HiQ sil™ HPLC Columns

KYA TECH Corporation

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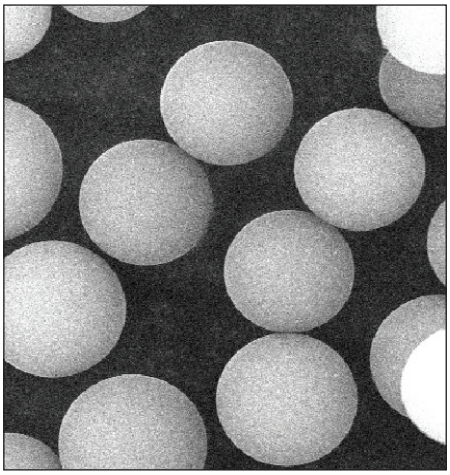
KYA Technologies of Japan

KYA Technologies Corporation, Tokyo, Japan was established in 1998 to develop a range of high quality HPLC products. The latest product HiQ sil HS is a high performance silica for rapid separations under normal reverse phase applications.

Over the last 9 years we have developed a complete range of high quality columns in the HiQ sil™ series which has gained a loyal following in Japan and East Asia. The DiNa range of products is dedicated to NanoLC and NanoLC-MS. The DiNa™ (Direct Nano) series of instruments has become the industry standard for proteomics separations in Japan.



Electron micrograph of 5um silica gel particle

Introduction of the HiQ sil™ series

HiQ sil™ HPLC columns are made from an ultra purity silica gel as the starting material. The unique manufacturing process ensures high mechanical strength and a very regular particle size whilst minimising fines to give a long life under the toughest conditions.

The HiQ sil gel is manufactured in a range of particle sizes, pore sizes and with a variety of chemical surface bondings for reverse phase and normal phase chromatography.

Our QA/QC

Incoming material is checked in accordance with our intensive QC procedure to ensure the highest possible quality from the outset.

The silica gel is subject to chemical treatment under strict conditions to ensure batch-to-batch reproducibility.

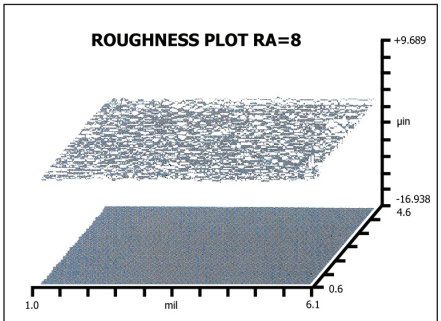
The columns are packed by trained experts under controlled conditions.

Before leaving the factory each column manufactured at KYA-Technologies is tested and a Column Test Report is attached to guarantee performance in your laboratory.

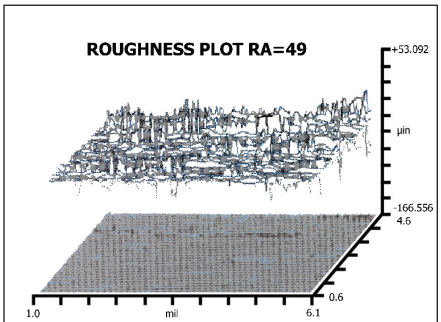
Our attention to detail doesn't end with the packing material, we are also concerned with the finish of blank columns. Our column blanks are manufactured from highly polished stainless steel. – a measure of the smoothness or flatness of the surface, expressed as the root average (Ra) in micro inches. The smaller the number, the smoother or flatter the surface. The surface finish of the inner diameter of our column blanks is extremely flat to eliminate preferential flow paths and eddy spots.

These topographic plots illustrate the difference in surface finish between our column blank (top) and other commercial available column blank (bottom).

The end fittings on each of our columns is also manufactured to the same high standard with accurate ZDV female threads.



KYA-Technologies Column blank



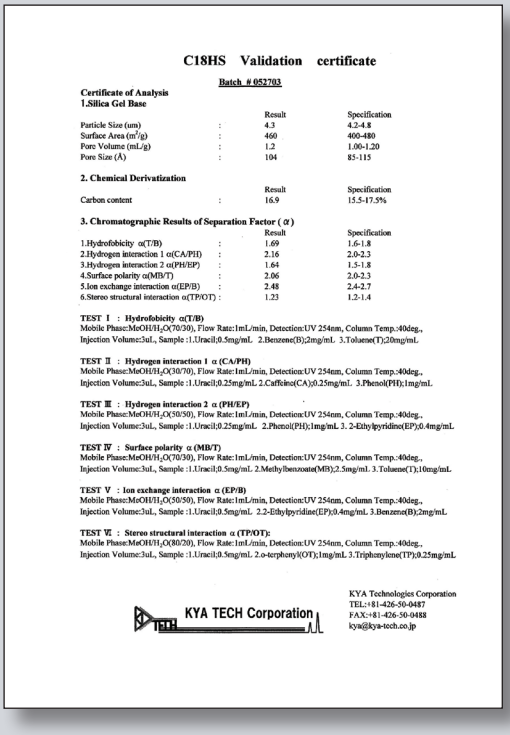
Typical column blank

HiQ sil™ series for micro to Analytical to preparative

- Outstanding loadability
- Effective end-cap to minimize residual free silanol
- Outstanding acid and alkalinity resistance
- Excellent reproducibility
- Long life time – highly durable
- High pH tolerance for acid and alkali
- Good retention even with 100% aqueous eluents

See the guide to column selection on page 8, it will help you choose which size and packing material is best for your application

- New HiQ sil C18 HS high performance high resolution analytical columns
- Capillary
- Semi-micro
- Analytical
- Preparative
- NanoLC spray columns
- DiNa trap columns



C18HS Validation certificate

Batch # 052703

Certificate of Analysis
1.Silica Gel Base

		Result	Specification
Particle Size (um)	:	4.3	4.2-4.8
Surface Area (m^2/g)	:	460	400-480
Pore Volume (mL/g)	:	1.2	1.00-1.20
Pore Size (Å)	:	104	85-115

2. Chemical Derivatization

		Result	Specification
Carbon content	:	16.9	15.5-17.5%

3. Chromatographic Results of Separation Factor (α)

		Result	Specification
1.Hydrofobicity α(T/B)	:	1.69	1.6-1.8
2.Hydrogen interaction 1 α(CA/PH)	:	2.16	2.0-2.3
3.Hydrogen interaction 2 α(PH/EP)	:	1.64	1.5-1.8
4.Surface polarity α(MB/T)	:	2.06	2.0-2.3
5.Ion exchange interaction α(EP/B)	:	2.48	2.4-2.7
6.Stereo structural interaction α(TP/OT)	:	1.23	1.2-1.4

TEST I : Hydrofobicity α(T/B)
Mobile Phase:MeOH/H_2O(70/30), Flow Rate:1mL/min, Detection:UV 254nm, Column Temp.:40deg.,
Injection Volume:3uL, Sample :1.Uracil;0.5mg/mL 2.Benzene(B);2mg/mL 3.Toluene(T);20mg/mL

TEST II : Hydrogen interaction 1 α (CA/PH)
Mobile Phase:MeOH/H_2O(30/70), Flow Rate:1mL/min, Detection:UV 254nm, Column Temp.:40deg.,
Injection Volume:3uL, Sample :1.Uracil;0.25mg/mL 2.Caffeine(CA);0.25mg/mL 3.Phenol(PH);1mg/mL

TEST III : Hydrogen interaction 2 α (PH/EP)
Mobile Phase:MeOH/H_2O(50/50), Flow Rate:1mL/min, Detection:UV 254nm, Column Temp.:40deg.,
Injection Volume:3uL, Sample :1.Uracil;0.25mg/mL 2.Phenol(PH);1mg/mL 3. 2-Ethylpyridine(EP);0.4mg/mL

TEST IV : Surface polarity α (MB/T)
Mobile Phase:MeOH/H_2O(70/30), Flow Rate:1mL/min, Detection:UV 254nm, Column Temp.:40deg.,
Injection Volume:3uL, Sample :1.Uracil;0.5mg/mL 2.Methylbenzoate(MB);2.5mg/mL 3.Toluene(T);10mg/mL

TEST V : Ion exchange interaction α (EP/B)
Mobile Phase:MeOH/H_2O(50/50), Flow Rate:1mL/min, Detection:UV 254nm, Column Temp.:40deg.,
Injection Volume:3uL, Sample :1.Uracil;0.5mg/mL 2.2-Ethylpyridine(EP);0.4mg/mL 3.Benzene(B);2mg/mL

TEST VI : Stereo structural interaction α (TP/OT):
Mobile Phase:MeOH/H_2O(80/20), Flow Rate:1mL/min, Detection:UV 254nm, Column Temp.:40deg.,
Injection Volume:3uL, Sample :1.Uracil;0.5mg/mL 2.o-terphenyl(OT);1mg/mL 3.Triphenylene(TP);0.25mg/mL

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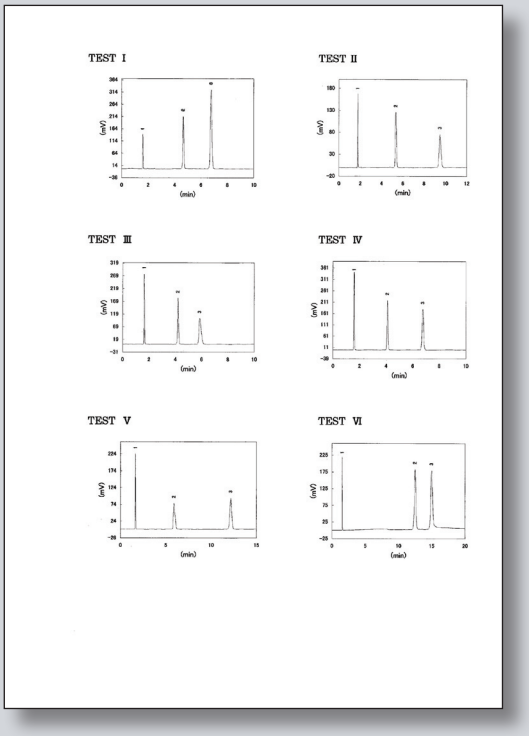


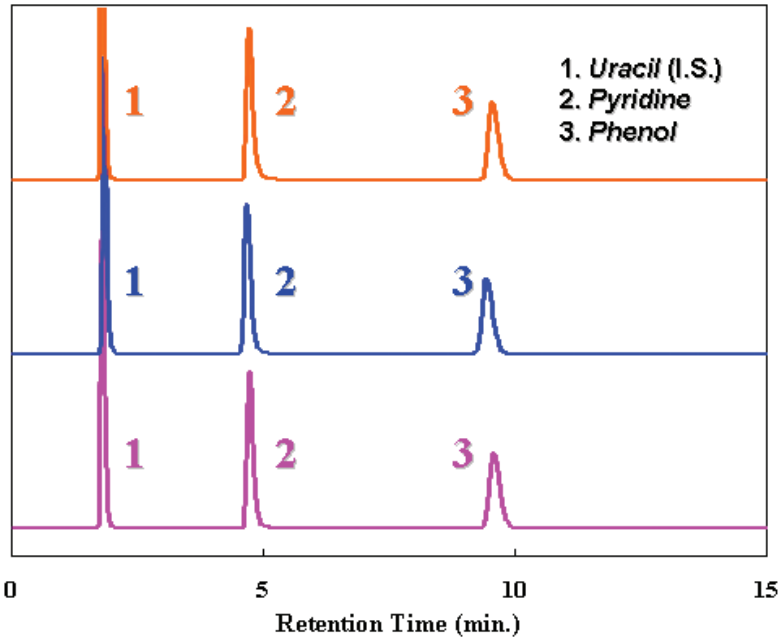
All HiQ sil C18HS columns have been tested to guarantee that every column gives excellent performance at the customers' site. A validation certificate is included with every HiQ sil C18HS column.

HiQ sil™ HPLC Columns

Excellent batch to batch reproducibility

Reproducibility on batch-to-batch productions has been further improved due to our strict manufacturing control. The following data shows chromatograms from HiQ sil™ C18HS columns taken from three different batches.

Column: HiQ sil™ C18HS 4.6mmID x 150mmL

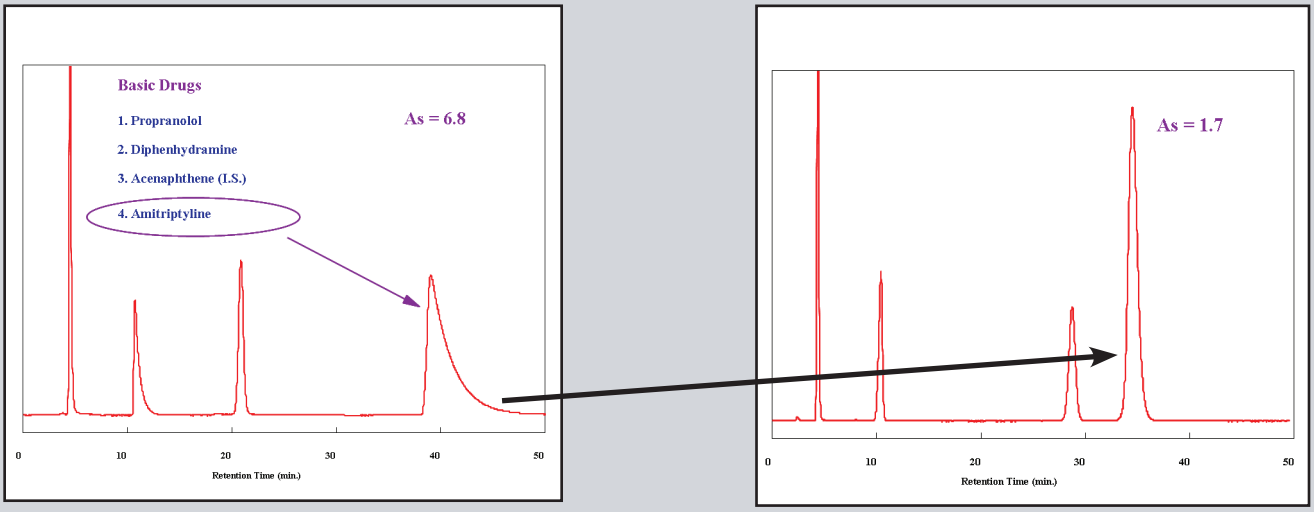


Excellent peak shape

The new HiQ sil™ HS packing material has great peak symmetry characteristics. NMR data shows that the free silanol groups are completely undetectable. The carbon loading is around 17%. Even with difficult materials the new HS packing offers great resolution with virtually no tailing.

Effective newly developed high carbon loading end-capping method has dramatically improved peak shape; this is due the near absence of free silica moieties. There is virtually no tailing on the peaks and excellent symmetrical peaks can be obtained from every HiQ sil™ C18HS column.

Column: HiQ sil™ C18HS 4.6mmID x 150mmL



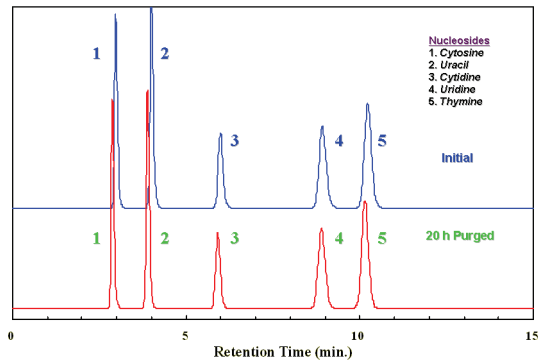
Excellent Sample Loading

HiQ sil has been developed for sample capacity whilst retaining good peak shape. The new packing material has shown a capacity up to 3 times higher than some popular brands. The key benefit of this new packing material is evident in preparative chromatography where you can obtain more material from fewer clean-up cycles, but it also aids regular chromatography for users that need to measure differences between very large and very small peaks; you can now improve the chromatography by loading the column with more material to improve the smaller peak's signal to noise.

Wide pH Tolerance in Both, Acid and Alkali Mobile Phases

HiQ sil has been tested for lifetime durability in both acid and alkaline mobile phases. The lifetime at pH 2.0 and pH 12.0 is around double when compared to many of the conventional silica technologies currently available.

Even with 100% aqueous mobile phase, the HiQ sil™ C18HS show good retention.



Column: HiQ sil C18HS 4.6mmID x 150mmL

Analytical and Semi-Micro Columns

For regular analytical HPLC columns the typical sizes are still 3um and 5um particle size with either a 2mm or 4.6mm ID - Lengths do tend to vary according to application; but those assays which need high resolution still demand a 250mmL column. Now with improved resolution the 150mmL x 4.6 or (2mmID is becoming more and more popular due to lower solvent consumption, quarter the flow rate compared to a 4.6mmID) without compromising peak resolution.

Stationary phases are typically C8 and C18, but you can choose from the complete range of material including C1, C4, silica, cyano, amino and phenyl.

Typical column sizes

3um 100Å C18

A046-150-03-100HS	4.6mm ID x 150mm L
A046-250-03-100HS	4.6mm ID x 250mm L
A021-150-03-100HS	2.1mm ID x 150mm L

5um 100Å C18

A046-150-05-100HS	4.6mm ID x 150mm L
A046-250-05-100HS	4.6mm ID x 250mm L
A021-150-05-100HS	2.1mm ID x 150mm L

There is a range of guard cartridges and guard columns to match the different packing material. Make sure you check the comprehensive price list.

HiQ sil™ HPLC Columns

Semi-Micro and Capillary Columns for LC-MS Applications

The HiQ sil is packed into a range of columns for micro and semi-micro applications. Starting from narrow capillaries of just 50um up to 2mm ID, there is a size to suit every low flow-rate application.

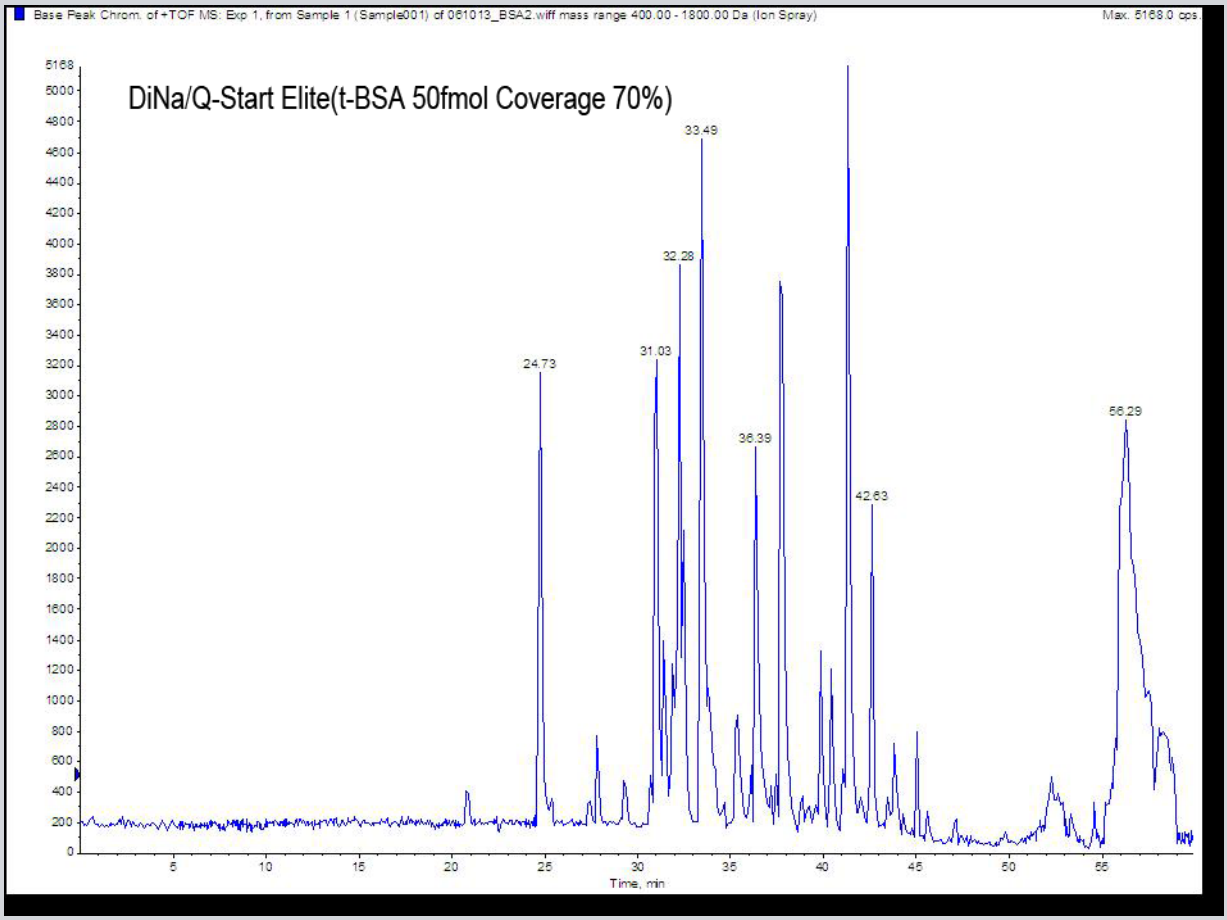
Columns for high resolution separations are packed in lengths of up to 250mm. For capacity the columns normally start at 75um ID x 45mm length for LC-MS proteomics applications.

Our 1mm columns are useful for increasing sensitivity at flow-rates in the region of 50 to 100uL/min whilst still retaining good reliability and column lifetime.

The example mass-spec chromatogram below shows excellent S/N ratio for the sample measured by LC-MS separated using a 150um x 100mmL capillary column

Column: HiQ sil™C18-3(150um x 100mmL)

Sample: HAS (Tryptic digest,)



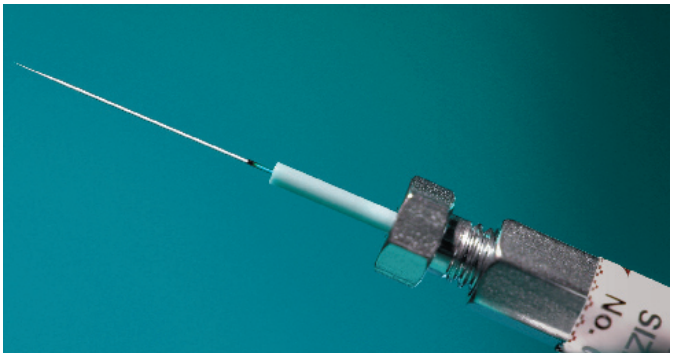
HiQ sil™ Packed Trap-Columns for Sample Clean-Up and Pre-Concentration

Fritless direct ESI nano spray columns for sub-microlitre flow-rates!

Easily handled with a ZDV fitting, not a connection sleeve! The metal fitting allows easy attachment to the ESI spray holder.

DiNaSpray™ columns can be used with virtually any ESI LC-MS interface.

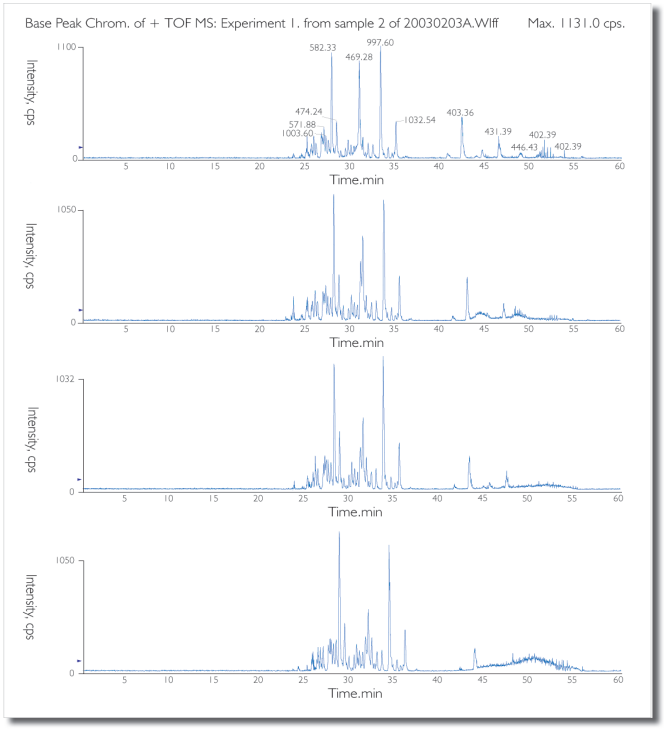
Particle size is 3um with a 120 Å pore size. Stationary phases are typically C8 and C18 for proteomics applications. Standard column dimensions are 150um ID x 45mm length, but we can pack to your specific requirements from 50um ID to 200um ID and from 30mm to 150mm length.



DiNa™ Trap-Columns

DiNa™ Trap-Columns can be used with any system, easy to handle and install, the outlet side is supplied with a length of pre-cut capillary. These columns are packed in the same way as conventional columns making them more reliable and able to accept a higher sample loading than most other commercially available and home-made trap columns. Particle size is 3um with a 120 Å pore size.

Stationary phase is C18 (other packing materials are available - C8, CN, Phenyl, Amino etc) column dimension is 0.5mm ID x 1mm L.



Column : HiQ sil C18-3(150um x100nmL)

DiNa™ Trap Columns

Sample : BSA (Tryptic digest, 500 fmol)

HiQ sil™ HPLC Columns

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Column Selection Guide for HiQ SIL™series

Sample Characteristics		Separation Mode	Product Name	Base Material	Functional Group
Water Soluble Low polarity compounds to high polarity compounds		Reverse phase Separation by polarity difference	HiQ sil C18	High Purity Silica Gel	C18
			HiQ sil C8		C8
			HiQ sil C4		C4
			HiQ sil C1		C1
			HiQ sil Ph		Phenyl
			HiQ sil CN		CN
Organic Solvent soluble Low polarity compounds	Soluble in polar solvents e.g methanol		HiQ sil NH2		NH2
			HiQ sil CN		CN
	Soluble in non-polar solvents e.g hexane	Normal phase distribution Separation by adsorptivity differential	HiQ sil NH2		NH2
		Normal phase distribution Separation by adsorptivity differential	HiQ sil Sil		Silica

	Packing Material Phases		
Product name	Particle size & pore size	Product name	Particle size and pore size
HiQ sil C18HS	5μm-100Å, 3μm-100Å	HiQ sil C1	5μm-120Å, 10μm-120 Å
HiQ sil C18	3μm-120Å, 3μm-200Å, 5μm-120Å, 5μm-300Å, 10μm-120Å, 15μm-120Å	HiQ sil SIL	5μm-60Å, 5μm-100Å, 5μm-120Å, 10μm-120Å, 15μm-120Å
HiQ sil C8	5μm-120Å, 5μm-300Å, 10μm-120Å	HiQ sil Ph	5μm-120Å, 10μm-120Å
HiQ sil C4	5μm-120Å, 5μm-300Å	HiQ sil NH2	5μm-120Å, 10μm-120Å
HiQ sil CN	5μm-120Å, 10μm-120Å		

	Selection of Column Sizes	
Column I.D	Column Length	Scale
50μm, 75μm, 100μm, 150μm	50mm *different lengths available.	LC-MS
0.3mm, 0.5mm	35mm, 50mm, 75mm, 100mm, 150mm, 250mm	Micro
1.0mm, 1.5mm, 2.1mm	35mm, 50mm, 75mm, 100mm, 150mm, 250mm	Semi-micro
4.0mm, 4.6mm	35mm, 50mm, 75mm, 100mm, 150mm, 250mm, 300mm	Analytical
7.8mm, 10.0mm, 30.0mm, 50.0mm	35mm, 50mm, 75mm, 100mm, 150mm, 250mm, 300mm	Preparative

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The specifications are subject to change without notices.

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