



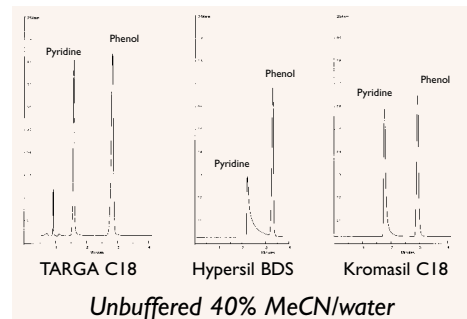
TARGA™

Unrivaled End Capping Technology

Efforts to eliminate solute-silanol interactions have recently lead to big advancements in sorbent chemistry. While “secondary” effects can be vital for obtaining desired selectivity in some applications, they rarely help when polar amines are being analyzed.

Targa HPLC columns are true to the Latin root of their name. TARGA, meaning “shield,” is precisely the effect the unique bonded phase has on the silica’s silanol surface.

Many HPLC column manufacturers illustrate the performance of their columns packed with inert, base deactivated, “Type B silica” bonded phases by the



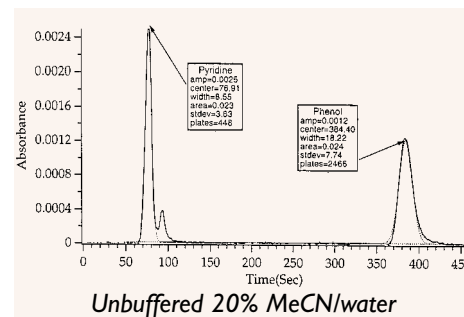
chromatographic behavior of polar compounds such as pyridine. Performance claims can be misleading, however, when mobile phases are buffered to low pH or when they contain high percentages of organic solvent.

TARGA - A uniquely shielded surface

- Phases C8 and C18
- Particle Sizes 3 and 5µm
- Pore Size 120Å
- Pore Volume 0.8mL/gm
- Surface Area 330m²/gm
- %Carbon (w/w) C8 = 8%, C18 = 16%
- Phase type Monofunctional with a unique polar and bulky end-capping
- Silica Class Type B
- Hardware Stainless steel and PEEK columns and cartridges

Applications TARGA columns and cartridges are ideal for applications requiring an absence of secondary solute-silanol interaction. Basic and acidic drugs and peptides can be chromatographed efficiently with little or no buffer. Targa columns are particularly well suited for LC/MS applications where acetic acid or formic acid can be substituted for TFA resulting in significant increase in signal. While TFA is not required, it does not preclude its use on TARGA columns. TARGA exhibits extremely fast equilibration kinetics from high to low organic phase compositions. It works well in 100% aqueous conditions for hydrophilic applications also.

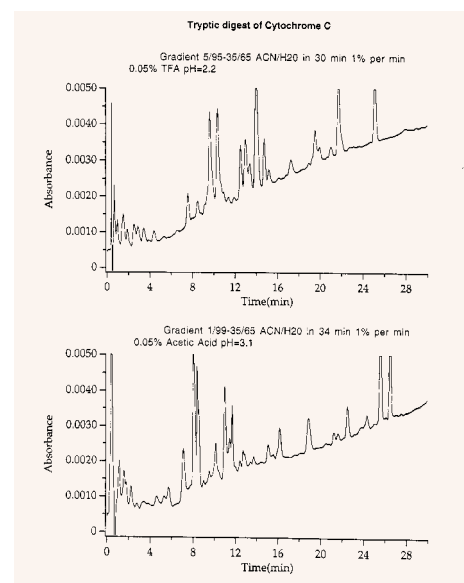
A more revealing test for solute-silanol interaction is to use a mobile phase containing a relatively low amount of organic solvent and no additives or buffers. Compared to three popular HPLC columns whose manufacturers claim have a high degree of inertness, TARGA C18 exhibits very good efficiency and symmetry for pyridine.



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Peptide Mapping without TFA

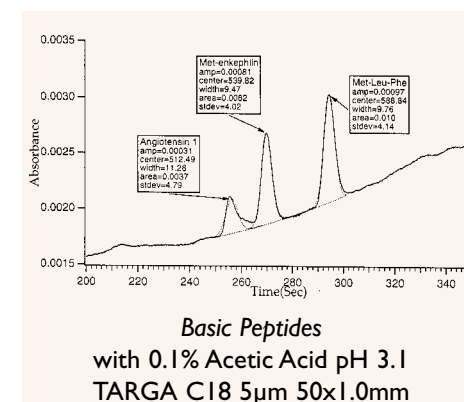
The following chromatograms illustrate the differences in selectivity for peptide maps of cytochrome-C when using 0.05% TFA or 0.05% acetic acid buffer in 1%/min acetonitrile gradient on a short 50x1.0mm TARGA



C18 column. Both dilute buffer examples are characterized by sharp peaks and no tailing

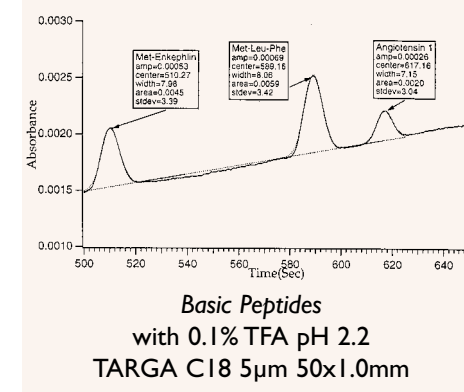
LC/MS without TFA

Researchers have shown that Higgins Analytical’s TARGA C8 and C18 phases have an extremely well protected silanol surface. An acetonitrile/water 1%/min gradient with as little as 0.05% acetic acid gives a very satisfactory peptide map on a



short 5cm x 1mm TARGA C18 column. The ability to buffer with acetic or formic acid rather than TFA greatly enhances signals for LC/MS techniques.

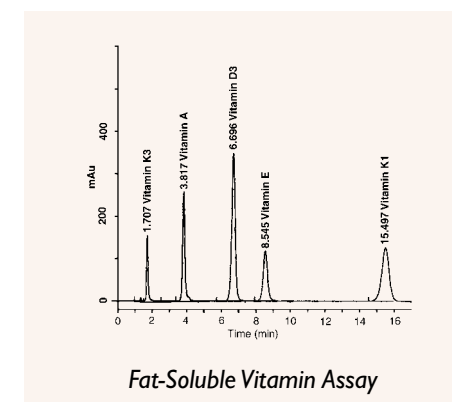
While TARGA columns give exceptional performance without TFA buffer, it does not mean that you are precluded from using it. In fact, the changes in selectivity that comes



with changing buffer acids can be a powerful tool for separation optimization. Notice how the peptide elution orders change between the acetic acid and TFA buffered chromatograms above.

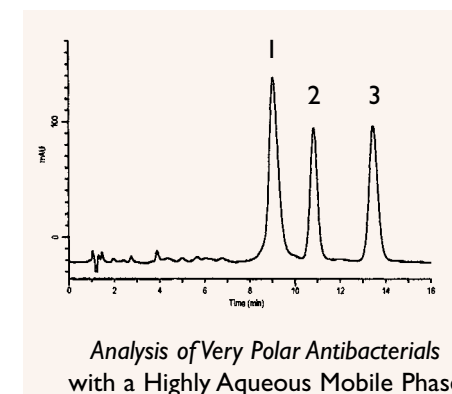
Favorable Kinetics at Aqueous or Organic Mobile Phase Extremes

The bulky moiety used for end capping TARGA C8 and C18 sorbents present other valuable selectivity characteristics in addition to the extreme inertness to basic and acidic compounds. Long chain alkane bonded phases collapse under low organic phase conditions on most reverse phase HPLC columns causing poor reproducibility and slow reequilibration. Fast gradients can be run on TARGA columns from initial 100% aqueous conditions with fast cycle times and very good run-to-run reproducibility. TARGA columns can also be run



TARGA C18 5µm 100x2.1mm
Part Number TS-1021-C185
3% water in MeOH mobile phase
200µl/min, diode array detection

isocratically in 100% aqueous conditions for carbohydrate analysis, or with only a few percent organic modifier to achieve selectivity on solutes that are retained under typical reverse phase conditions.

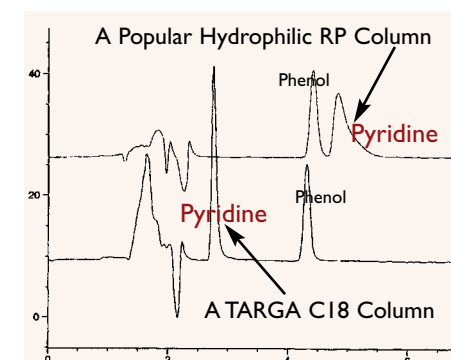


1. Vancomycin, 2. Cefotaxime, 3. Cefazolin

TARGA C18 100x2.1mm TS-1021-C185
Mobile Phase: 92% Water with 0.1% TFA
pH2.5, 8% MeOH, DAD at 230nm

TARGA’s Superior Hydrophilic Reverse Phase Properties

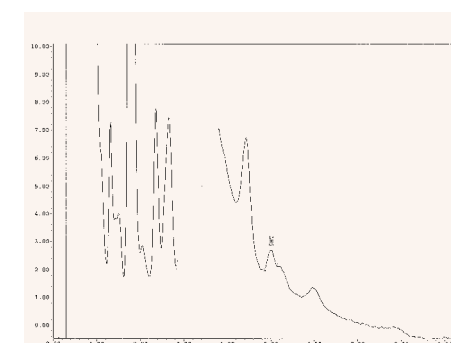
Several manufacturers offer reverse phase column products with imbedded polar functionality intended to enhance the chromatography of hydrophilic compounds like those illustrated in the previous antibacterial example. Unfortunately, most of these approaches introduce undesirable secondary effects that preclude their use with acidic or basic solutes unlike TARGA with its unique bonded phase.



TARGA compared to a competitor’s hydrophilic column. 150x4.6mm, 20% MeCN/water (unbuffered) 1mL/min

Trace Catecholamine Analysis

In vivo microdialysis present a challenge to both instrumentation and column design, especially when depended upon as a tool for routine analysis. The chromatogram below illustrates rat hypothalamus microdialysis analysis for 5HT. Researchers report that the 100x2.1mm Higgins Analytical PEEK and titanium TARGA C18 column operates routinely at 0.2 - 100 nM detection levels.



TARGA C18 5µm 100x2.1mm
P/N TS-1021-C185

- Na₂HPO₄ 0.15M
- OSA 0.74mM
- EDTA 0.1mM
- pH 2.87 (orthophosphoric acid)
- 2% IPA

Instrumentation: Flux Rheos Isocratic Pump, In-line Solvent Degasser, Spark Holland Triathlon Autosampler, Antec INTRO EC Detector

Detection levels of 0.2 - 100 nM are routinely achieved.

Nanobore Columns

TARGA C8 5µm 30x0.15mm TC-0315-C085	0.15mm I.D. 50x0.15mm TC-0515-C085	100x0.15mm TC-1015-C085
TARGA C18 3µm 30x0.15mm TC-0315-C183	0.15mm I.D. 50x0.15mm TC-0515-C183	100x0.15mm TC-1015-C183
TARGA C18 5µm 30x0.15mm TC-0315-C185	0.15mm I.D. 50x0.15mm TC-0515-C185	100x0.15mm TC-1015-C185

Microbore Columns

TARGA C8 5µm 30x1.0mm TS-0301-C085 30x0.5mm TS-03M5-C085 30x0.3mm TS-03M3-C085	1.0mm - 0.5mm - 0.3mm I.D. 50x1.0mm TS-0501-C085 50x0.5mm TS-05M5-C085 50x0.3mm TS-05M3-C085	100x1.0mm TS-1001-C085 100x0.5mm TS-10M5-C085 100x0.3mm TS-10M3-C085	150x1.0mm TS-1501-C085 150x0.5mm TS-15M5-C085	250x1.0mm TS-2501-C085
TARGA C18 3µm 30x1.0mm TS-0301-C183 30x0.5mm TS-03M5-C183 30x0.3mm TS-03M3-C183	1.0mm - 0.5mm - 0.3mm I.D. 50x1.0mm TS-0501-C183 50x0.5mm TS-05M5-C183 50x0.3mm TS-05M3-C183	100x1.0mm TS-1001-C183 100x0.5mm TS-10M5-C183 100x0.3mm TS-10M3-C183	150x1.0mm TS-1501-C183 150x0.5mm TS-15M5-C183	250x1.0mm TS-2501-C183
TARGA C18 5µm 30x1.0mm TS-0301-C185 30x0.5mm TS-03M5-C185 30x0.3mm TS-03M3-C185	1.0mm - 0.5mm - 0.3mm I.D. 50x1.0mm TS-0501-C185 50x0.5mm TS-05M5-C185 50x0.3mm TS-05M3-C185	100x1.0mm TS-1001-C185 100x0.5mm TS-10M5-C185 100x0.3mm TS-10M3-C185	150x1.0mm TS-1501-C185 150x0.5mm TS-15M5-C185	250x1.0mm TS-2501-C185

Analytical Columns - Stainless Steel

TARGA C8 5µm 30x4.6mm TS-0346-C085 30x3.0mm TS-0330-C085 30x2.1mm TS-0321-C085	4.6, 3.0, and 2.1mm I.D. s.s. columns 50x4.6mm TS-0546-C085 50x3.0mm TS-0530-C085 50x2.1mm TS-0521-C085	100x4.6mm TS-1046-C085 100x3.0mm TS-1030-C085 100x2.1mm TS-1021-C085	150x4.6mm TS-1546-C085 150x3.0mm TS-1530-C085 150x2.1mm TS-1521-C085	250x4.6mm TS-2546-C085 250x3.0mm TS-2530-C085 250x2.1mm TS-2521-C085
TARGA C18 3µm 30x4.6mm TS-0346-C183 30x3.0mm TS-0330-C183 30x2.1mm TS-0321-C183	4.6, 3.0, and 2.1mm I.D. s.s. columns 50x4.6mm TS-0546-C183 50x3.0mm TS-0530-C183 50x2.1mm TS-0521-C183	100x4.6mm TS-1046-C183 100x3.0mm TS-1030-C183 100x2.1mm TS-1021-C183	150x4.6mm TS-1546-C183 150x3.0mm TS-1530-C183 150x2.1mm TS-1521-C183	250x4.6mm TS-2546-C183 250x3.0mm TS-2530-C183 250x2.1mm TS-2521-C183
TARGA C18 5µm 30x4.6mm TS-0346-C185 30x3.0mm TS-0330-C185 30x2.1mm TS-0321-C185	4.6, 3.0, and 2.1mm I.D. s.s. columns 50x4.6mm TS-0546-C185 50x3.0mm TS-0530-C185 50x2.1mm TS-0521-C185	100x4.6mm TS-1046-C185 100x3.0mm TS-1030-C185 100x2.1mm TS-1021-C185	150x4.6mm TS-1546-C185 150x3.0mm TS-1530-C185 150x2.1mm TS-1521-C185	250x4.6mm TS-2546-C185 250x3.0mm TS-2530-C185 250x2.1mm TS-2521-C185

Semi-Prep and Prep Columns

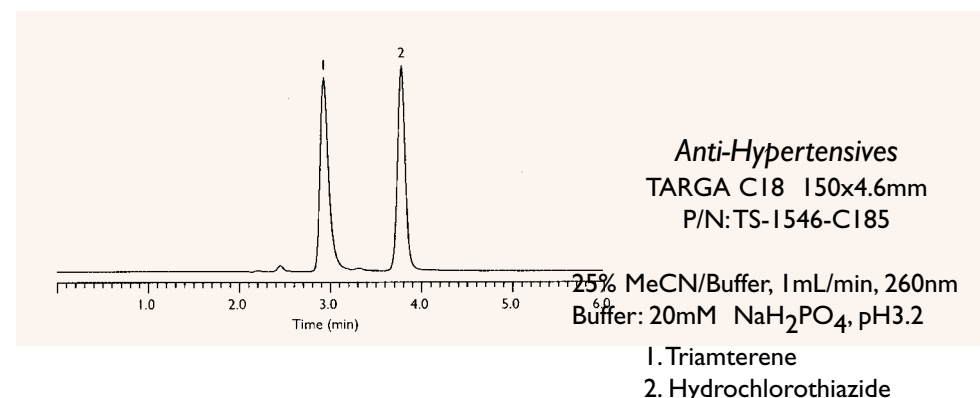
TARGA C8 5µm	10mm & 20mm I.D. Stainless Steel Semi-Prep and Prep Columns 50x10mm TS-0510-C085 50x20mm TS-0520-C085	100x10mm TS-1010-C085 100x20mm TS-1020-C085	150x10mm TS-1510-C085 150x20mm TS-1520-C085	250x10mm TS-2510-C085 250x20mm TS-2520-C085
TARGA C18 10µm	10mm & 20mm I.D. Stainless Steel Semi-Prep and Prep Columns 50x10mm TS-0510-C181 50x20mm TS-0520-C181	100x10mm TS-1010-C181 100x20mm TS-1020-C181	150x10mm TS-1510-C181 150x20mm TS-1520-C181	250x10mm TS-2510-C181 250x20mm TS-2520-C181
TARGA C18 5µm	10mm & 20mm I.D. Stainless Steel Semi-Prep and Prep Columns 50x10mm TS-0510-C185 50x20mm TS-0520-C185	100x10mm TS-1010-C185 100x20mm TS-1020-C185	150x10mm TS-1510-C185 150x20mm TS-1520-C185	250x10mm TS-2510-C185 250x20mm TS-2520-C185

HAISpeed10 - 10mm I.D. Stainless Steel Cartridge Columns

TARGA C8 5µm	10mm I.D. s.s. HAISpeed Cartridges 30x10mm TF-0310-C085	1/pkg 50x10mm TF-0510-C085	1/pkg 100x10mm TF-1010-C085
TARGA C18 10µm	10mm I.D. s.s. HAISpeed Cartridges 30x10mm TF-0310-C181	1/pkg 50x10mm TF-0510-C181	1/pkg 100x10mm TF-1010-C181
TARGA C18 5µm	10mm I.D. s.s. HAISpeed Cartridges 30x10mm TF-0310-C185	1/pkg 50x10mm TF-0510-C185	1/pkg 100x10mm TF-1010-C185

HAISpeed20 - 20mm I.D. Prep Guard Cartridges

TARGA C18 10µm	20mm I.D. Stainless Steel Prep Guard Cartridge 25x20mm TF-0220-C181	2/pkg
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HAICART - Stainless Steel Analytical Cartridge Columns

TARGA C8 5µm	4.6 and 3.2mm I.D. s.s. HAICART Analytical Cartridges					
	40x4.6mm	2/pkg	50x4.6mm	2/pkg	100x4.6mm	1/pkg
	TF-0446-C085		TF-0546-C085		TF-1046-C085	
TARGA C18 5µm	4.6 and 3.2mm I.D. s.s. HAICART Analytical Cartridges					
	40x3.2mm	2/pkg	50x3.2mm	2/pkg	100x3.2mm	1/pkg
	TF-0432-C085		TF-0532-C085		TF-1032-C085	



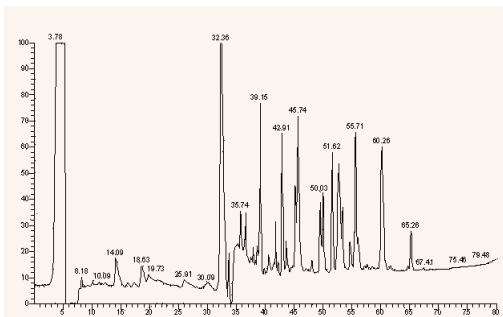
TARGA C18 5µm	4.6 and 3.2mm I.D. s.s. HAICART Analytical Cartridges					
	40x4.6mm	2/pkg	50x4.6mm	2/pkg	100x4.6mm	1/pkg
	TF-0446-C185		TF-0546-C185		TF-1046-C185	
TARGA C18 5µm	4.6 and 3.2mm I.D. s.s. HAICART Analytical Cartridges					
	40x3.2mm	2/pkg	50x3.2mm	2/pkg	100x3.2mm	1/pkg
	TF-0432-C185		TF-0532-C185		TF-1032-C185	

HAIPEEK - PEEK Analytical Cartridge Columns

TARGA C8 5µm	2.1mm I.D. PEEK Analytical Cartridges			
	40x2.1mm	2/pkg	50x2.1mm	2/pkg
	TK-0421-C085		TK-0521-C085	

TARGA C18 3µm	2.1mm I.D. PEEK Analytical Cartridges			
	40x2.1mm	2/pkg	50x2.1mm	2/pkg
	TK-0421-C183		TK-0521-C183	

TARGA C18 5µm	2.1mm I.D. PEEK Analytical Cartridges			
	40x2.1mm	2/pkg	50x2.1mm	2/pkg
	TK-0421-C185		TK-0521-C185	

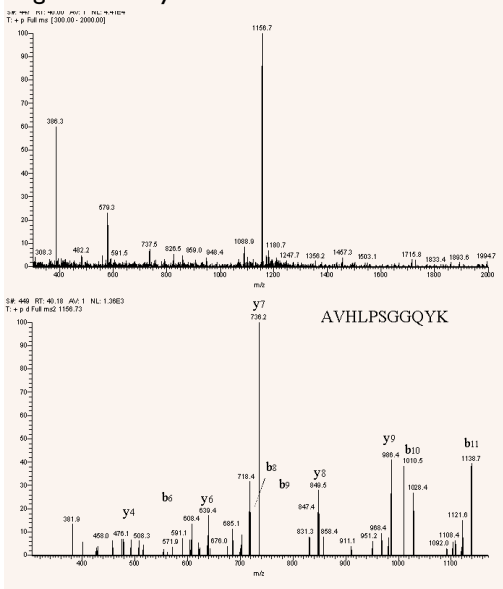


Tryptic Map of Human Ocular Lens Proteins beta A1 crystallin and gamma S crystallin

TARGA C18 5µm 150x0.5mm P/N TS-15M5-C185

Solvent A: 0.1% Acetic Acid
Solvent B: 0.1% Acetic Acid, 65% MeCN
0 - 50% B in 60min, 50 - 100%B in 15min

Sample is a tryptic digest of a 2D electrophoresis separated spot digested from PDVF membrane. The two ocular proteins are ~25kD. The LC/MS zoom scan below confirms the peak at 39.15min is singly charged, and software interpretation of the MS/MS scan at the bottom confirms the 1156.6 ion as residues 84-94 in human gamma S crystallin.



HAICART - Stainless Steel Guard Cartridges

TARGA C8 5µm	3.2mm I.D. s.s. Guard Cartridges	
	20x3.2mm	5/pkg
	T108	



TARGA C18 5µm	3.2mm I.D. s.s. Guard Cartridges	
	20x3.2mm	5/pkg
	T118	

HAIPEEK - PEEK Guard Cartridges

TARGA C8 5µm	2.1mm I.D. PEEK Guard Cartridges	
	20x2.1mm	5/pkg
	TK-0221-C085	



TARGA C18 3µm	2.1mm I.D. PEEK Guard Cartridges	
	20x2.1mm	5/pkg
	TK-0221-C183	

TARGA C18 5µm	2.1mm I.D. PEEK Guard Cartridges	
	20x2.1mm	5/pkg
	TK-0221-C185	

Kromasil 100	
Phases	C8 and C18
Particle Sizes	3.5 and 5µm
Pore Size	110Å
Pore Volume	0.9mL/gm
Surface Area	330m ² /gm
%Carbon (w/w)	C8 = 12%, C18 = 20%
Silica Class	Type B
Hardware	Stainless steel and PEEK columns and cartridges

The only commercially available sorbent offered in our product family, Kromasil has become well known for its unique selectivity, robust mechanical and chemical structure, and wide use in pharmaceutical process scale facilities. Higgins Analytical's ability to manufacture Kromasil HPLC columns that have unrivaled performance has made us an economically competitive and routine supplier of very high quality Kromasil columns to laboratories and OEM customers on five continents.



Nanobore Columns

Kromasil 100 C8 5µm	0.15mm I.D.		
	30x0.15mm	50x0.15mm	100x0.15mm
	KC-0315-C085	KCC-0515-C085	KC-1015-C085
Kromasil 100 C18 3.5µm	0.15mm I.D.		
	30x0.15mm	50x0.15mm	100x0.15mm
	KC-0315-C183	KN-0515-C183	KC-1015-C183
Kromasil 100 C18 5µm	0.15mm I.D.		
	30x0.15mm	50x0.15mm	100x0.15mm
	KC-0315-C185	KC-0515-C185	KC-1015-C185

Microbore Columns

Kromasil 100 C8 5µm	1.0mm - 0.5mm - 0.3mm I.D.				
	30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
	KS-0301-C085	KS-0501-C085	KS-1001-C085	KS-1501-C085	KS-2501-C085
	30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	
	KS-03M5-C085	KS-05M5-C085	KS-10M5-C085	KS-15M5-C085	
	30x0.3mm	50x0.3mm	100x0.3mm		
	KS-03M3-C085	KS-05M3-C085	KS-10M3-C085		
Kromasil 100 C18 3.5µm	1.0mm - 0.5mm - 0.3mm I.D.				
	30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
	KS-0301-C183	KS-0501-C183	KS-1001-C183	KS-1501-C183	KS-2501-C183
	30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	
	KS-03M5-C183	KS-05M5-C183	KS-10M5-C183	KS-15M5-C183	
	30x0.3mm	50x0.3mm	100x0.3mm		
	KS-03M3-C183	KS-05M3-C183	KS-10M3-C183		
Kromasil 100 C18 5µm	1.0mm - 0.5mm - 0.3mm I.D.				
	30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
	KS-0301-C185	KS-0501-C185	KS-1001-C185	KS-1501-C185	KS-2501-C185
	30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	
	KS-03M5-C185	KS-05M5-C185	KS-10M5-C185	KS-15M5-C185	
	30x0.3mm	50x0.3mm	100x0.3mm		



KROMASIL 100

TARGA™ Ordering Information

HK-GUARD, HK-HOLD, 10-HOLD and 20-HOLD holders required for these cartridge columns.

We Violate the 80:20 Rule

This catalog contains hundreds of parts and it would probably be no surprise to you if we pointed out that only about 20% of them are manufactured 80% of the time. But what you would not know is that another 20% of the products we manufacture are not even listed in this catalog!

We stock tubing with a wide variety of internal diameters, and since we machine the columns and cartridges ourselves, custom length and I.D. columns are almost as easy for us to provide as are the standard sizes listed in this catalog. Since our part numbering system has an easy to understand pattern, customers routinely compose and order custom configurations.

Easy to Understand Part Numbers

Except for HAICART Guard Cartridges, all Higgins Analytical HPLC column product part numbers are based on a 2-4-4 character pattern. While we will not manufacture every combination and permutation devisable with this scheme, this page will serve as a guide to assist you in defining a product that you believe would better address your needs than one of the hundreds of formats we routinely manufacture.

The two character prefix indicates *sorbent and hardware type*. Standard configurations are **highlighted**.

Prefix Character 1 (Sorbent)

X-XXXX-XXXX
C = CLIPEUS
H = HAISIL 100 or HAISIL 300
K = Kromasil
L = HAISIL HL
T = TARGA

Prefix Character 2 (Hardware)

X■-XXXX-XXXX
S = Stainless steel HPLC Column
P = PEEK HPLC column
F = Stainless steel cartridge column
K = PEEK cartridge column
N = Nano Scale column (150µm)

The four center characters indicate the column or cartridge *length (cm) and internal diameter (mm)*.

Center Characters 1 and 2 (Length)

XX-■XX-XXX
03 = 3cm **04** = 4cm
05 = 5cm **07** = 7.5cm
10 = 10cm **12** = 12.5cm
15 = 15cm **20** = 20cm
22 = 22cm **25** = 25cm
30 = 30cm **50** = 50cm

Center Characters 3 and 4 (I.D.)

XX-XX■-XXXX
15 = 150µm **M3** = 300µm
M5 = 500µm **M8** = 800µm
01 = 1.0mm **21** = 2.1mm
30 = 3.0mm **32** = 3.2mm
40 = 4.0mm **46** = 4.6mm
10 = 10mm **20** = 20mm

The four character suffix indicates *sorbent chemistry and particle size*.

Suffix Characters 1 to 3 (Phase)

XX-XXXX-■XX
C04 = Butyl or C4
C08 = Octyl or C8
C18 = ODS or C18
CNP = Cyano or Nitrile
M08 = HAISIL 100 C8
M18 = HAISIL 100 C18
NH2 = Amino
PHN = Phenyl
SIL = Silica Gel
W04 = 300Å C4
W08 = 300Å C8
W18 = 300Å C18

Suffix Character 4 (Particle Size)

XX-XXXX-XXX■
1 = 10µm
2 = 10 - 15µm
3 = 3 or 3.5µm
5 = 4.5 or 5µm
7 = 15 - 20µm

Custom HPLC Columns

Let us or The Nest Group, Inc. know if you have particular needs or are interested in formats or chemistries not listed in this catalog. Higgins Analytical is continuously developing new products and would be interested in discussing your individual requirements.

We are also able to pack your own sorbents into analytical or semiprep columns enabling you to conduct selectivity tests and separation optimization work before you commit your sample to very large scale columns packed with the same material.

Higgins is grateful to the following individuals for permission to share their data in this catalog:

Jane Cooper, Lilly Research, Erl Wood Manor, Windlesham, Surrey UK
In Vivo Microdialysis Samples from Rat Hypothalamus. Page 27

Larry David, Oregon Health Sciences University, School of Dentistry, Portland, OR
Human Ocular Lens Protein (Beta A1 Crystallin and Gamma S Crystallin) Analysis by LC/MS. Page 29

Chris Gong and Chulani Karunatilake, Genentech, Inc., South San Francisco, CA
Fast Peptide map of rhGH on a 5cm column. Page 17

Elizabeth Harris, Emisphere Technologies, Inc., Hawthorne, NY
Fast Analysis a Drug Delivery System. Page 17

David Hawke, Perseptive Biosystems, Western Technical Center, South San Francisco, CA
Fast Tryptic Map of Cytochrome-C. Page 17

Ted Holman, University of California, Santa Cruz, CA
Large Competitive Kinetic Isotope Effects in Human 15-Lipoxygenase Catalysis Measured by a Novel HPLC Method. Page 11

David Isom, Analytical Sales and Service, Pompton Plains, NJ
Fat-Soluble Vitamin Assay. Page 27
Antibacterials. Page 27
Antihypertensives. Page 29

Krishna Kalghatgi, NeoGenesis, Cambridge, MA
RPC of Basic Compounds in Combinatorial Mixtures. Page 23

Kamlesh Patel, University of North Carolina, Department of Chemistry, Charlottesville, VA
Analysis of Basic Peptides and Peptide Mapping without TFA. Page 27

Mark Ross, Argonex, Inc., Charlottesville, VA
Micropreparative Chromatography and Reanalysis of Peptides from Tumor Cells. Page 17

Steve Sharp, Roche Products, Welwyn Garden City, UK
LC/MS of Serum Samples. Page 23

Lorne Vandermark, Pharmco, Titusville, FL
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Expert and Responsive Technical Support

As a Higgins Analytical Customer seeking technical support or product information, you will eliminate long waits and expensive phone calls, and you will never be transferred from one person to another only to end up in someone's phone mail! By simply faxing (1-508-485-5736) or e-mailing (sales@nestgrp.com) your question to The Nest Group's **Technical Support**, you will receive a prompt written response. If we don't know the answer, they will tell you so – but, that doesn't happen very often. Additional up-to-date product and application information can be found by pointing your browser at <http://www.higanalyt.com> or <http://www.nestgrp.com>

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Our worldwide network of qualified distributors can provide expert support and prompt delivery from their local inventory. Our catalog-listed items are generally shipped from the factory within a day of receiving the order. In the event that we have not provided you with a near by distributor, we can ship an order to you directly from the factory by a variety of carriers.

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