discovery C18	A	C	0,98
Waters	XTerra MS C18	A	C	0,98
Phenomenex	Luna Omega C18	A	C	0,98
Waters	Spherisorb S5 ODSB	A	C	0,97
Tosoh Bioscience	TSKgel ODS-120T	A	C	0,97
Supelco	Supelcosil LC-18-DB	A	C	0,97
Phenomenex	Kinetex XB-C18	A	C	0,97
Bischoff	ProntoSIL 120 C18-AQ	A	C	0,97
Thermo/Hypersil	Hypersil ODS	A	C	0,97
ES Industries	Chromagabond WR C18	A	C	0,97
Tosoh Bioscience	TSKgel ODS-80T	A	C	0,96
Waters	Spherisorb ODS-2	A	C	0,96
Phenomenex	Gemini C18 110A	A	C	0,96
Phenomenex	Kinetex C18 100A	A	C	0,96
YMC	YMC-Pack ODS-AQ	A	C	0,96
Fortis Technologies	Fortis C18	A	C	0,96
Agilent Technologies	Poroshell 120 SB-C18	A	C	0,96
Shiseido	Capcell Pak C18 MG III	A	C	0,95
Shiseido	Capcell Pak C18 IF	A	C	0,95
SepaChrom	Adamas C18-Select	A	C	0,95
YMC	YMC-Triart C18	A	C	0,92
Thermo/Hypersil	Hypersil GOLD aQ	A	C	0,91
Waters	Atlantis dC18	A	C	0,91
GL Sciences	Inertsil ODS-4	A	C	0,91
Merck KGaA (EMD Millipore)	LiChrosorb RP-18	A	C	0,90
Macherey Nagel	Nucleosil C18	A	C	0,90
ACT	Ace 5 C18-PFP	A	C	0,90
Tosoh Bioscience	TSKgel ODS-120A	A	C	0,89
Grace/Alltech (Formerly)	Prevail C18	A	C	0,88
Grace/Alltech (Formerly)	Alltima C18 AQ	A	C	0,88
Thermo/Hypersil	Hypersil GOLD	A	C	0,88

HPLC Columns Introduction

HPLC Column Selection

A Comparison of Reversed - Phase Columns

Manufacturer	Column name	Hydrogen-bond acidity value A	Interaction with ionized soluted molecules value C	Hydrophobicity
SepaChrom	Adamas C18-AQ	A	C	0,85
Merck KGaA (EMD Millipore)	Purospher RP-18	A	C	0,84
Grace/Alltech (Formerly)	GraceSmart RP 18	A	C	0,83
Grace/Alltech (Formerly)	Econosphere C18	A	C	0,81
Phenomenex	Partisil ODS(3)	A	C	0,81
Waters	MicroBondapak C18	A	C	0,79
Grace/Alltech (Formerly)	Platinum C18	A	C	0,78
Grace/Alltech (Formerly)	VisionHT C18	A	C	0,78
Grace/Alltech (Formerly)	Alltima C18-LL	A	C	0,78
Waters	Spherisorb ODS-1	A	C	0,68
Grace/Alltech (Formerly)	Platinum EPS C18	A	C	0,61
Agilent Technologies	Zorbax SB-AQ	A	C	0,59

Hydrophobic Subtraction Model (HSM) chart

H= Hydrophobicity

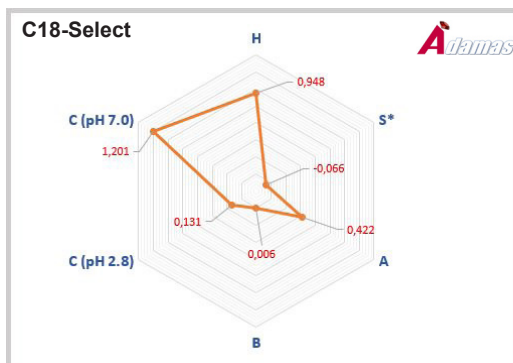
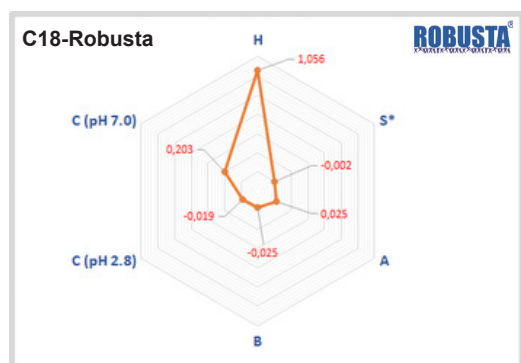
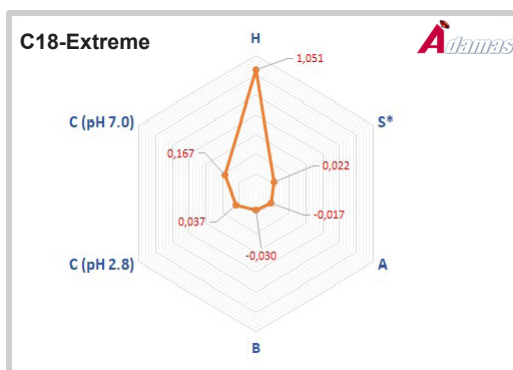
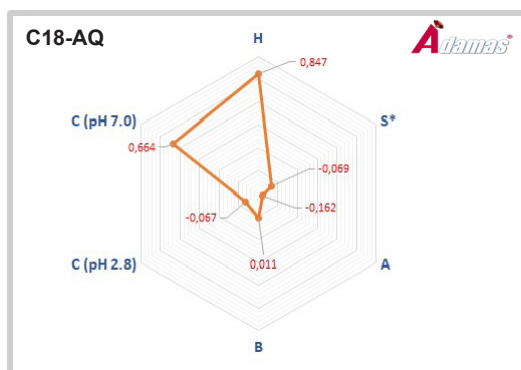
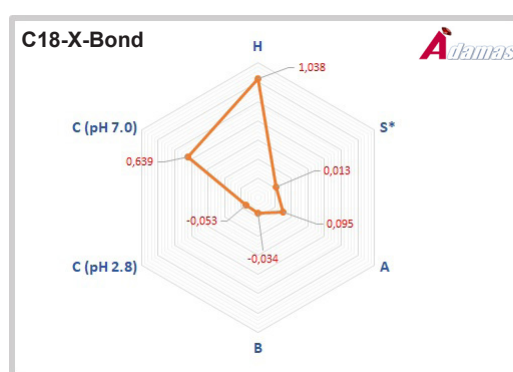
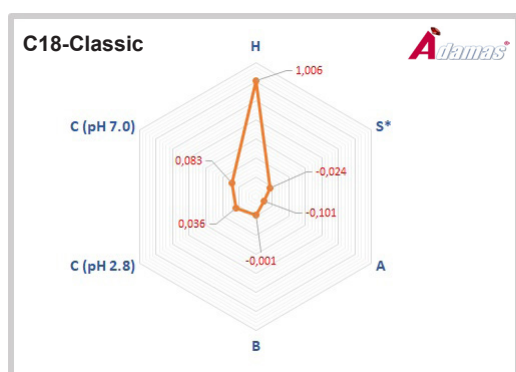
S*= Resistance to penetration by a solute molecule

A= Hydrogen-bond acidity

B= Hydrogen-bond basicity

C(pH2.8)= interaction with ionized solute molecules

C(pH7.0)= interaction with ionized solute molecules



Traditional Chinese Medicine

Traditional Chinese Medicine (TCM) is a branch of traditional medicine in China.

Among the various forms around the TCM, the Herbal Medicine uses a very wide range of natural products for the therapies.

Natural products requires the use of HPLC as the main analytical technology in R&D, QC and Production.

SepaChrom offer an affordable HPLC column line for the Traditional Chinese Medicine which matches High Quality, Robustness and great Performance in this segment.

- **Robustness**
- **High Quality**
- **Performance**
- **Ideal for TCM Applications**



We've perfected the manufacturing procedure of the TCM® HPLC Column to the point that reproducibility and performance is assured.

This allows us to test TCM® HPLC Columns in batches instead of individually, without sacrificing quality.

TCM® HPLC Columns are covered by full SepaChrom guarantee.

Each TCM® HPLC Column comes with a copy of the batch QC Test.

The saving due to above procedure is forwarded to you by a dramatic price reduction.

TCM® HPLC Columns are ideal for application where robustness and performance are required, and the saving is very important.



Typical TCM® HPLC Column QC Test



Ordering Information				
Phase	Particle Size	Length / ID	250mm	Full-Guard Cartridge*
TCM® C18	5µ	150 x 4.6mm	TM0001	CD0722
	5µ	250 x 4.6mm	TM0002	CD0722
TCM® C18-AQ	5µ	150 x 4.6mm	TM0004	CD0723
	5µ	250 x 4.6mm	TM0003	CD0723

* 3/pkg - Full-Guard Cartridges require Full-Guard Holder. Two versions available :
 Part.No **CD0100** - Direct Connection
 Part.No **CD0101** - In-Line Connection

Other products available from SepaChrom

HPLC

HPLC Silica Based Columns for Routine Analysis
HPLC & UHPLC Silica Based Columns for Small Molecules Separation
HPLC Silica Based Columns for Large Molecules Separation
HPLC Silica Based Columns for Traditional Chinese Medicine
Polymer Base Columns for Carbohydrate & Organic Acids Analysis Chiral HPLC Columns
Ion Chromatography Columns for Anions and Cations Analysis

ROBUSTA[®]

Adamas[®]

MEDIA

Irregular & Spherical Silica Gel for Flash, Preparative & Industrial Purification
Raw & Bonded Silica Gel for Any Application
Wide Range Porosity (30Å- 2500Å) and Particle Size (10µ-200µ)
Polymer Based Resin for Reversed Phase and Ion Exchange Chromatography

PREP

10mm - 50mmID Packed Preparative Columns for Lab Scale Purification packed by SepaChrom

50mm - 2000mmID Process Scale Chromatography Columns & Systems, Flanged & DAC Technology

OEM Packed Preparative Columns

Scale-up Method Development & Custom Packing Service

ROBUSTA[®]

Adamas[®]

Vydac[®]

FLASH

Instruments for Flash and Prep Chromatography up to 825mL/min & 400 bar pressure

Integrated ELSD & MS Simple Quad Detector for Flash Purification

TLC Plates and Accessories for Flash Chromatography

A Complete Range of Flash Columns for All Existing Flash Instruments

Lurezza

Advion Interchim

SPE

SEClute[™], Extract-Clean[™], Maxi-Clean[™] SPE Cartridges for Pharma, Environmental, Food&Beverage Applications.

PuroPhase[™] Polymer Base SPE Cartridges for Clinical & Forensic Applications.

Maxi-Clean[™] Ion Chromatography SPE Cartridges

Vydac[®] - Bioselect SPE Cartridges for Biological Samples

Accessories for SPE & Syringe Filters

OTHER INSTRUMENTS

SepaChrom Hydrogen, Nitrogen and Air Generators for GC

SepaChrom Nitrogen Generators for LC-MS

Automated Sample Evaporators for Lab Scale Purification

Interchim Advion CMS Compact Mass Spectrometer Detector

CONSUMABLE

Autosampler Vials for HPLC, IC e GC

Head Space and Sampling Vials

SS & PEEK Tubing, Fittings, Ferrule & Valves

Syringes and Septa for GC

Traps for GC Gas Lines

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