



Higgins  
Analytical

TARGA C18-5µm  
250 x 0.075mm  
PIN: TC-2507-C185  
SN 166435



2022

Higgins Analytical is a quality oriented company, dedicated to providing high performance products, expert support, and rapid delivery to research and quality control laboratories worldwide.

Higgins Analytical on kromatografiakolonneja valmistava yritys, joka tarjoaa laadukkaita tuotteita, asiantuntevaa palvelua ja nopeat toimitukset tutkimus- ja laadunvalvontalaboratoriolle maailmanlaajuisesti.

हिगिन्स विश्लेषणशाळा एक गुणप्रधान कम्पनी हे जो समस्त विश्व की शोधन एवं गुण-निश्चय प्रयोगशाळाओं को क्रियात्मक उत्पादन, विशेषज्ञ-सहायता तथा द्रुत निगमन की विश्वस्त सेवाएँ प्रदान करती है,

היג'ינס אנליטיקל הינה חברה שדוגלת באיכות, מחויבת למוצרים בעלי ביצועים גבוהים, תמיכה מעולה ואספקה מהירה למעבדות מחקר ובקרת איכות, בעולם כולו.

La Higgins Analytical é una società orientata verso l'alta qualità, dedicata a fornire ai laboratori di ricerca e controllo qualità nel mondo prodotti ad alto livello, supporto di esperti e rapide consegne.

希度分析儀器公司是一個高品質走向的公司，致力於生產高效能產品、提供專業技術服務、並且交貨迅速、以供應全球的品管和研究機構。

Higgins Analytical est une société ayant pour objectif la qualité et de proposer des produits performants, un support expert, des livraisons rapides pour les laboratoires de recherches et de contrôle qualité à travers le monde.

Higgins Analytical 은 세계각국의 품질관리 연구소에 고품질 제품의 제공과 전문가 지원 그리고 빠른 전송에 공헌해온 품질지향적 회사입니다.

I Higgins Analytical iyinkampani engusaziwayo kwezobuchwepheshe. Izinikele ekuthini ikhiqize umkhiqizo oseqophelweni eliphezulu. Izebenzisa uxhaso oluphambili ukukhipha imiphumela ecutshungwe kahle nangokushesha kanye nezindawo zokucubungula eziseqophelweni eliphezulu emhlabeni jikelele.

Higgins Analytical es una compañía dedicada a proveer productos de óptima calidad, excelente rendimiento, experto soporte técnico y entrega inmediata a los laboratorios de investigación y de control de calidad del mundo entero.

هيجيزاناليتيكال بشركة تعنيها الجودة في المقام الأول و هدفها تقديم منتجات التحليل الكروماتوجرافي عالي الأداء وضمان توفير الدعم الفني و سرعة تقديم الخدمة الى معامل الأبحاث و رقابة الجودة في أنحاء العالم.

Higgins Analytical ist eine Qualitäts orientierte Firma, welche sich der Lieferung von leistungsfähigen Produkten widmet, Kundenunterstützung durch Experten, sowie rasche Lieferung an Forschungs und Qualitätskontrollenrichtungen ist weltweit unser Ziel.

Higgins Analytical er fyrirtæki sem leggur áherslu á gæði, býður hágæða vöru og sérfræðipjónustu með stuttum afgreiðslufresti, fyrir fyrirtæki á sviði rannsóknar og matvælaeftirlits.

Higgins Analytical ایک معیاری کمپنی ہے جو کہ اعلیٰ مصنوعات، ماہرانہ صلاحیت اور تیز ڈیلیوری بین الاقوامی کوالٹی کنٹرول اور تحقیق لیباریٹری کو فراہم کرتی ہے۔

Higgins Analytical は質の高い仕事をめざす会社です。

お客様の満足を求めて、高品質製品の提供、専門家によるサポート、また各国の研究室や品質管理ラボへの迅速なデリバリーに専心しています。













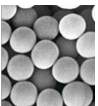





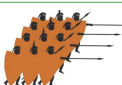


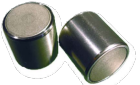





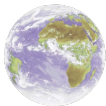
Higgins Analytical, hedefi yüksek performanslı ürünler sağlamak olan, dünya genelinde araştırma ve kalite kontrol laboratuvarlarına expert destek veren ve hızlı dağıtım yapan kalite odaklı bir şirkettir.

Higgins Analities is 'n kwaliteits-georiënteerde maatskappy wat toegewyd is om produkte van hoogstaande gehalte, kundige ondersteuning en snelle lewering van produkte vir navorsings-en gehalte-beheer laboratoria wereldwyd te voorsien.

Представленная во всем мире компания Джереми Хиггинса, посвящает свою работу представлению высококачественной продукции, консультацию и поддержку опытными специалистами, и быстрой доставке всех требуемых материалов для исследовательских лабораторий и лабораторий занимающихся вопросами качественного контроля.

Công ty Higgins Analytical chú trọng đến chất lượng, chuyên cung ứng các sản phẩm đem lại hiệu quả cao. Là chuyên gia trong ngành hóa phân tích, công ty luôn bảo đảm việc cố vấn, bảo hành sản phẩm chu đáo và giao hàng nhanh chóng đến các phòng thí nghiệm kiểm định chất lượng cùng các phòng thí nghiệm nghiên cứu ở mọi nơi trên toàn thế giới.

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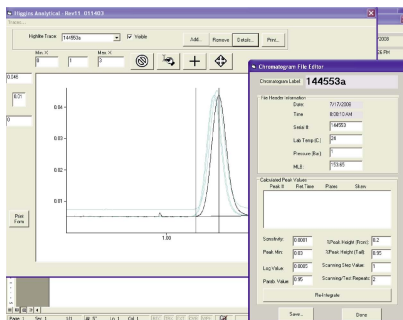
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**Experience, Expertise, Continuity**

Higgins Analytical was founded in early 1994, but that is less than half of the story. The two founders had already been packing commercial HPLC columns for more than fifteen years before that. Besides a lot of expertise, our experience brings an unrivaled continuity to the field.

**Total Quality Approach to all Aspects of Design, Manufacturing and Testing**

Each HPLC column and analytical cartridge from Higgins Analytical is evaluated by a computerized performance test prior to receiving a quality



control approval. This testing protocol involves a highly accurate statistical moments determination of the column's performance characteristics. These sensitive peak shape and column efficiency measurements can only be made by computerized data logging methods. The raw digital chromatogram for every column we have manufactured since March 1994 is retrievable from our archives.

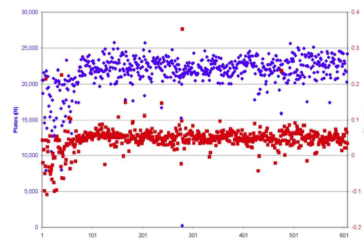
**Product Traceability**

The test data for these serialized columns include sorbent properties and lot number as well as complete description of the test conditions. We are able to trace the serial number of every

column to the customer that originally purchased the column.

**Comprehensive Record Keeping and Statistical Quality Control**

Raw digital test data is automatically archived for every column and analytical cartridge we manufacture. As a result, it is a simple matter for us to retrieve comprehensive quality control information and routinely apply it to our statistical process control activities. This



commitment to quality manufacturing and comprehensive record keeping permits us to produce replacement Certificates of Analysis when requested by laboratories complying with their internal GLP needs. And, most

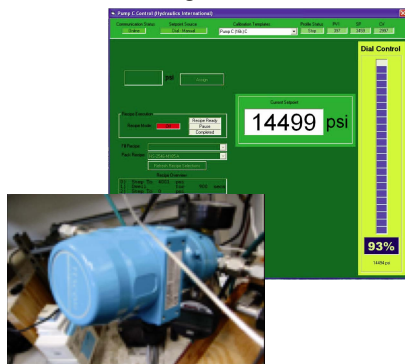
importantly, we are able to assist customers during the lengthy process beginning with method development and optimization with validation and NDA filing by providing comprehensive serial number, manufacturing date, sorbent lot, and performance data for every column they ever purchased.

**Expert Manufacturing and State-of-the-Art Equipment**

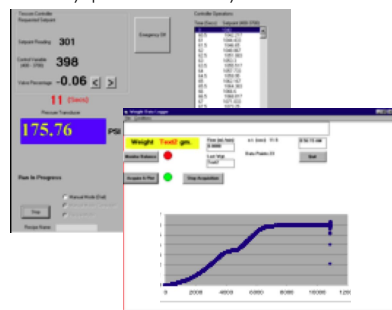
Two of Higgins Analytical's staff have been involved with the chemical separations business for over 30 years, others for only 10 or 15. By focusing this expertise exclusively on the separations consumables business, high quality products as well as high quality processes are assured. A key element of this expertise is the electronic manufacturing

lab book that we have developed. All of our column packing equipment is controlled by this electronic book, and all methods are electronically stored. It is impossible to pack a column without the electronic lab book being completely documented. Processes cannot be

changed without an expert supervisor's intervention. When new processes for new products are developed or optimization is required for an existing method, a complete audit trail is created for every condition change that is made. The packing pumps operate with PID (proportional integral/derivative) controllers allowing for control flow rate,



rather than pressure, throughout the packing process. This is a very important point. Common folklore is that it takes high pressure to pack an HPLC column. Actually, pressure is only the result of a



complex two phase (liquid/solid) flow. This flow, not pressure, is what produces a packed bed. The "pressures" used by many column manufacturers are the result of flow rates that approach the velocities that will produce a "fluidized bed" during certain phases of the packing process, not exactly a condition that will produce a stable, optimally packed column. In addition to being able to control our equipment digitally, we are able to data log the actual conditions as well.

Our unique and highly automated column packing process is based on a closed, continuous flow system employing recoverable, unreactive, and safe fluids. And the best part about it is that it enables Higgins Analytical to manufacture a wide variety of HPLC columns with unrivaled efficiency.

### Quality and Environmental Aspects of Process Solvents

Proper composition of slurry and packing solvents is vital to the whole process. Our solvent purification equipment and procedures allow us to address all of the solvent requirements for production and quality control. Not only does this investment permit us to use the highest purity solvents available, it also eliminates much of the expensive and environment-polluting solvent disposal practice characteristically found in today's chemical industry.

### Unique Bonded Phase Synthesis

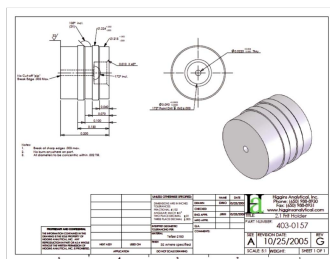
Chemists at Higgins Analytical have been producing bonded phases since 1979. During this long experience, we have pioneered many technologies long before they were "discovered" by others with a bigger marketing clout. Higgins Analytical's introduction of a "No



Requirement for TFA" HPLC column in early 1997 is just one example of our vanguard approach to this field.

### Computer Aided Drawings and Numerical Control Machinery

Key to reinforcing our ability to provide the highest performance-to-price ratio products available in the separations consumables industry has been our investment in computer aided design (CAD) technology and computer numerically controlled (CNC) machinery. SolidWorks™ software is used by our engineers which permits us to design HPLC hardware and see it in its



assembled 3D form before we manufacture it. Dedicated tooling and secure backups of machine code assure fast setups and consistent high quality production of all the stainless steel and plastic components in each product line.

Our product development, manufacturing, and testing processes strictly follow a systematic and well documented cycle.

*A Certificate of Analysis, like the one below for a 3cm x 10mm cartridge, accompanies each HPLC Column and Cartridge we manufacture*

*Note: This high performance cartridge is typically used as a guard column.*

**la Higgins Analytical, Inc.**  
 Expert Manufacturer of HPLC Consumables  
 1235 Pear Ave. Ste 105, Menlo View, CA 94043  
 Ph: 650-988-8930 • www.higginsanalytical.com

Serial No. TF-0310-C185

Catalog No. TF-0310-C185  
 Description: TARGA C18 5µm  
 Dimensions: 30 x 10mm  
 Sorbent Lot#: T281180  
 Particle Size: 5 µm  
 Pore Size: 120 Å  
 Mobile Phase: 70% Acetonitrile in Water  
 Flow Rate: 4.75 mL/min  
 Pressure: 5 bar  
 Temp: 28 °C

Peak (R/min)	Plates(N)	Skewness
# 1 0.52 Dimethyl Phthalate	1,917	0.134
# 2 0.92 Diphenylamine	2,009	0.055
# 3 1.42 Fluorene	2,697	0.036

File: 153.71



**CLIQUEUS** A “Small Shield” for a Big Job

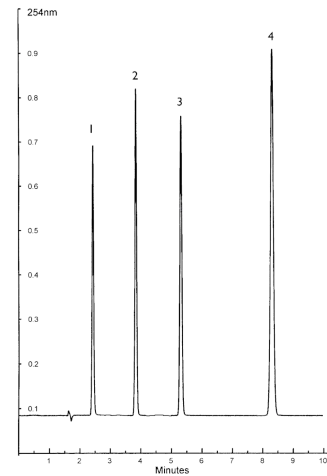
Phases	Silica, C8, C18, Cyano, Phenyl
Particle Sizes	4.5 and 10µm
Pore Size	120Å
Pore Volume	0.8mL/gm
Surface Area	330m <sup>2</sup> /gm
Carbon%(w/w)	C18 = 18%
Phase type	Extremely well end-capped monofunctional phases
Silica Class	Type B
USP Class	L3 (CLIQUEUS Silica) L7 (CLIQUEUS C8) L1 (CLIQUEUS C18) L10 (CLIQUEUS Cyano) L11 (CLIQUEUS Phenyl)

**Applications**

The high purity base silica and thoroughly end capped bonded phases insure that CLIQUEUS columns and cartridges will perform well in demanding situations where many other column brands fail. Even polar compounds elute as sharp and symmetrical peaks permitting surprisingly short columns to be used for high speed analysis. In addition to Silica, C8 and C18 phases, CLIQUEUS columns are available with phenyl or cyano functionality.

**Guide to CLIQUEUS Part Numbers**

- Cx-xxxx-SIL5 CLIQUEUS Silica 5µm
  - Cx-xxxx-C085 CLIQUEUS C8 5µm
  - Cx-xxxx-C185 CLIQUEUS C18 5µm
  - Cx-xxxx-CNP5 CLIQUEUS Cyano 5µm
  - Cx-xxxx-PHN5 CLIQUEUS Phenyl 5µm
- See Page 23 for complete Part Number information

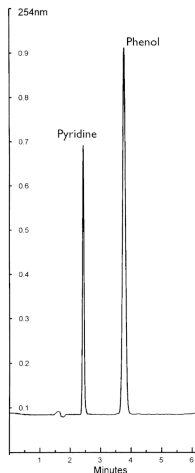


Methylxanthines

CLIQUEUS C18 150x4.6mm  
P/N CS-1546-C185  
25% MeOH/water (unbuffered)  
1mL/min, 30°C, 254nm

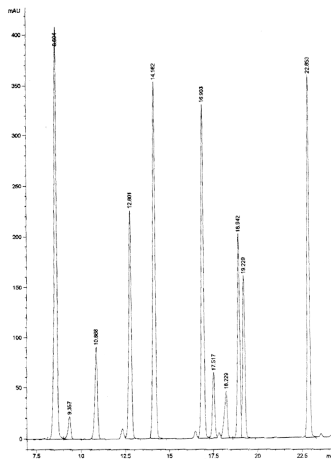
- 1. Theobromine
- 2. Theophylline
- 3. Caffeine
- 4. Phenol

This unbuffered Pyridine and Phenol chromatogram illustrates the absence of any undesirable solute/silanol interaction on a CLIQUEUS C18 HPLC Column.



CLIQUEUS C18 5µm 150x4.6mm

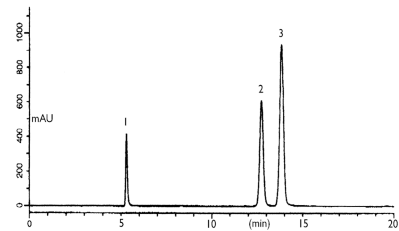
40% MeOH/water (unbuffered)  
1mL/min, 25°C, 254nm  
P/N CS-1546-C185



Carbamates and Urea Pesticides  
EPA 632A

Industrial and Municipal Waste Water  
Column P/N CS-2546-C185

- 1. Monuron
- 2. Propoxur
- 3. Carbaryl
- 4. Propham
- 5. Diuron
- 6. Linuron
- 7. Methiocarb
- 8. Mexacarbate
- 9. Chlorpropham
- 10. Barban
- 11. Neburon



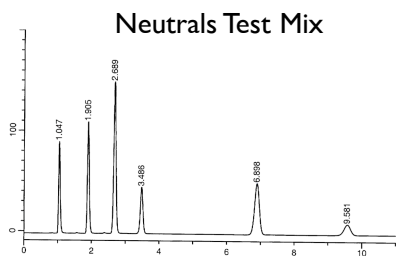
Sunscreen Formulation

CLIQUEUS C18 250x4.6mm  
P/N CS-2546-C185  
87.5% MeOH/ 12.5% water (unbuffered)  
1mL/min, 30°C, 285nm

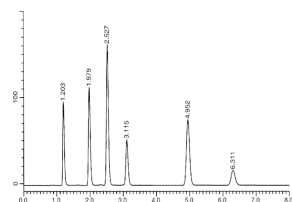
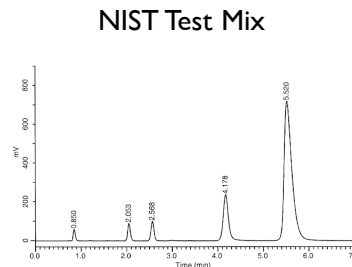
- 1. Oxybenzone
- 2. Padimate O
- 3. Octyl Methoxycinnamate



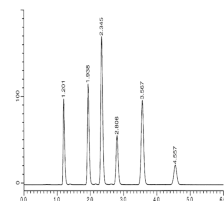
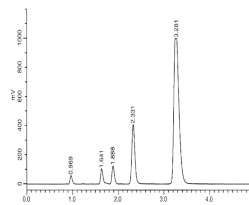
Comparative Selectivity of CLIFEUS HPLC Columns



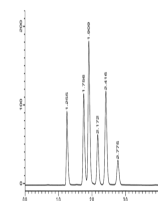
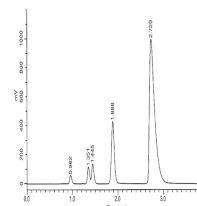
CLIFEUS C18 150x4.6mm P/N CS-1546-C185



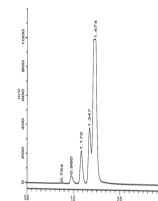
CLIFEUS C8 150x4.6mm P/N CS-1546-C085



CLIFEUS Phenyl 150x4.6mm P/N CS-1546-PHN5



CLIFEUS Cyano 150x4.6mm P/N CS-1546-CNP5



50% MeCN/water, 1.5mL/min, 205nm

1. Thiourea
2. Phenol
3. Acetophenone
4. Nitrobenzene
5. Toluene
6. Napthalene

80% MeOH/Buffer, 1.5mL/min, 254nm  
Buffer: 20mM potassium phosphate

1. Uracil
2. Toluene
3. Ethylbenzene
4. Quinizarin
5. Amitriptyline





## HAISIL 100 The Workhorse

Phases	Silica, C8, and C18
Particle Sizes	3 $\mu$ m and 5 $\mu$ m
Pore Size	100Å
Pore Volume	0.5mL/gm
Surface Area	190m <sup>2</sup> /gm
Carbon%(w/w)	C8 = 7%(w/w), C18 = 12%(w/w)
Phase type	Monofunctional & fully endcapped
Silica Class	Type A
USP Class	L3 (HAISIL Silica)
	L7 (HAISIL 100 C8)
	L1 (HAISIL 100 C18)

### Guide to HAISIL 100 Part Numbers

Hx-xxxx-SIL3 HAISIL 100 Silica 3 $\mu$ m

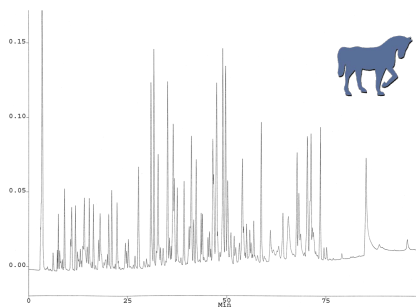
Hx-xxxx-M183 HAISIL 100 C18 3 $\mu$ m

Hx-xxxx-SIL5 HAISIL 100 Silica 5 $\mu$ m

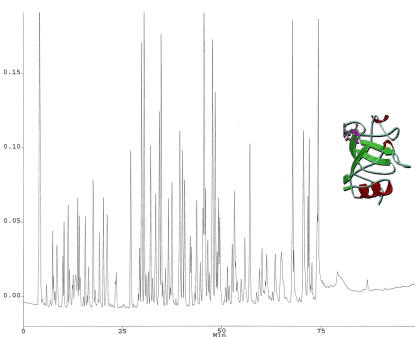
Hx-xxxx-M085 HAISIL 100 C8 5 $\mu$ m

Hx-xxxx-M185 HAISIL 100 C18 5 $\mu$ m

See Page 23 for complete Part Number information



Tryptic Map of Transferrin on HAISIL 100  
250x4.6mm P/N HS-2546-M185



Tryptic Map of Transferrin on HAISIL 300  
250x2.1mm P/N HS-2521-W185

### Applications

HAISIL 100 columns and cartridges are very good general purpose columns that are particularly well suited for small molecules and peptide applications. The HAISIL 100 column and cartridge efficiencies are unrivaled yet they represent one of the most economical product lines in the market today. In formats ranging from 0.075 to 20mm ID and from 10 to 250mm in length,

### 100Å vs. 300Å Columns for Peptide Mapping

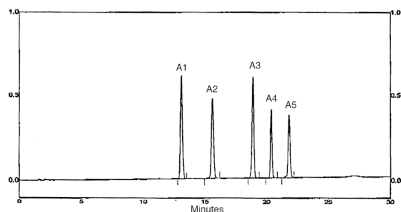
The question of whether to use a 100Å or 300Å column for mapping usually divides peptide chromatographers into two groups. Rather than take sides, we have chosen to offer very efficient columns with both pore diameters to suit both camps' preferences. HAISIL 100 and HAISIL 300 columns are available in 10 to 250mm lengths and 0.075mm to 20mm internal diameters.





### Hormone Analogs

LH-RH (Luteinizing Hormone - Releasing Hormone) Analogs are used for the inhibition of gonadal steroid production. An important application area is in the treatment of prostate cancer.



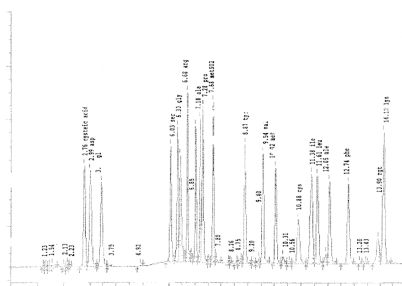
#### Conditions

HAISIL 100 C18 5µm 150x4.6mm  
Solvent A: Phosphoric acid, ammonium sulfate aqueous buffer

Solvent B: Acetonitrile.  
Linear gradient at 1mL/min  
254nm detection

#### Analogs:

- A1: pGlu-His-Trp-Ser-Tyr-(d-Ser(but))-Leu-Arg-Pro-NH<sub>2</sub>
- A2: pGlu-His-Trp-Ser-Tyr-d-Ala-Leu-Arg-Pro-NH<sub>2</sub>
- A3: pGlu-His-Trp-Ser-Tyr-d-Leu-Leu-Arg-Pro-NH<sub>2</sub>
- A4: pGlu-His-Trp-Ser-Tyr-d-Ala-Trp-Leu-Pro-NH<sub>2</sub>
- A5: pGlu-His-Trp-Ser-Tyr-d-Trp-Leu-Arg-Pro-NH<sub>2</sub>

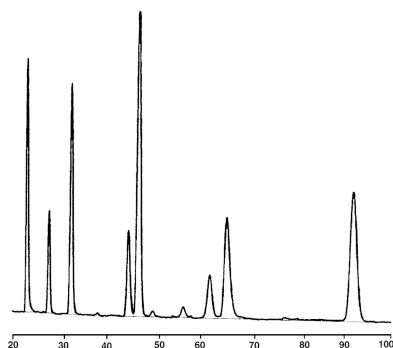


Economical Alternative for PICOTAG Analysis

Our HAISIL 100 C18 columns have demonstrated superior resolution and life time for PICOTAG™ amino acid analysis when compared to considerably more expensive columns from other manufacturers. Besides good linearity and column lifetime, the 150x4.6mm column yields very efficient amino acid analysis as shown in the chromatogram above (P/N HS-1546-M185).

### Alkaloids

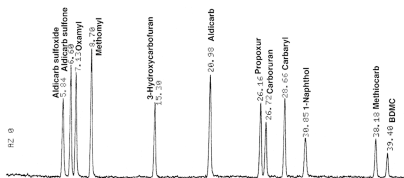
A Peruvian vine named "Una de Gato" (Uncaria tomentosa) and commonly referred to as Cat's Claw, has become a popular natural product source for herbal remedies. Enthusiasts claim the oxindole alkaloid extracts to be effective in the treatment of a wide range of digestive and circulatory diseases as well as other afflictions ranging from cancer to arthritis. Reputable providers of such phytochemical containing formulations carefully assay the alkaloid content of the extracts and formulations. The chromatogram above illustrates baseline resolution of Cat's Claw bark extracts containing isopteropodine, pteropodine, mitraphylline, isomitraphylline, ryncophylline and isoryncophylline.



Alkaloids from Cat's Claw  
analyzed on a HAISIL 100 C18 column  
P/N HS-2546-M185

### HAISIL 100 - the Separations Work Horse

The 100Å pore size, monomeric bonded phase, and very high performance make HAISIL 100 an ideal choice for separations ranging from small molecules such as carbamate pesticides and pharmaceu-



Carbamate Pesticide Analysis  
250 x 4.6mm HAISIL 100 C18

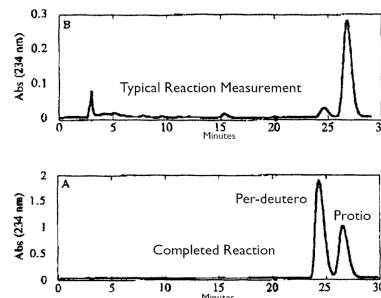
tical drugs to synthetic oligonucleotides and small peptides. High efficiency, symmetrical peaks, and long column life is characteristic not only of the C8 and C18 reverse phase columns, but the normal phase silica columns as well.

### Kinetic Measurements in Disease Research

Researchers at the University of California, Santa Cruz have recently published a novel HPLC method that yields baseline separation of per-deuterated and protonated lipoxigenases.

The striking ability of a 250x4.6mm HAISIL 100 C18 column to resolve these two very similar compounds is enabling researchers to study large competitive kinetic isotope effects in Human 15-lipoxygenase catalysis. Protio/per-deutero ratio data obtained by this HPLC method agreed within experimental error of data obtained by ES-MS.

The elucidation of these mechanisms is noteworthy because of the increasing role human lipoxigenases are playing in inflammatory diseases and cancer growth regulation.



Enzymatic Reaction Mixtures of Human 15-lipoxygenase

HAISIL 100 C18 250x4.6mm  
74.9% MeOH, 25% water, 0.1%HOAc  
1mL/min, 234nm  
P/N HS-2546-M185



**HAISIL 300 For Biomolecules**

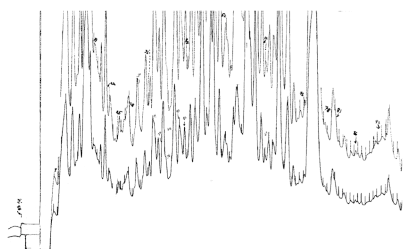
Phases	C18
Particle Sizes	5 and 10 $\mu\text{m}^*$
Pore Size	300Å
Pore Volume	0.7mL/gm
Surface Area	80m <sup>2</sup> /gm
%Carbon (w/w)	C18 = 6%
Phase type	Monofunctional and fully endcapped
Silica Class	Type A
USP Class	L1

**Guide to HAISIL 300 Part Numbers**

Hx-xxxx-W185 HAISIL 300 C18 5 $\mu\text{m}$

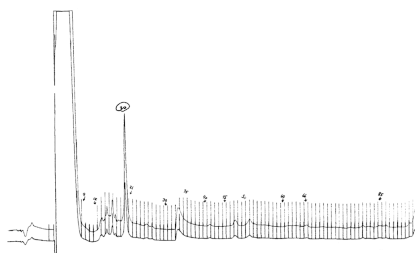
See Page 23 for complete Part Number information

\* 10 $\mu\text{m}$  is offered in HAI Speed 20 Guard Cartridges only. See pages 68-69.



*Fractionation of a Purified Tumor Cell Extract*

Peptides ranging from 100 fmol to 1 pmol are collected in 40sec intervals during a 70min gradient from 0 - 60% MeCN with HFBA modifier. A 40x2.1mm HAISIL 300 C18 5 $\mu\text{m}$  cartridge column (HK-0421-W185) is used.



*Reanalysis of a Fraction  
from the Chromatogram above*

The same 40x2.1mm HAISIL 300 cartridge is used for a 70min gradient from 0-60% MeCN with TFA modifier. Tic marks indicate 40sec fraction collections.

**Applications**

HAISIL 300 columns and cartridges are ideal for biomolecule separations such as peptides and small proteins. Optimized phase bonding and column packing techniques assure unsurpassed performance and column-to-column reproducibility. Short cartridge columns are economical and are ideally suited for LC/MS applications. The column and cartridge offering ranges from 150 $\mu\text{m}$  to 20mm I.D. which means that bioseparations can be optimized by selecting a format that best fits your analytical requirements.

**Micro-Preparative HPLC**

Higgins Analytical Cartridge Columns are helping researchers understand the immune response of living cells. An investigation to understand the genetic control of the immune response systems in organisms involves the extraction, isolation, and identification of more than 10,000 peptides. These distinct peptides are bound to a major histocompatibility complex (MHC) molecule on tumor cells.

Extraction of approximately  $5 \times 10^{10}$  cells yield several nanomoles of a very complex peptide mixture. Several rounds of RP-HPLC with different organic modifiers on a 40x2.1mm PEEK cartridge column (HAISIL 300 C18 5 $\mu\text{m}$ , P/N: HK-0421-W185) are performed to fractionate the mixture into individual components.

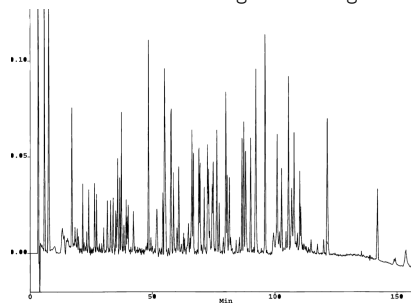
The chromatograms on the left illustrate how this technique is being used to narrow the search for the one peptide that marks a particular tumor cell as being diseased enabling it to be recognized by the immune cells.



Peek and Titanium cartridge columns used in the application described above.  
P/N: HK-0421-W185

### Very High Peak Capacity

Depending upon the type of information a protein chemist is seeking, the HPLC analysis of a complex digest can take 1 to 2 hours. The following chromatogram

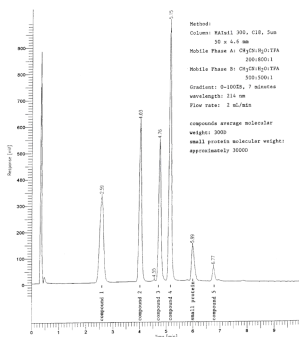


Tryptic Map of BSA  
on HAISIL 300 C18 5µm 250x4.6mm  
P/N HS-2546-W185

illustrates a high resolution tryptic digest map of BSA on a 250x2.1mm HAISIL 300 C18 5µm column indicates peak capacities in excess of 100. Small proteins, on the other hand can yield fewer fragments, and if only a "fingerprint" of a digest is required, high peak capacity columns can be a waste of time.

### Fast Analysis of a Complex Drug Delivery System

Most pharmaceutical QC laboratories are faced with rapidly increasing demands for high throughput capability. A good example of one laboratory's





## HAISIL HL High Load

Phases	C18
Particle Sizes	5µm
Pore Size	100Å
Pore Volume	0.8mL/gm
Surface Area	300m <sup>2</sup> /gm
%Carbon (w/w)	C18 = 18%
Phase type	Monofunctional & fully endcapped
Silica Class	Type B
USP Class	L1

### Guide to HAISIL HL Part Numbers

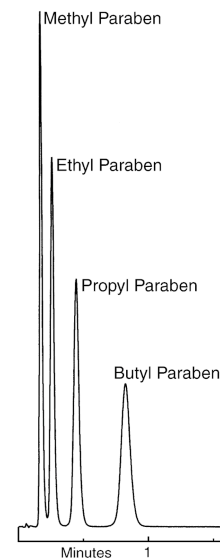
Lx-xxxx-C185 HAISIL HL C18 5µm  
See Page 23 for complete Part Number information

### Applications

HAISIL HL "high load" columns and cartridges are intended for applications requiring maximum loading and selectivity. The high surface area permits high bonded phase loading yet the monofunctional bonded phase and the absence of micro-pores eliminates the problems that plague many of the so-called "high capacity" columns currently on the market. The Type B silica backbone is pure, robust, and stable under harsh conditions. Users report satisfactory lifetime when used for prolonged periods at pH as high as 9.

### High Speed Analysis of Paraben Food Preservatives

Parabens represent another example of food additives that are routinely analyzed by HPLC. Often, the food matrix being assayed for preservative content requires exhaustive cleanup and pre-filtration in order to prevent clogging of columns with nonporous or 2µm sorbents recently suggested for this analysis. As in the previous diet cola example, the compounds of interest are baseline resolved under isocratic conditions. The inexpensive HAISIL HL 5µm 20x2.1mm cartridge column and the 50 second analysis time contribute significantly towards reducing operating costs.



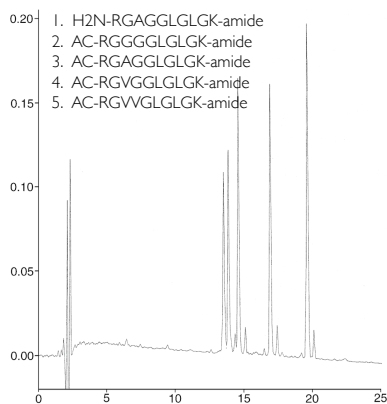
Fast Paraben Analysis

HAISIL HL C18 5µm  
20x2.1mm Cartridge  
LK-0221-C185  
700µL/min, 40% MeCN/water



### HPLC Peptide Standards for RP on the HAISIL HL C18 Column

The aromatic hydrocarbons that most HPLC column manufacturers use to quality control columns render little information about a column's selectivity

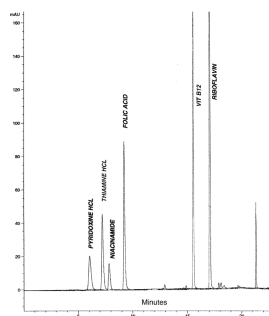


"Hodges Test Peptide Mix"  
(from Synthetic Peptides, Inc.)

HAISIL HL C18 5µm  
150x4.6mm P/N LS-1546-C185

and performance characteristics for peptides. The Canadian corporation, SPI, produces a well characterized yet challenging peptide mixture that is very useful for quantifying HPLC column performance for peptides. The difficult to separate first pair of peptides are resolved to near base line on HAISIL HL C18 columns. Many so-called peptide analysis columns are unable to separate this pair.

### Water Soluble Vitamin Analysis on HAISIL HL

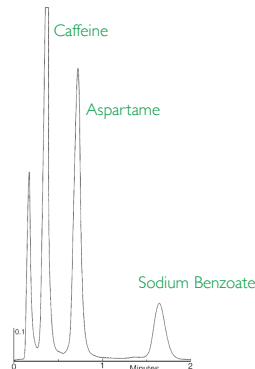


Water Soluble Vitamins

HAISIL HL C18 5µm 250x4.6mm  
A: 0.05mM KOAc, pH5; B: MeCN  
Gradient: 2.5% - 30%B in 25min

### Food Additives

Beverage additive analysis is not only an important industrial application, but it also serves as a practical and relatively simple procedure for introductory HPLC courses. Industry is increasingly driven by rapid analysis requirements and an HPLC column can represent an overwhelming expense in a teaching environment. The diet cola analysis in the chromatogram to the left illustrates an extremely fast analysis on an extremely inexpensive HPLC column. A package containing five



Fast Diet Cola Analysis

HAISIL HL C18 5µm  
2cm x 2.1mm Cartridge PN LK-0221-C185  
15% MeCN/Water 200µL/min

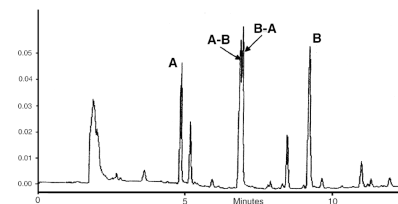
of the 20x2.1mm cartridge column used for this analysis costs about half as much as one moderately priced HPLC column. And, there's no need to pre-filter the cola sample through a 0.5µm filter as some column manufacturers recommend when using their expensive columns packed with 2µm particles for this analysis! The readily available and non-toxic nature of the sample and the low cost of Higgins Analytical cartridges has made the diet cola analysis an ideal choice for classroom purposes.

### Reverse Phase Chromatography of Basic Compounds in Combinatorial Mixtures

In the example at the top of the next column, A and B are single compounds containing two identical building blocks. A-B and B-A represent positional isomers, each containing two building blocks.

This analysis was conducted on the crude liquid-phase reaction mixture. Each component contains multiple secondary

and tertiary amine functionality yet the combinatorial products can be rapidly chromatographed and exhibit no tailing on a 150x4.6mm HAISIL HL C18 column using a simple linear 5% to 100% MeCN/water 0.1% TFA gradient.

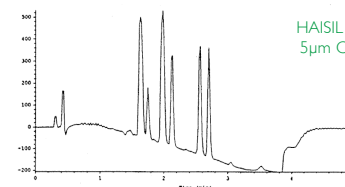


Basic Compounds in Combinatorial Mixtures

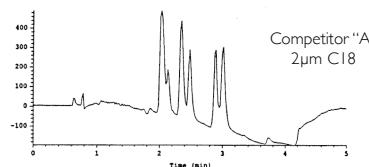
HAISIL HL C18  
P/N LS-1546-C185

### Speed and Selectivity for Ballistic Gradients on Complex Libraries

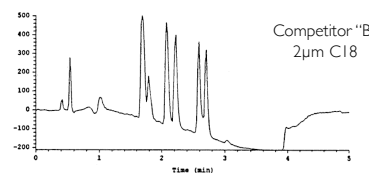
The relative importance of particle size and selectivity are graphically illustrated below by the high speed analysis of a six component combinatorial library on a HAISIL HL C18 5µm column and two competitor's C18 2µm columns. HAISIL HL with its high carbon loading and surface area often works much better than expensive small particle size columns that are prone to plugging up more quickly.



HAISIL HL  
5µm C18



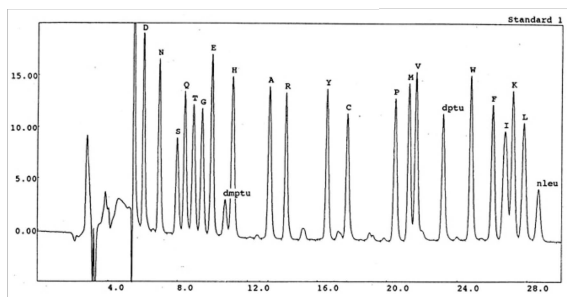
Competitor "A"  
2µm C18



Competitor "B"  
2µm C18



## HAISIL PTH Protein Sequencing Columns



PTH Standards on HAISIL PTH Column P/N: HS-2221-PTH5  
 Note: Chromatogram Courtesy of Al Smith, Stanford PAN Facility, (1996)

### Application

In 1985, protein sequencing by Edman degradation was revolutionized by Applied Biosystems when it introduced the Model 470 Protein Sequencer. This powerful, highly automated instrument evolved over the following 20 years into its most recent version - the PROCISE® Protein Sequencing System.

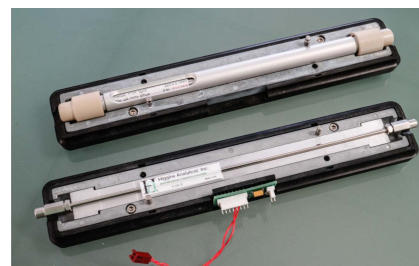
Today, over 30 years later, this unique platform continues to be a workhorse for many protein chemists worldwide.

Higgins Analytical offers a broad range of high quality, reasonably priced PTH Columns, Cartridges, and related consumables, for both HT and cLC sequencing on these classical instruments.

### Guide to HAISIL PTH Column and Cartridge Part Numbers

Part Number	Description
HS-2221-PTH5	<b>HAISIL PTH Column 220 x 2.1mm</b> This is the same conventional format, heater block compatible, HPLC column that Higgins Analytical has been manufacturing since 1996
HF-2221-PTH5	<b>HAISIL PTH Cartridge Column 220 x 2.1mm</b> This high efficiency cartridge requires two HAIPEEK Cartridge Holder End Caps, and is compatible with the Procise® Cartridge Heater Block
HF-0203-PTH5	<b>HAISIL PTH Cartridge Column 220 x 2.1mm</b> Compatible with the original ABI Cartridge Holder
HS-25M8-PTH5	<b>HAISIL PTH Column 250 x 0.8mm</b> Compatible with the Standard Procise® Cartridge Heater Block
HF-0232-PTH5	<b>HAISIL PTH GUARD 20 x 3.2mm (Pkg of 5)</b> These Cartridges are for the Static Mixer on the Pump
PEEK-CAPS	<b>HAIPEEK Cartridge Holder End Caps (Pkg of 2)</b> Convert Standard Cartridge Holder for HF-2221-PTH5 This modification of the Holder makes it compatible with both HF-2221-PTH5 and HF-0203-PTH5 cartridges

### Price



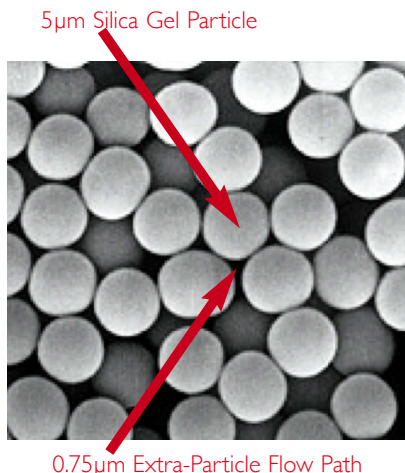
### Some of the Custom Columns We Manufacture for Special Applications

Part Number	Description	Price
HS-2521-PTH5	<b>HAISIL PTH Column 250 x 2.1mm</b> A longer 250 x 2.1mm column that still fits in heater	
HC-25MI-PTH5	<b>HAISIL PTH Column 250 x 0.1mm</b> Capillary Column for LC-MS Detection	



### Why do HPLC columns plug up?

A large percentage of HPLC columns die because the back pressure builds up to



levels that exceed the instrument's practical limits. Most chromatographers (and many column manufacturers) believe this is because the inlet frit plugs up with particles. Actually, it is usually the packed-bed that becomes plugged by smaller than 1µm particles that pass through in-line filters and the 2µm inlet frits. The SEM above illustrates the relative sizes of particles and pores. Higgins Analytical offers a wide variety of guard cartridges that address this problem.

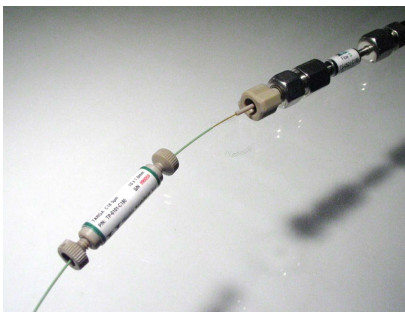
### SPRITE is Designed to Operate in Either Flow Direction

A SPRITE is made of PEEK and titanium and can be connected directly to a sample injection valve or directly to a mass spectrometer's source inlet.

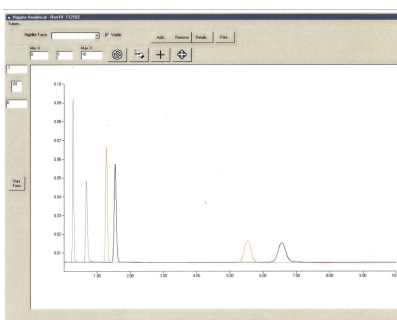


### Using a PICCOLO as a Microbore Guard Column

PICCOLO columns are normally used as trap columns but since they are manufactured with the same techniques



we use to pack microbore HPLC columns, they are very efficient. Their performance makes them ideal for use as short microbore HPLC column or as a guard for placed in front of another analytical microbore column. The chromatograms in the figure below illustrate typical performance when used in these unconventional modes.



Piccolo Column performance as an Analytical Column and as a Guard Column

Blue Trace:  
10x1mm Targa C18 5µm Piccolo Guard Column alone (P/N TP-0101-C185)

Red Trace:  
50x1mm TARGA C18 5µm Analytical Column (P/N TS-0501-C185)

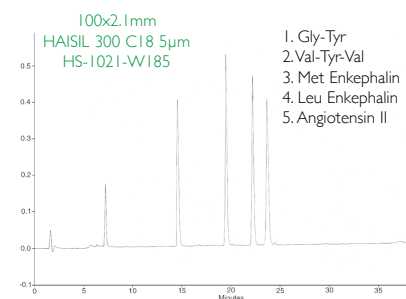
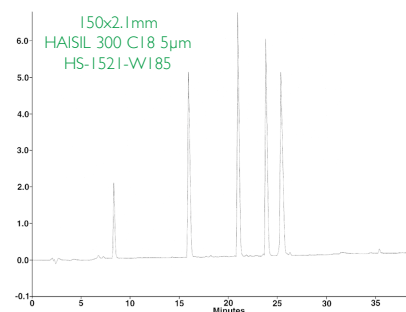
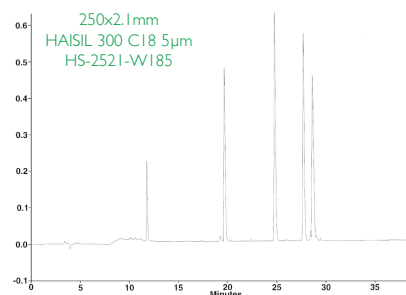
Black Trace:  
10x1mm Guard coupled to 50x1mm Analytical Column

Peak #1: Dimethyl Phthalate Peak #2: Fluorene  
60% MeCN/water, 50µL/min  
System Variance ~6µL<sup>2</sup> at 50µL/min

### The Role of Column Length in Gradient Separations

Changes in column length have a direct and linear effect on theoretical plates and analysis time in isocratic separations. Column length plays a less important role, however, in gradient techniques. The three chromatograms below illustrate how well packed short HPLC columns yield very similar peptide separations under identical gradient conditions.

For this study, the 2.1mm I.D. HAISIL 300 C18 5µm columns ranged from 250 to 100mm in length. While solvent and analysis time savings may be minimal, column cost savings can be significant when using as short a column as possible. Short columns also exhibit lower pressure at high flow rates.



**PROTO™ 200 More Selectivity and Resolution for Peptides**

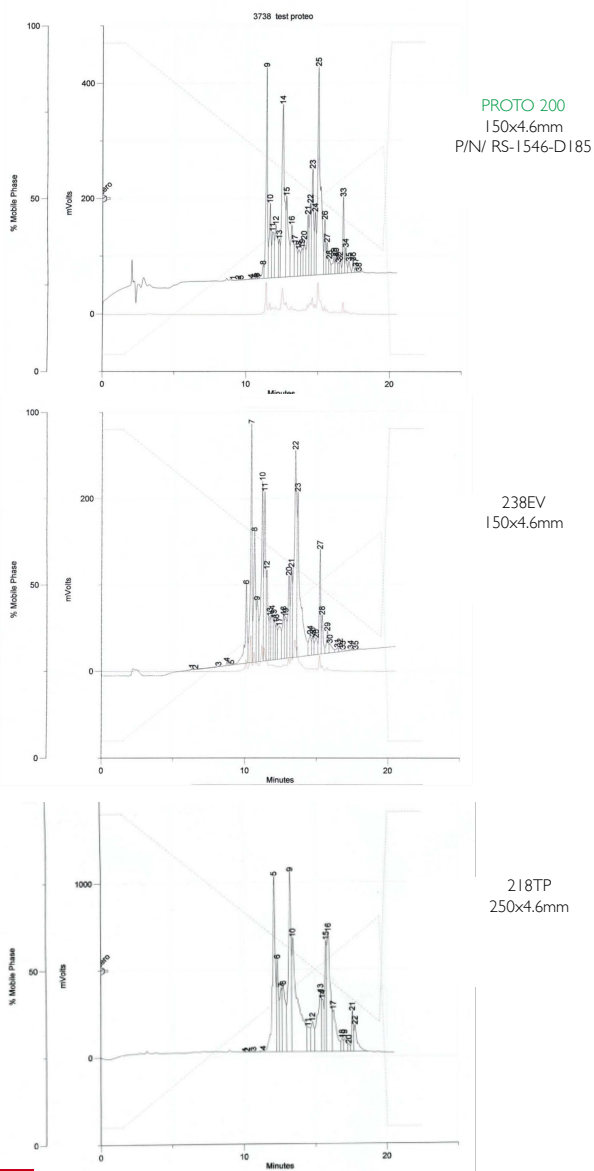
200

Phases	C4 and C18
Particle Sizes	4.5 and 10µm
Pore Size	200Å
Pore Volume	1.1mL/gm
Surface Area	200m <sup>2</sup> /gm
%Carbon (w/w)	C4. = 4.5%, C18= 14%
Phase type	Monofunctional & fully endcapped
Silica Class	Type B
USP Class	L26 PROTO 200 C4 LI PROTO 200 C18

**Applications**

300Å wide pore HPLC columns are traditionally used for biomolecule analysis since the molecular radii of large peptides and proteins are better matched than with smaller pore size columns (80 - 120Å) typically used for small molecule analysis. 300Å sorbents, however, have reduced surface area, thus less capacity and selectivity than would be had with smaller pore size materials. Higgins Analytical's new PROTO™ 200 presents a powerful alternative for the analysis of peptides of ~19kD and less.

**Comparison of Phosphopeptide Purity Analysis**



**Guide to PROTO 200 Part Numbers**

Rx-xxxx-D045 PROTO 200 C4 5µm  
 Rx-xxxx-D185 PROTO 200 C18 5µm  
 See Page 23 for complete Part Number information

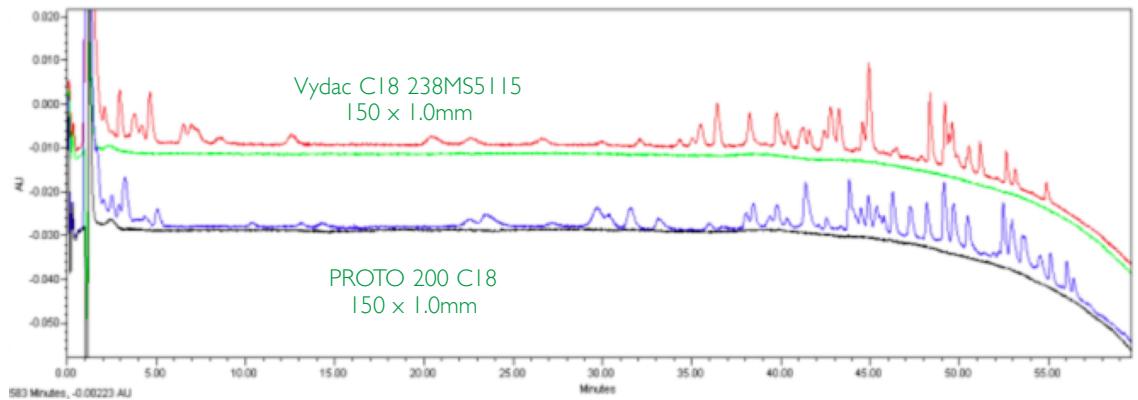
**Phosphopeptide Purity Analysis**

Peptide HPLC column performance, using the same gradient conditions, was evaluated on the PROTO™ 200 C18, a new peptide analysis column obtained from The Nest Group, Inc.. Against the industry standard, Grace/Vydac® 218TP C18, and their newer peptide chemistry, Everest® C18, the data show that the PROTO™ 200 C18 column has superior resolution to the 218TP chemistry and better resolution, especially for the more hydrophobic peptides, than the Everest® C18. In addition, the PROTO 200 columns can be run without TFA, which allows better detection when utilizing LC-MS.

Previously, the Everest chemistry had been shown by Grace/Vydac to be superior to all other wide pore columns, especially for the more hydrophobic peptides. However, the ready availability of the PROTO™ 200 peptide columns, in either C4 or C18 chemistries, and in capillary through preparative sizes, now allows researchers their first opportunity to save both time and money on a wider variety of applications, compared to the Grace/Vydac columns, and by extension to all other peptide columns.



Proto™ 200 C18 provides greater selectivity than the popular 300Å choice



Tryptic Digest of Carbamidomethylated BSA (16h, 20 pMols on column).

Column Size:  
150 x 1.0mm

Column Brand:  
Upper Chromatogram: Vydac 300Å 238MS C18 5µm P/N 238MS5115  
Lower Chromatogram: Higgins 200Å Proto 200 C18 5µm P/N RS-1501-D185

Conditions:  
A = 0.1% formic acid containing 0.01% TFA  
B = 0.085% formic acid in CH<sub>3</sub>CN containing 0.01% TFA  
Initial 5 min isocratic hold at 5% B, then 60 min hyperbolic gradient to 65%B  
Flow 0.15 ml/min, Green & Black curves: Blank gradient profile

Higgins Analytical thanks Amos Heckendorf of The Nest Group ([www.nestgrp.com](http://www.nestgrp.com)) for these Proto 200 data.

**PROTO™ 300 Robust Bioseparations**



Phases	C4 and C18
Particle Sizes	4.5 and 10µm
Pore Size	300Å
Pore Volume	0.9mL/gm
Surface Area	100m <sup>2</sup> /gm
%Carbon (w/w)	C4 = 3%, C18= 8%
Phase type	Monofunctional & fully endcapped
Silica Class	Type B
USP Class	L26 PROTO 300 C4 L1 PROTO 300 C18

**Applications**

Low pH operating conditions and high pH column washing steps are typical bioprocessing operating conditions that can severely limit the lifetime and performance of widepore columns typically used for protein and peptide analysis. Higgins Analytical's new PROTO300 has high capacity for enhanced resolution and is robust enough to withstand prolonged use at extreme pH (1.5 - 10).

**Guide to PROTO 300 Part Numbers**

Rx-xxxx-W045 PROTO 300 C4 5µm  
 Rx-xxxx-W185 PROTO 300 C18 5µm  
 See Page 23 for complete Part Number information

**Stability Study Under Extremely Alkaline Conditions**

**Experimental:**  
 150 x 4.6mm columns were studied. All experiments were conducted on duplicate columns. Solutes used for performance measurement were dimethylphthalate and fluorene.

**Step One:**

Column stability and measurement precision was established for each column with multiple injections over 18hrs under neutral conditions (70% MeCN/water, 1mL/min). All columns were very stable. The chromatograms of a column from each manufacturer at the end of the 18 hour period are shown on the left hand side.

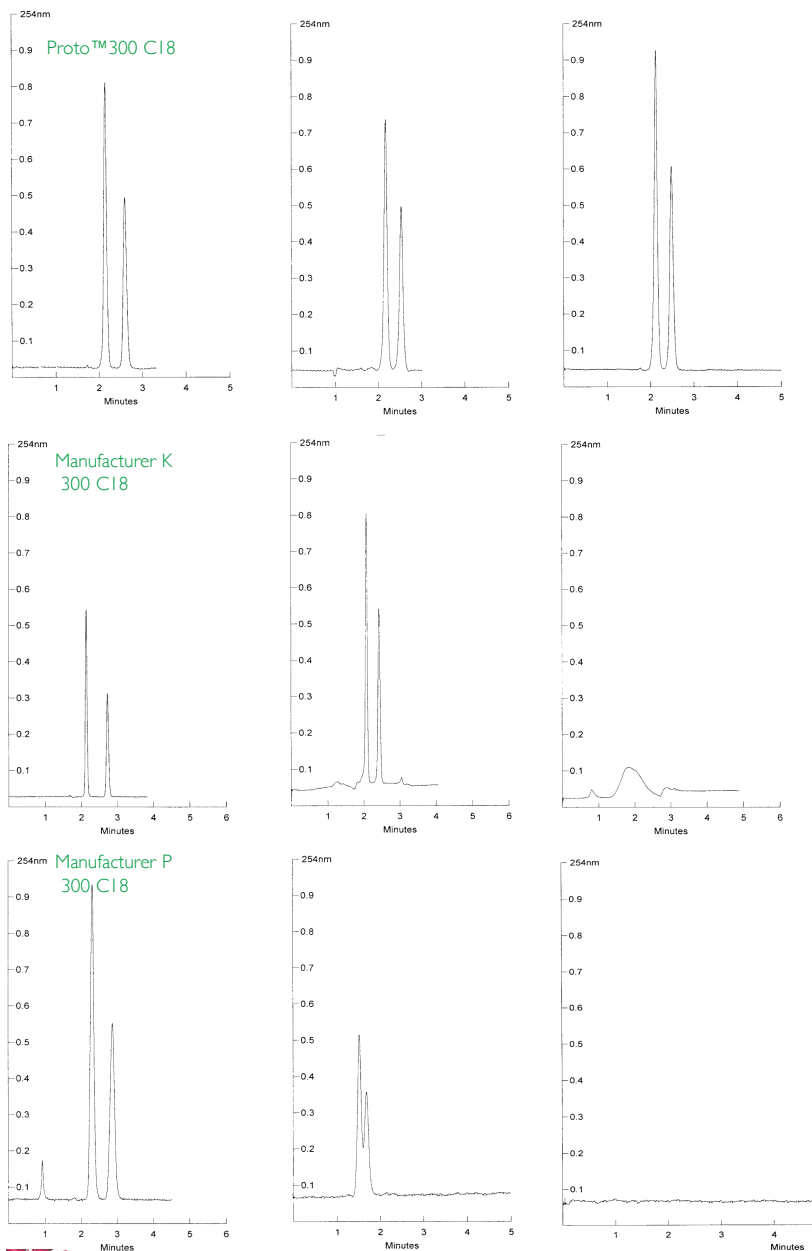
**Step Two:**

Each column was flushed with 70% MeCN/0.5N NaOH solution at 1mL/min for one hour (23°C). The columns were then purged and equilibrated under the standard neutral conditions then retested. The center chromatograms are the results of the first test after neutral equilibration

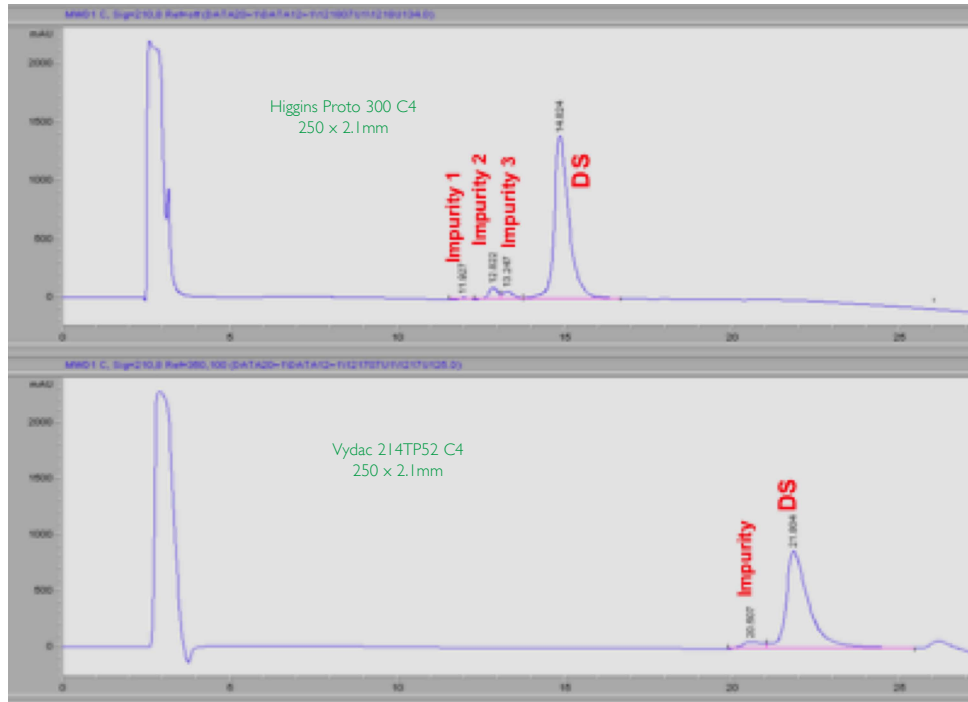
**Step Three:**

After the second step, the neutral test conditions were maintained for one hour and a repeat injection was made. The results are illustrated in the chromatograms on the right hand side of the figure.

While Higgins Analytical does not recommend flushing any silica-based HPLC column under such aggressive conditions, these data show the superior alkaline stability of Proto™ 300 C18.

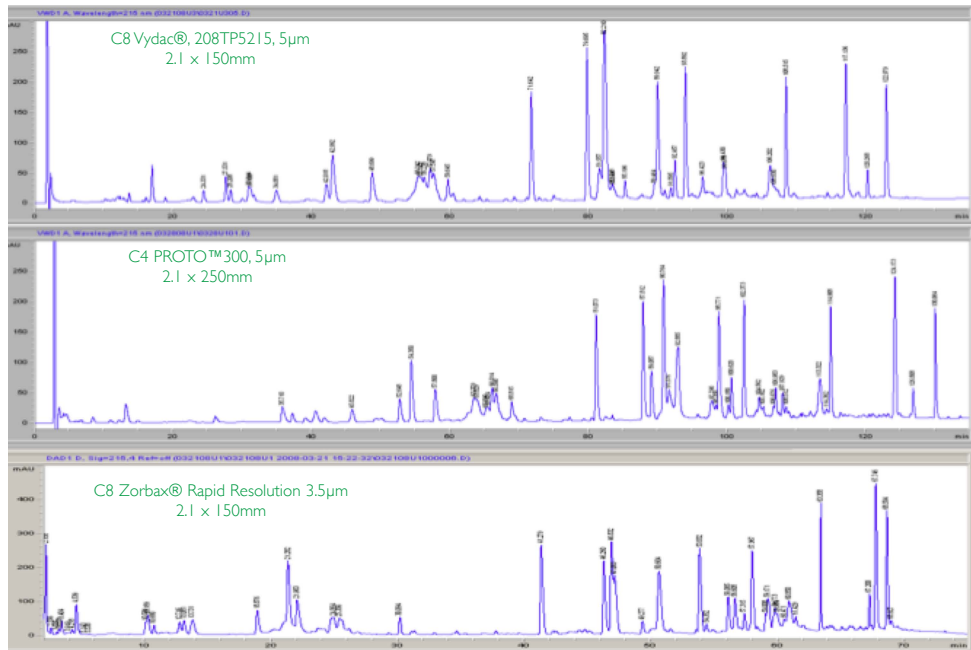


PROTO™ 300 C4 for Protein Analysis



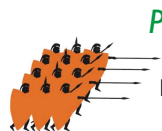
Column: 250 x 2.1mm Higgins P/N RS-2521-W045 (5µm, 300Å)  
 Vydac P/N 214TP52 (5µm, 300Å)  
 Mobile Phase: (A) 0.1%TFA in water; (B) 0.08%TFA in ACN, Flow Rate: 0.3min  
 Start Conditions: 25%B, Linear Gradient Run Time 34min

Superior Resolution with PROTO™300 C4 for Protein Tryptic Digests



Higgins Analytical thanks Amos Heckendorf of The Nest Group ([www.nestgrp.com](http://www.nestgrp.com)) for these data.





**PHALANX Ultra High Density End Capping**

Phases	C18
Particle Sizes	3, 4.5, 10µm
Pore Size	100Å
Pore Volume	1.1 mL/gm
Surface Area	430m <sup>2</sup> /gm
%Carbon (w/w)	C18 = 18%
Phase type	Monofunctional & fully endcapped
Silica Class	Type B

**Guide to Phalanx Part Number**

Px-xxxx-C185      Phalanx C18 5µm  
 See Page 23 for complete Part Number information

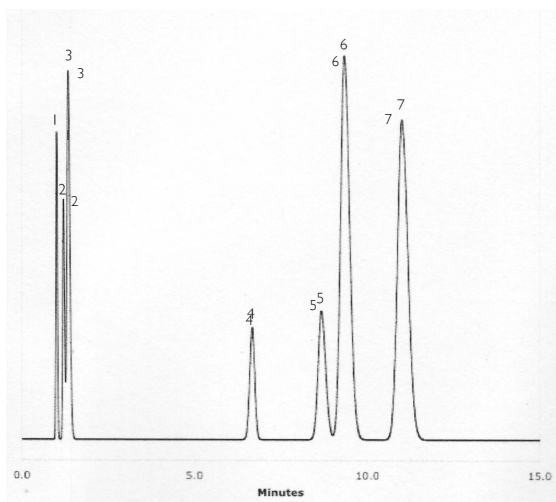
Phalanx HPLC columns and cartridges facilitate the development of robust assays for challenging analytes

Unique Features:

- Ideal for Basic and Acidic Analytes
- Wide pH Range Stability
- High Capacity
- No secondary Si-OH interaction
- No metal contamination
- Extreme hydrophobicity range

Standard Sizes:

- Special products for LC-MS
- 0.075 - 20mm I.D. range
- Wide range of HPLC Cartridge and Column types
- PEEK/titanium as well as stainless steel formats



**High Selectivity**

Wide range of solutes resolve quickly on a short HPLC column

Phalanx C18, 100x4.6mm, P/N: PS-1046-C185

(1) Uracil, (2) Caffeine, (3) Phenol, (4) n-Butylbenzene, (5) o-Terphenyl, (6) n-Amylbenzene, (7) Triphenylene  
 80% MeOH/water; 1mL/min



**Applications**

Phalanx is uniquely suitable for the efficient analysis of both acidic and basic analytes. In addition, its high capacity, good stability at high pH, and fast equilibration at extreme ranges of hydrophobicity make Phalanx a powerful option for challenging separation problems.

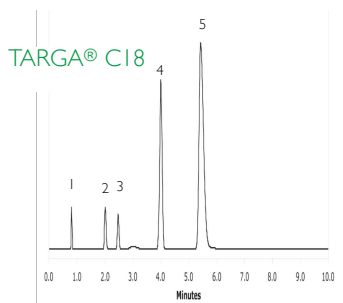
Phalanx is Higgins Analytical's latest addition to a family of unique high performance HPLC sorbents. The novel end capping technology of this new sorbent is a continuation of the pioneering approach taken in 1996 when we introduced Targa®, the first HPLC sorbent specifically designed for efficient LC-MS applications without TFA.



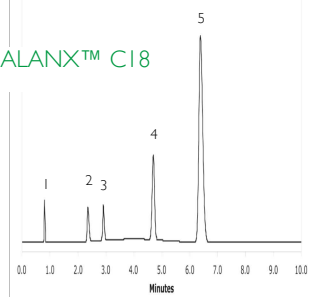
Based on an ultrapure, Type-B silica backbone, Phalanx has a relatively high surface area of 430 m<sup>2</sup>/gm, but its very tight pore size distribution eliminates the undesirable side effects of micropores that often plague other high surface materials.

Optimum for Basic and Acidic compounds: Many modern HPLC sorbents employ embedded polar functionality. While these secondary structures can provide unique selectivity and eliminate undesirable solute/sorbent interaction, they often compromise the useful range of solutes or buffers that can be used. The figure on the left and those on page 2 illustrate that Phalanx columns produce symmetrical peaks during the analysis of basic, neutral, and acidic compounds.

Wide pH operating range: The unique endcapping reduces acid/base hydrolysis of the bonded phase and greatly reduces silica solvation at high pH.



PHALANX™ C18



*NIST Test Mix for Metal Activity and Residual Silanols*

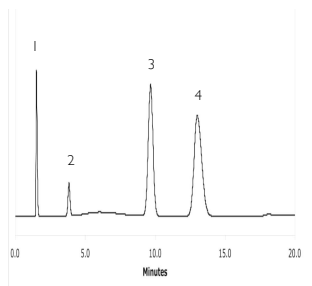
Quinizarin, a strong metal chelator, and amitriptyline, a very sensitive solute for residual silanols, both elute with good recovery and symmetrical peaks on both Targa and Phalanx C18 columns.

Targa® C18, 150x4.6mm, P/N: TS-1546-C185

Phalanx™ C18, 150x4.6mm, P/N: PS-1546-C185

(1) Uracil, (2) Toluene, (3) Ethylbenzene, (4) Quinizarin, (5) Amitriptyline.  
80% MeOH/buffer, 1.5mL/min

*See page 28 for an interesting comparison of PHALANX to KROMASIL C18 for an analysis of a pharmaceutical drug.*

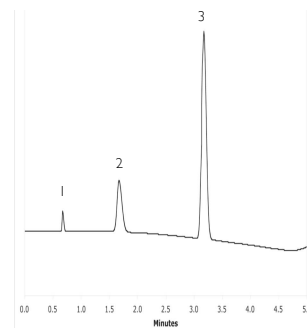


*Good Peak Symmetry for Basic Compounds*

The very low solute/sorbent interaction of Phalanx C18 is clearly illustrated by the analysis of basic compounds on a short 5cm cartridge column.

Phalanx C18, 50x2.1mm, P/N: PK-0521-C185

(1) Propanediol, (2) Diphenylramine, (3) Acenaphthene, (4) Amitriptyline.  
65% MeOH/water 20mM KH<sub>2</sub>PO<sub>4</sub> (pH 7.0), 200µL/min

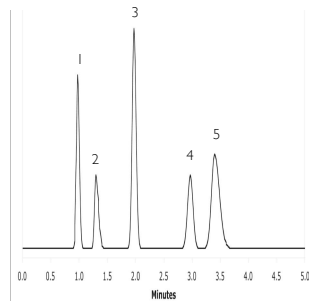


*Unbuffered Pyridine Test for Free Silanol Activity*

A very sensitive test for residual silanols produces a symmetrical pyridine peak in a low organic mobile phase without buffers.

Phalanx C18, 50x2.1mm, P/N: PK-0521-C185

(1) Uracil, (2) Phenol, (3) Pyridine  
40% MeCN/water, 200µL/min

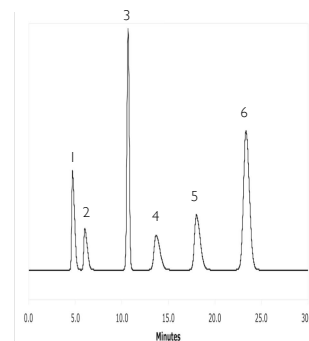


*Nucleosides*

Like its cousin Targa, Phalanx's unique end-capping chemistry works equally well at extreme hydrophilic and hydrophobic ranges.

Phalanx C18, 50x2.1mm, P/N: PK-0521-C185

(1) Cytosine, (2) Uracil, (3) Cytidine, (4) Uridine, (5) Thymine.  
100% Water, 1.0mL/min



*Tricyclic Antidepressants*

The very low solute/sorbent interaction of Phalanx C18 is clearly illustrated by the analysis of basic compounds on a 100x4.6mm HPLC column.

Phalanx C18, 100x4.6mm, P/N: PS-1046-C185

(1) Desipramine, (2) Nortriptyline, (3) Acenaphthene, (4) Imipramine, (5) Amitriptyline, (6) Trimipramine.  
70% MeOH/water 20mM KH<sub>2</sub>PO<sub>4</sub> (pH 7.0), 1.0mL/min





### TARGA A Uniquely Shielded Surface

Phases	C8 and C18
Particle Sizes	3, 4.5 and 10µm
Pore Size	120Å
Pore Volume	0.8mL/gm
Surface Area	330m <sup>2</sup> /gm
Carbon%(w/w)	C18 = 18%
Phase type	Monofunctional with a unique polar and bulky end-capping
Silica Class	Type B

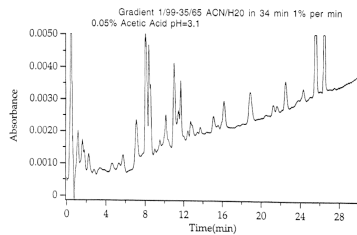
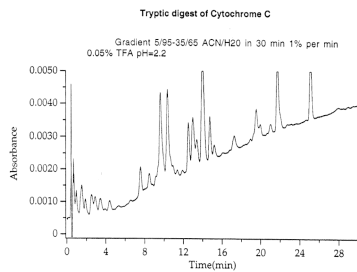
### Guide to TARGA Part Numbers

Tx-xxxx-C183 Targa C18 3µm  
 Tx-xxxx-C185 Targa C18 5µm

See Page 23 for complete Part Number information

### 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



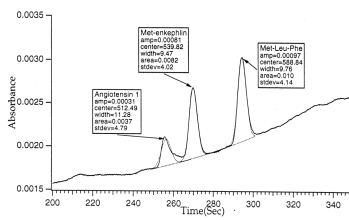
1%/min acetonitrile gradient on a short 50x1.0mm TARGA C18 column. Both dilute buffer examples are characterized by sharp peaks and no tailing.

### 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.



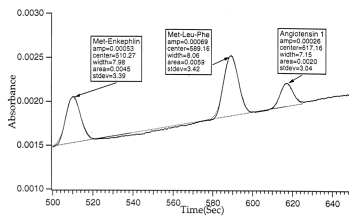
While TARGA columns give exceptional performance without TFA buffer, it does not mean that you are precluded from using it. In fact, the changes in selectivity



Basic Peptides

with 0.1% Acetic Acid pH 3.1  
 TARGA C18 5µm 50x1.0mm

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 (above) and TFA (below) buffered chromatogram. This is due to the differences in pH of the acetic acid and TFA mobile phase.

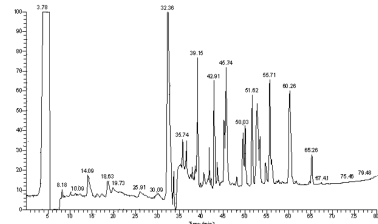


Basic Peptides

with 0.1% TFA pH 2.2  
 TARGA C18 5µm 50x1.0mm

### 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.

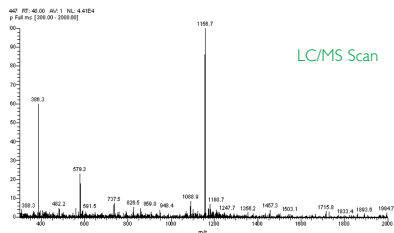


Tryptic Map of Human Ocular Lens Proteins  
 beta A1 crystallin and gamma S crystallin

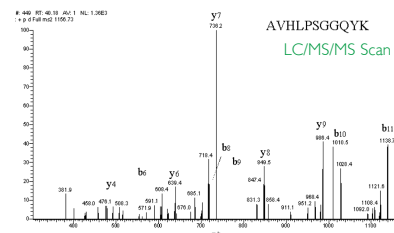
TARGA C18 5µm 150x0.5mm  
 P/INTS-15M5-C185

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.



LC/MS Scan

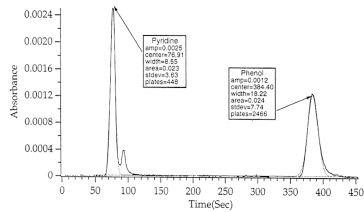


AVHLPSSGGQYK  
 LC/MS/MS Scan

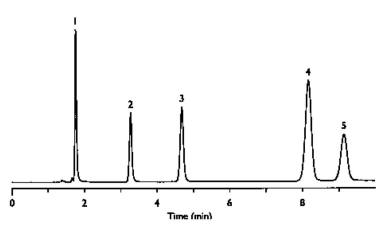
**Unrivaled End Capping Technology Efforts to eliminate solute-silanol**

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.

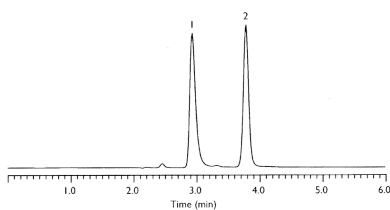


Unbuffered 20% MeCN/water



Analgesics and Anti-Inflammatories

TARGA C18 5µm 150x4.6mm  
Part Number TS-1546-C185  
45% MeCN/20mM NaH<sub>2</sub>PO<sub>4</sub> pH3.2 1mL/min 260nm  
1. Acetaminophen 2. Indoprofen  
3. Naproxan 4. Indomethacin  
5. Ibuprofen

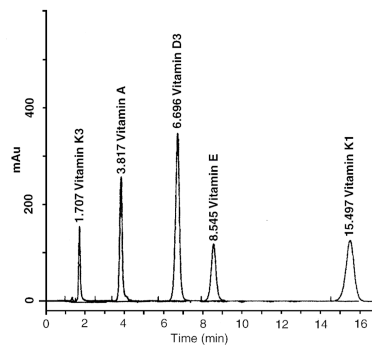


Anti-Hypertensives

TARGA C18 5µm 150x4.6mm  
Part Number TS-1546-C185  
25% MeCN/20mM NaH<sub>2</sub>PO<sub>4</sub> pH3.2 1mL/min 260nm  
1. Triamterene 2. Hydrochlorothiazide

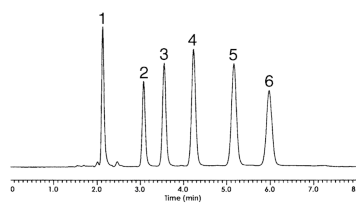
**Favorable Kinetics at Aqueous or Organic Mobile Phase Extremes**

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 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.



Fat-Soluble Vitamin Assay

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



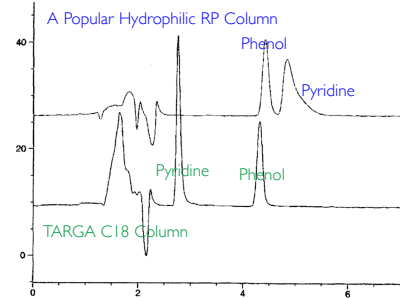
Analysis of Very Polar Antibacterials with a Highly Aqueous Mobile Phase

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**

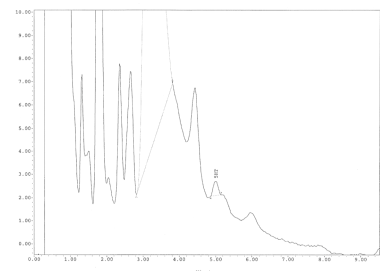
Several manufacturers offer reverse phase column products with imbedded polar functionality intended to enhance the chromatography of hydrophilic compounds like those illustrated in the previous antibacterial example. Unfortunately, most of these approaches introduce undesirable secondary effects that 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.



5HT Analysis of Rat Hypothalamus Dialysate

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

NaH<sub>2</sub>PO<sub>4</sub> 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.



## PTC Amino Acid Analysis

Higgins Analytical now manufactures the PTC Amino Acid analysis column used on the Applied Biosystems Model 420 Analyzer. We have approval from AB to manufacture these columns and we can provide a certificate indicating that our columns have the identical form and function as the product previously supplied by AB.

Part Number: 071 I-0204

Price:

Always available from stock.

A recent publication cites a Higgins Analytical PTC column: *Mass-spectrometric study of changes in allergen proteins by application of controlled chemical reaction*, where attempts to identify stable peptide markers from hazelnut and soybean were made.

C. Platteau, T. Cucu, R. Dobson, S. Fourdrilis, C. Bourgeon, D. Ebo, M. De Loose, I. Taverniers, E. Daeseleire, B. De Meulenaer, B. Devreese, E. De Pauw, G. Maghuin-Rogister, M.-L. Scippo, W. Stevens, C. Bridts. "Development of an integrated strategy for controlling the allergen issue in the Belgian food and catering industry ALLERRISK". Final Report. Brussels : Belgian Science Policy 2011 – 109 p. (Research Programme Science for a Sustainable Development), Page 54



[http://www.belspo.be/belspo/SSD/science/Reports/ALLERRISK\\_FinRep%20ML.pdf](http://www.belspo.be/belspo/SSD/science/Reports/ALLERRISK_FinRep%20ML.pdf)

## We Manufacture Products with Internal Diameters Ranging Almost Three Orders of Magnitude

This catalog contains over one thousand products manufactured with over fifteen different phases in an unequalled variety of formats. This generous offering makes it easy to choose the proper column for your application.



The columns and cartridges included in this version of the Higgins Analytical catalog have internal diameters ranging from 75 $\mu$ m to 20mm. Not listed are our 30mm and 50mm i.d. prep-columns. The bulk of our business in these large formats is based on Proto 200 and Proto 300 C4 and C18 products on particle sizes ranging from 10 $\mu$ m to 50 $\mu$ m geared for biomolecule purification - especially synthetic peptides.

As outlined in the paragraph below, another service we provide is custom manufacturing for columns of all sizes, 30mm and 50mm prep-columns included, with sorbents produced by manufacturers other than ourselves. So, if you are interested in one of our many sorbents, or another material that you may prefer, please

give us a call to discuss the details.

## UNEQUALED FLEXIBILITY

### Custom Manufacturing Service

Besides being known worldwide for our huge variety of high quality and uncompromisingly affordable Higgins Analytical products, custom labeled manufacturing represents a sizeable part of our business. In fact, a lot of people might be very surprised if they learned that their favorite competitive column was actually packed by Higgins Analytical. In addition to being based on our own unique sorbents, many of the products we manufacture are produced with our customers' own proprietary media. So, if your company feels it might want to add a selection of high quality HPLC columns to its product offering, or if you need large numbers of a particular column or device for your internal analytical needs, please give us a call. Higgins Analytical is very expert at providing this type of service.

*If you can put it in a bottle, Higgins Analytical will pack it into a column.  
If we're unsuccessful, it won't cost a thing!*



### HPLC Columns and Cartridges

Higgins Analytical HPLC column product part numbers are based on a 2-4-4 character pattern. For example:

TS-1521-C185

is the part number for a conventional 15cm x 2.1mm stainless steel column packed with Targa C18 5µm sorbent.

The two character prefix indicates sorbent and hardware type.

Prefix Character 1 (Sorbent)  
 ■X-XXXX-XXXX

- C = CLIPEUS
- H = HAISIL 100 or HAISIL 300
- L = HAISIL HL
- P = PHALANX
- R = PROTO 200 or 300
- T = TARGA
- V = HEAVY

Prefix Character 2 (Hardware)  
 X■-XXXX-XXXX

- FS = Capellini 6-32 column
- PS = Capellini 10-32 column
- S = Stainless steel HPLC Column
- P = PEEK HPLC column
- F = Stainless steel cartridge column
- K = PEEK cartridge column
- R = Sprite Direct-Connect column

Note: Microbore columns have the second character, S, like stainless steel columns, but they are glass lined.

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

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

Center Characters 3 and 4 (I.D.)  
 XX-XX■ ■-XXXX

- 07 = 0.075mm
- M1 = 0.1mm
- 15 = 0.15mm
- M3 = 0.3mm
- M5 = 0.5mm
- M8 = 0.8mm
- 01 = 1.0mm
- 21 = 2.1mm
- 30 = 3.0mm
- 32 = 3.2mm
- 39 = 3.9mm
- 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-■ ■ ■X

- C04 = Butyl or C4
- C08 = Octyl or C8
- C18 = ODS or C18
- CNP = Cyano or Nitrile
- D04 = 200Å C4
- D18 = 200Å C18
- 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 - 5µm
- 7 = 15 - 20µm

Notes:

- (1) Standard configurations are highlighted.
- (2) Polymeric phases have a 3-4-6 pattern. The first two prefix characters are PL. The last character denotes particle size.

PLx-xxxx-xxxxxx

### Cartridge Holders

#### Guards

Two types of holders for 2cm long PEEK and s.s. cartridges are offered.

- HK-GUARD-FF Female/Female
- HK-GUARD-FM Direct Connect

#### Analytical Cartridge Holders

Three internal diameters (2.1, 3.2, and 4.6mm) and three lengths are offered.

- HK-HOLD-40 for 4cm long cartridge
- HK-HOLD-50 for 5cm long cartridge
- HK-HOLD-100 for 10cm long cartridge

#### HAISpeed 10 Cartridge Holders

These 10mm i.d. cartridges are offered in three lengths.

- 10-HOLD-30 for 3cm long cartridge
- 10-HOLD-50 for 5cm long cartridge
- 10-HOLD-100 for 10cm long cartridge

#### HAISpeed 20 Cartridge Holder

20mm i.d. prep guard cartridges require a 25, 35, or a 50mm long cartridge holder.

- 20-HOLD-25 for 20 x 25mm cartridge
- 20-HOLD-35 for 20 x 35mm cartridge
- 20-HOLD-50 for 20 x 50mm cartridge

## HPLC Columns

Wide Range of Stainless Steel HPLC COLUMNS



### Widest Range of Hardware Types and Sizes Available Anywhere

Higgins Analytical manufacturers the widest range of column formats in the widest range of hardware types available anywhere. Conventional HPLC columns are offered in stainless steel hardware. Frit materials include stainless steel, Carpenter C, titanium. Standard lengths range from 3.3cm to 25 cm. Custom columns are routinely manufactured in odd length ranging from 3.3 to 50cm. The internal diameters of our entire HPLC column and cartridge offering range from 75µm to 20mm, over two orders of magnitude.

### Guide to Some Standard HPLC Column Part Numbers

xS-xxxx-xxxx	Stainless Steel (ss) column	
xP-xxxx-xxxx	PEEK column	
xS-03xx-xxxx	3.5cm ss column	Shortest standard size
xS-25xx-xxxx	25cm ss column	Longest standard size
xP-05xx-xxxx	5cm PEEK column	Shortest standard size
xP-25xx-xxxx	25cm PEEK column	Longest standard size
xS-xx21-xxxx	2.1mm ss I.D.	Smallest standard I.D.
xP-xx21-xxxx	2.1mm PEEK I.D.	Smallest standard I.D.
xS-xx46-xxxx	4.6mm ss I.D.	Popular standard I.D.
xP-xx46-xxxx	4.6mm PEEK I.D.	Popular standard I.D.

See Page 23 for complete Part Number information

## CLIQUEUS Analytical Columns - Stainless Steel



<b>CLIQUEUS C8 5µm</b>	<b>4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns</b>			
30x4.6mm	50x4.6mm	100x4.6mm	150x4.6mm	250x4.6mm
CS-0346-C085	CS-0546-C085	CS-1046-C085	CS-1546-C085	CS-2546-C085
30x4.0mm	50x4.0mm	100x4.0mm	150x4.0mm	250x4.0mm
CS-0340-C085	CS-0540-C085	CS-1040-C085	CS-1540-C085	CS-2540-C085
30x3.0mm	50x3.0mm	100x3.0mm	150x3.0mm	250x3.0mm
CS-0330-C085	CS-0530-C085	CS-1030-C085	CS-1530-C085	CS-2530-C085
30x2.1mm	50x2.1mm	100x2.1mm	150x2.1mm	250x2.1mm
CS-0321-C085	CS-0521-C085	CS-1021-C085	CS-1521-C085	CS-2521-C085
<b>CLIQUEUS C18 10µm</b>	<b>4.6mm I.D. s.s. columns</b>			
30x4.6mm	50x4.6mm	100x4.6mm	150x4.6mm	250x4.6mm
CS-0346-C181	CS-0546-C181	CS-1046-C181	CS-1546-C181	CS-2546-C181
<b>CLIQUEUS C18 5µm</b>	<b>4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns</b>			
30x4.6mm	50x4.6mm	100x4.6mm	150x4.6mm	250x4.6mm
CS-0346-C185	CS-0546-C185	CS-1046-C185	CS-1546-C185	CS-2546-C185
30x4.0mm	50x4.0mm	100x4.0mm	150x4.0mm	250x4.0mm
CS-0340-C185	CS-0540-C185	CS-1040-C185	CS-1540-C185	CS-2540-C185
30x3.0mm	50x3.0mm	100x3.0mm	150x3.0mm	250x3.0mm
CS-0330-C185	CS-0530-C185	CS-1030-C185	CS-1530-C185	CS-2530-C185
30x2.1mm	50x2.1mm	100x2.1mm	150x2.1mm	250x2.1mm
CS-0321-C185	CS-0521-C185	CS-1021-C185	CS-1521-C185	CS-2521-C185



## CLIQUEUS Analytical Columns - Stainless Steel



<b>CLIQUEUS Cyano 5µm</b>	<b>4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns</b>			
30x4.6mm	50x4.6mm	100x4.6mm	150x4.6mm	250x4.6mm
CS-0346-CNP5	CS-0546-CNP5	CS-1046-CNP5	CS-1546-CNP5	CS-2546-CNP5
30x4.0mm	50x4.0mm	100x4.0mm	150x4.0mm	250x4.0mm
CS-0340-CNP5	CS-0540-CNP5	CS-1040-CNP5	CS-1540-CNP5	CS-2540-CNP5
30x3.0mm	50x3.0mm	100x3.0mm	150x3.0mm	250x3.0mm
CS-0330-CNP5	CS-0530-CNP5	CS-1030-CNP5	CS-1530-CNP5	CS-2530-CNP5
30x2.1mm	50x2.1mm	100x2.1mm	150x2.1mm	250x2.1mm
CS-0321-CNP5	CS-0521-CNP5	CS-1021-CNP5	CS-1521-CNP5	CS-2521-CNP5

<b>CLIQUEUS Phenyl 5µm</b>	<b>4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns</b>			
30x4.6mm	50x4.6mm	100x4.6mm	150x4.6mm	250x4.6mm
CS-0346-PHN5	CS-0546-PHN5	CS-1046-PHN5	CS-1546-PHN5	CS-2546-PHN5
30x4.0mm	50x4.0mm	100x4.0mm	150x4.0mm	250x4.0mm
CS-0340-PHN5	CS-0540-PHN5	CS-1040-PHN5	CS-1540-PHN5	CS-2540-PHN5
30x3.0mm	50x3.0mm	100x3.0mm	150x3.0mm	250x3.0mm
CS-0330-PHN5	CS-0530-PHN5	CS-1030-PHN5	CS-1530-PHN5	CS-2530-PHN5
30x2.1mm	50x2.1mm	100x2.1mm	150x2.1mm	250x2.1mm
CS-0321-PHN5	CS-0521-PHN5	CS-1021-PHN5	CS-1521-PHN5	CS-2521-PHN5

<b>CLIQUEUS Silica 5µm</b>	<b>4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns</b>			
30x4.6mm	50x4.6mm	100x4.6mm	150x4.6mm	250x4.6mm
CS-0346-SIL5	CS-0546-SIL5	CS-1046-SIL5	CS-1546-SIL5	CS-2546-SIL5
30x4.0mm	50x4.0mm	100x4.0mm	150x4.0mm	250x4.0mm
CS-0340-SIL5	CS-0540-SIL5	CS-1040-SIL5	CS-1540-SIL5	CS-2540-SIL5
30x3.0mm	50x3.0mm	100x3.0mm	150x3.0mm	250x3.0mm
CS-0330-SIL5	CS-0530-SIL5	CS-1030-SIL5	CS-1530-SIL5	CS-2530-SIL5
30x2.1mm	50x2.1mm	100x2.1mm	150x2.1mm	250x2.1mm
CS-0321-SIL5	CS-0521-SIL5	CS-1021-SIL5	CS-1521-SIL5	CS-2521-SIL5

## HAISIL 100 Analytical Columns - Stainless Steel



<b>HAISIL 100 C8 5µm</b>	<b>4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns</b>			
30x4.6mm	50x4.6mm	100x4.6mm	150x4.6mm	250x4.6mm
HS-0346-M085	HS-0546-M085	HS-1046-M085	HS-1546-M085	HS-2546-M085
30x4.0mm	50x4.0mm	100x4.0mm	150x4.0mm	250x4.0mm
HS-0340-M085	HS-0540-M085	HS-1040-M085	HS-1540-M085	HS-2540-M085
30x3.0mm	50x3.0mm	100x3.0mm	150x3.0mm	250x3.0mm
HS-0330-M085	HS-0530-M085	HS-1030-M085	HS-1530-M085	HS-2530-M085
30x2.1mm	50x2.1mm	100x2.1mm	150x2.1mm	250x2.1mm
HS-0321-M085	HS-0521-M085	HS-1021-M085	HS-1521-M085	HS-2521-M085

<b>HAISIL 100 C18 5µm</b>	<b>4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns</b>			
30x4.6mm	50x4.6mm	100x4.6mm	150x4.6mm	250x4.6mm
HS-0346-M185	HS-0546-M185	HS-1046-M185	HS-1546-M185	HS-2546-M185
30x4.0mm	50x4.0mm	100x4.0mm	150x4.0mm	250x4.0mm
HS-0340-M185	HS-0540-M185	HS-1040-M185	HS-1540-M185	HS-2540-M185
30x3.0mm	50x3.0mm	100x3.0mm	150x3.0mm	250x3.0mm
HS-0330-M185	HS-0530-M185	HS-1030-M185	HS-1530-M185	HS-2530-M185
30x2.1mm	50x2.1mm	100x2.1mm	150x2.1mm	250x2.1mm
HS-0321-M185	HS-0521-M185	HS-1021-M185	HS-1521-M185	HS-2521-M185



## HPLC Columns (continued)

Wide Range of Stainless Steel HPLC COLUMNS



### HAISIL100 Analytical Columns - Stainless Steel (cont.)



HAISIL 100 Silica 5µm	4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns			
30x4.6mm HS-0346-SIL5	50x4.6mm HS-0546-SIL5	100x4.6mm HS-1046-SIL5	150x4.6mm HS-1546-SIL5	250x4.6mm HS-2546-SIL5
30x4.0mm HS-0340-SIL5	50x4.0mm HS-0540-SIL5	100x4.0mm HS-1040-SIL5	150x4.0mm HS-1540-SIL5	250x4.0mm HS-2540-SIL5
30x3.0mm HS-0330-SIL5	50x3.0mm HS-0530-SIL5	100x3.0mm HS-1030-SIL5	150x3.0mm HS-1530-SIL5	250x3.0mm HS-2530-SIL5
30x2.1mm HS-0321-SIL5	50x2.1mm HS-0521-SIL5	100x2.1mm HS-1021-SIL5	150x2.1mm HS-1521-SIL5	250x2.1mm HS-2521-SIL5

### HAISIL300 Analytical Columns - Stainless Steel



HAISIL 300 C18 5µm	4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns			
30x4.6mm HS-0346-W185	50x4.6mm HS-0546-W185	100x4.6mm HS-1046-W185	150x4.6mm HS-1546-W185	250x4.6mm HS-2546-W185
30x4.0mm HS-0340-W185	50x4.0mm HS-0540-W185	100x4.0mm HS-1040-W185	150x4.0mm HS-1540-W185	250x4.0mm HS-2540-W185
30x3.0mm HS-0330-W185	50x3.0mm HS-0530-W185	100x3.0mm HS-1030-W185	150x3.0mm HS-1530-W185	250x3.0mm HS-2530-W185
30x2.1mm HS-0321-W185	50x2.1mm HS-0521-W185	100x2.1mm HS-1021-W185	150x2.1mm HS-1521-W185	250x2.1mm HS-2521-W185

### HAISIL HL Analytical Columns - Stainless Steel



HAISIL HL C18 5µm	4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns			
30x4.6mm LS-0346-C185	50x4.6mm LS-0546-C185	100x4.6mm LS-1046-C185	150x4.6mm LS-1546-C185	250x4.6mm LS-2546-C185
30x4.0mm LS-0340-C185	50x4.0mm LS-0540-C185	100x4.0mm LS-1040-C185	150x4.0mm LS-1540-C185	250x4.0mm LS-2540-C185
30x3.0mm LS-0330-C185	50x3.0mm LS-0530-C185	100x3.0mm LS-1030-C185	150x3.0mm LS-1530-C185	250x3.0mm LS-2530-C185
30x2.1mm LS-0321-C185	50x2.1mm LS-0521-C185	100x2.1mm LS-1021-C185	150x2.1mm LS-1521-C185	250x2.1mm LS-2521-C185





See pages 62 - 63 for information on the wide variety of Guard Cartridges available for these Analytical Columns

### PROTO 200 Analytical Columns - Stainless Steel

200

#### PROTO 200 C4 5µm

30x4.6mm  
RS-0346-D045  
30x4.0mm  
RS-0340-D045  
30x3.0mm  
RS-0330-D045  
30x2.1mm  
RS-0321-D045

#### 4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns

50x4.6mm  
RS-0546-D045  
50x4.0mm  
RS-0540-D045  
50x3.0mm  
RS-0530-D045  
50x2.1mm  
RS-0521-D045  
100x4.6mm  
RS-1046-D045  
100x4.0mm  
RS-1040-D045  
100x3.0mm  
RS-1030-D045  
100x2.1mm  
RS-1021-D045

150x4.6mm  
RS-1546-D045  
150x4.0mm  
RS-1540-D045  
150x3.0mm  
RS-1530-D045  
150x2.1mm  
RS-1521-D045

250x4.6mm  
RS-2546-D045  
250x4.0mm  
RS-2540-D045  
250x3.0mm  
RS-2530-D045  
250x2.1mm  
RS-2521-D045

#### PROTO 200 C18 5µm

30x4.6mm  
RS-0346-D185  
30x4.0mm  
RS-0340-D185  
30x3.0mm  
RS-0330-D185  
30x2.1mm  
RS-0321-D185

#### 4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns

50x4.6mm  
RS-0546-D185  
50x4.0mm  
RS-0540-D185  
50x3.0mm  
RS-0530-D185  
50x2.1mm  
RS-0521-D185  
100x4.6mm  
RS-1046-D185  
100x4.0mm  
RS-1040-D185  
100x3.0mm  
RS-1030-D185  
100x2.1mm  
RS-1021-D185

150x4.6mm  
RS-1546-D185  
150x4.0mm  
RS-1540-D185  
150x3.0mm  
RS-1530-D185  
150x2.1mm  
RS-1521-D185

250x4.6mm  
RS-2546-D185  
250x4.0mm  
RS-2540-D185  
250x3.0mm  
RS-2530-D185  
250x2.1mm  
RS-2521-D185

### PROTO 300 Analytical Columns - Stainless Steel



#### PROTO 300 C4 5µm

30x4.6mm  
RS-0346-W045  
30x4.0mm  
RS-0340-W045  
30x3.0mm  
RS-0330-W045  
30x2.1mm  
RS-0321-W045

#### 4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns

50x4.6mm  
RS-0546-W045  
50x4.0mm  
RS-0540-W045  
50x3.0mm  
RS-0530-W045  
50x2.1mm  
RS-0521-W045  
100x4.6mm  
RS-1046-W045  
100x4.0mm  
RS-1040-W045  
100x3.0mm  
RS-1030-W045  
100x2.1mm  
RS-1021-W045

150x4.6mm  
RS-1546-W045  
150x4.0mm  
RS-1540-W045  
150x3.0mm  
RS-1530-W045  
150x2.1mm  
RS-1521-W045

250x4.6mm  
RS-2546-W045  
250x4.0mm  
RS-2540-W045  
250x3.0mm  
RS-2530-W045  
250x2.1mm  
RS-2521-W045

#### PROTO 300 C18 5µm

30x4.6mm  
RS-0346-W185  
30x4.0mm  
RS-0340-W185  
  
30x3.0mm  
RS-0330-W185  
30x2.1mm  
RS-0321-W185

#### 4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns

50x4.6mm  
RS-0546-W185  
50x4.0mm  
RS-0540-W185  
  
50x3.0mm  
RS-0530-W185  
50x2.1mm  
RS-0521-W185  
100x4.6mm  
RS-1046-W185  
100x4.0mm  
RS-1040-W185  
  
100x3.0mm  
RS-1030-W185  
100x2.1mm  
RS-1021-W185

150x4.6mm  
RS-1546-W185  
150x4.0mm  
RS-1540-W185  
  
150x3.0mm  
RS-1530-W185  
150x2.1mm  
RS-1521-W185

250x4.6mm  
RS-2546-W185  
250x4.0mm  
RS-2540-W185  
  
250x3.0mm  
RS-2530-W185  
250x2.1mm  
RS-2521-W185



## HPLC Columns (continued)

Wide Range of Stainless Steel HPLC COLUMNS



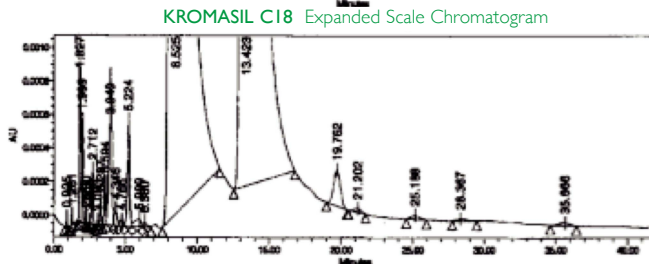
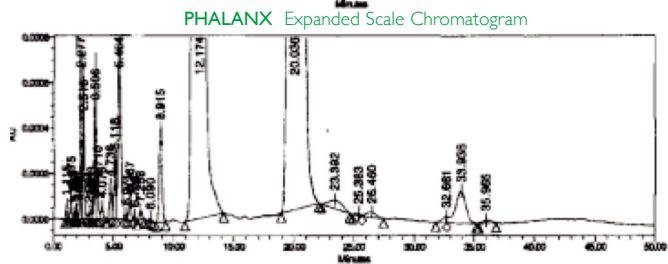
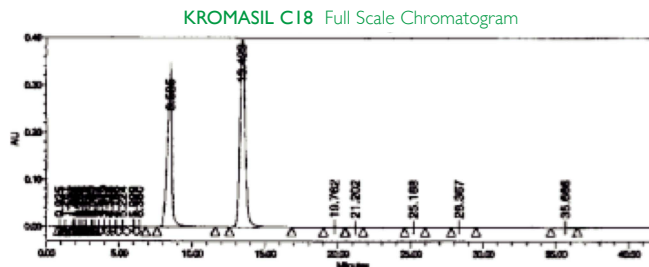
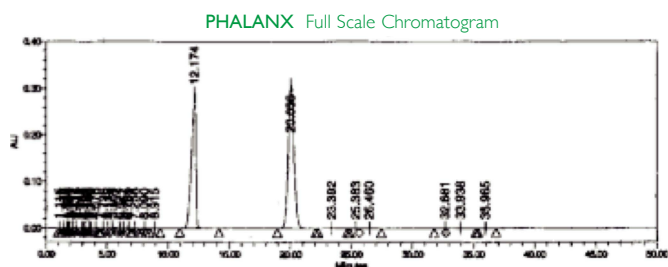
### PHALANX Analytical Columns - Stainless Steel



PHALANX C18 3µm		4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns							
30x4.6mm	PS-0346-C183	50x4.6mm	PS-0546-C183	100x4.6mm	PS-1046-C183	150x4.6mm	PS-1546-C183	250x4.6mm	PS-2546-C183
30x4.0mm	PS-0340-C183	50x4.0mm	PS-0540-C183	100x4.0mm	PS-1040-C183	150x4.0mm	PS-1540-C183	250x4.0mm	PS-2540-C183
30x3.0mm	PS-0330-C183	50x3.0mm	PS-0530-C183	100x3.0mm	PS-1030-C183	150x3.0mm	PS-1530-C183	250x3.0mm	PS-2530-C183
30x2.1mm	PS-0321-C183	50x2.1mm	PS-0521-C183	100x2.1mm	PS-1021-C183	150x2.1mm	PS-1521-C183	250x2.1mm	PS-2521-C183

PHALANX C18 5µm		4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns							
30x4.6mm	PS-0346-C185	50x4.6mm	PS-0546-C185	100x4.6mm	PS-1046-C185	150x4.6mm	PS-1546-C185	250x4.6mm	PS-2546-C185
30x4.0mm	PS-0340-C185	50x4.0mm	PS-0540-C185	100x4.0mm	PS-1040-C185	150x4.0mm	PS-1540-C185	250x4.0mm	PS-2540-C185
30x3.0mm	PS-0330-C185	50x3.0mm	PS-0530-C185	100x3.0mm	PS-1030-C185	150x3.0mm	PS-1530-C185	250x3.0mm	PS-2530-C185
30x2.1mm	PS-0321-C185	50x2.1mm	PS-0521-C185	100x2.1mm	PS-1021-C185	150x2.1mm	PS-1521-C185	250x2.1mm	PS-2521-C185

### Comparison of PHALANX to Kromasil C18 for a Pharmaceutical Drug Analysis 150 X 4.6mm Columns, 1mL/min Linear Gradient for 50 minutes



Higgins Analytical thanks Amos Heckendorf of The Nest Group ([www.nestgrp.com](http://www.nestgrp.com)) for these data.



See pages 62 - 63 for information on the wide variety of Guard Cartridges available for these Analytical Columns

### TARGA Analytical Columns - Stainless Steel



<b>TARGA C8 5µm</b>	<b>4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns</b>			
30x4.6mm TS-0346-C085	50x4.6mm TS-0546-C085	100x4.6mm TS-1046-C085	150x4.6mm TS-1546-C085	250x4.6mm TS-2546-C085
30x4.0mm TS-0340-C085	50x4.0mm TS-0540-C085	100x4.0mm TS-1040-C085	150x4.0mm TS-1540-C085	250x4.0mm TS-2540-C085
30x3.0mm TS-0330-C085	50x3.0mm TS-0530-C085	100x3.0mm TS-1030-C085	150x3.0mm TS-1530-C085	250x3.0mm TS-2530-C085
30x2.1mm TS-0321-C085	50x2.1mm TS-0521-C085	100x2.1mm TS-1021-C085	150x2.1mm TS-1521-C085	250x2.1mm TS-2521-C085

<b>TARGA C18 3µm</b>	<b>4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns</b>			
30x4.6mm TS-0346-C183	50x4.6mm TS-0546-C183	100x4.6mm TS-1046-C183	150x4.6mm TS-1546-C183	250x4.6mm TS-2546-C183
30x4.0mm TS-0340-C183	50x4.0mm TS-0540-C183	100x4.0mm TS-1040-C183	150x4.0mm TS-1540-C183	250x4.0mm TS-2540-C183
30x3.0mm TS-0330-C183	50x3.0mm TS-0530-C183	100x3.0mm TS-1030-C183	150x3.0mm TS-1530-C183	250x3.0mm TS-2530-C183
30x2.1mm TS-0321-C183	50x2.1mm TS-0521-C183	100x2.1mm TS-1021-C183	150x2.1mm TS-1521-C183	250x2.1mm TS-2521-C183

<b>TARGA C18 5µm</b>	<b>4.6, 4.0, 3.0, and 2.1mm I.D. s.s. columns</b>			
30x4.6mm TS-0346-C185	50x4.6mm TS-0546-C185	100x4.6mm TS-1046-C185	150x4.6mm TS-1546-C185	250x4.6mm TS-2546-C185
30x4.0mm TS-0340-C185	50x4.0mm TS-0540-C185	100x4.0mm TS-1040-C185	150x4.0mm TS-1540-C185	250x4.0mm TS-2540-C185
30x3.0mm TS-0330-C185	50x3.0mm TS-0530-C185	100x3.0mm TS-1030-C185	150x3.0mm TS-1530-C185	250x3.0mm TS-2530-C185
30x2.1mm TS-0321-C185	50x2.1mm TS-0521-C185	100x2.1mm TS-1021-C185	150x2.1mm TS-1521-C185	250x2.1mm TS-2521-C185



## Microbore HPLC Columns

Wide Range of 1mm, 0.8mm, 0.5mm, and 0.3mm Columns

### Guide to MICROBORE Part Numbers

xS-xx01-xxxx	1.0mm Microbore
xS-xxM8-xxxx	0.8mm Microbore
xS-xxM5-xxxx	0.5mm Microbore
xS-xxM3-xxxx	0.3mm Microbore

See Page 23 for complete Part Number information

### Widest Range of Microbore column sizes with a wide range of sorbents

Higgins Analytical manufactures the widest range of Microbore column formats available anywhere. In addition to the glass-lined columns ranging from 300µm to 1mm I.D., we also provide unique PEEK/Titanium microbore columns for specialized applications (see our **PICCOLO** on page 52).

## CLIQUEUS Microbore Columns



CLIQUEUS C8 5µm	1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
CS-0301-C085	CS-0501-C085	CS-1001-C085	CS-1501-C085	CS-2501-C085
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
CS-03M8-C085	CS-05M8-C085	CS-10M8-C085	CS-15M8-C085	CS-25M8-C085
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
CS-03M5-C085	CS-05M5-C085	CS-10M5-C085	CS-15M5-C085	CS-25M5-C085
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
CS-03M3-C085	CS-05M3-C085	CS-10M3-C085	CS-15M3-C085	CS-25M3-C085

CLIQUEUS C18 5µm	1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
CS-0301-C185	CS-0501-C185	CS-1001-C185	CS-1501-C185	CS-2501-C185
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
CS-03M8-C185	CS-05M8-C185	CS-10M8-C185	CS-15M8-C185	CS-25M8-C185
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
CS-03M5-C185	CS-05M5-C185	CS-10M5-C185	CS-15M5-C185	CS-25M5-C185
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
CS-03M3-C185	CS-05M3-C185	CS-10M3-C185	CS-15M3-C185	CS-25M3-C185

CLIQUEUS Cyano 5µm	1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
CS-0301-CNP5	CS-0501-CNP5	CS-1001-CNP5	CS-1501-CNP5	CS-2501-CNP5
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
CS-03M8-CNP5	CS-05M8-CNP5	CS-10M8-CNP5	CS-15M8-CNP5	CS-25M8-CNP5
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
CS-03M5-CNP5	CS-05M5-CNP5	CS-10M5-CNP5	CS-15M5-CNP5	CS-25M5-CNP5
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
CS-03M3-CNP5	CS-05M3-CNP5	CS-10M3-CNP5	CS-15M3-CNP5	CS-25M3-CNP5

CLIQUEUS Phenyl 5µm	1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
CS-0301-PHN5	CS-0501-PHN5	CS-1001-PHN5	CS-1501-PHN5	CS-2501-PHN5
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
CS-03M8-PHN5	CS-05M8-PHN5	CS-10M8-PHN5	CS-15M8-PHN5	CS-25M8-PHN5
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
CS-03M5-PHN5	CS-05M5-PHN5	CS-10M5-PHN5	CS-15M5-PHN5	CS-25M5-PHN5
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
CS-03M3-PHN5	CS-05M3-PHN5	CS-10M3-PHN5	CS-15M3-PHN5	CS-25M3-PHN5





**CLIQUEUS Microbore Columns (cont.)**



<b>CLIQUEUS Silica 5µm</b>	<b>1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns</b>			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
CS-0301-SIL5	CS-0501-SIL5	CS-1001-SIL5	CS-1501-SIL5	CS-2501-SIL5
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
CS-03M8-SIL5	CS-05M8-SIL5	CS-10M8-SIL5	CS-15M8-SIL5	CS-25M8-SIL5
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
CS-03M5-SIL5	CS-05M5-SIL5	CS-10M5-SIL5	CS-15M5-SIL5	CS-25M5-SIL5
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
CS-03M3-SIL5	CS-05M3-SIL5	CS-10M3-SIL5	CS-15M3-SIL5	CS-25M3-SIL5

**HAISIL100 Microbore Columns**



<b>HAISIL 100 C8 5µm</b>	<b>1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns</b>			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
HS-0301-M085	HS-0501-M085	HS-1001-M085	HS-1501-M085	HS-2501-M085
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
HS-03M8-M085	HS-05M8-M085	HS-10M8-M085	HS-15M8-M085	HS-25M8-M085
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
HS-03M5-M085	HS-05M5-M085	HS-10M5-M085	HS-15M5-M085	HS-25M5-M085
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
HS-03M3-M085	HS-05M3-M085	HS-10M3-M085	HS-15M3-M085	HS-25M3-M085

<b>HAISIL 100 C18 5µm</b>	<b>1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns</b>			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
HS-0301-M185	HS-0501-M185	HS-1001-M185	HS-1501-M185	HS-2501-M185
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
HS-03M8-M185	HS-05M8-M185	HS-10M8-M185	HS-15M8-M185	HS-25M8-M185
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
HS-03M5-M185	HS-05M5-M185	HS-10M5-M185	HS-15M5-M185	HS-25M5-M185
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
HS-03M3-M185	HS-05M3-M185	HS-10M3-M185	HS-15M3-M185	HS-25M3-M185

<b>HAISIL 100 Silica 5µm</b>	<b>1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns</b>			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
HS-0301-SIL5	HS-0501-SIL5	HS-1001-SIL5	HS-1501-SIL5	HS-2501-SIL5
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
HS-03M8-SIL5	HS-05M8-SIL5	HS-10M8-SIL5	HS-15M8-SIL5	HS-25M8-SIL5
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
HS-03M5-SIL5	HS-05M5-SIL5	HS-10M5-SIL5	HS-15M5-SIL5	HS-25M5-SIL5
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
HS-03M3-SIL5	HS-05M3-SIL5	HS-10M3-SIL5	HS-15M3-SIL5	HS-25M3-SIL5



## Microbore HPLC Columns (continued)

Wide Range of 1mm, 0.5mm, and 0.3mm Columns



### HAISIL300 Microbore Columns



#### HAISIL 300 C18 5µm

30x1.0mm  
HS-0301-W185  
30x0.8mm  
HS-03M8-W185  
30x0.5mm  
HS-03M5-W185  
30x0.3mm  
HS-03M3-W185

#### 1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns

50x1.0mm  
HS-0501-W185  
50x0.8mm  
HS-05M8-W185  
50x0.5mm  
HS-05M5-W185  
50x0.3mm  
HS-05M3-W185

100x1.0mm  
HS-1001-W185  
100x0.8mm  
HS-10M8-W185  
100x0.5mm  
HS-10M5-W185  
100x0.3mm  
HS-10M3-W185

150x1.0mm  
HS-1501-W185  
150x0.8mm  
HS-15M8-W185  
150x0.5mm  
HS-15M5-W185  
150x0.3mm  
HS-15M3-W185

250x1.0mm  
HS-2501-W185  
250x0.8mm  
HS-25M8-W185  
250x0.5mm  
HS-25M5-W185  
250x0.3mm  
HS-25M3-W185

### HAISIL HL Microbore Columns



#### HAISIL HL C18 5µm

30x1.0mm  
LS-0301-C185  
30x0.8mm  
LS-03M8-C185  
30x0.5mm  
LS-03M5-C185  
30x0.3mm  
LS-03M3-C185

#### 1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns

50x1.0mm  
LS-0501-C185  
50x0.8mm  
LS-05M8-C185  
50x0.5mm  
LS-05M5-C185  
50x0.3mm  
LS-05M3-C185

100x1.0mm  
LS-1001-C185  
100x0.8mm  
LS-10M8-C185  
100x0.5mm  
LS-10M5-C185  
100x0.3mm  
LS-10M3-C185

150x1.0mm  
LS-1501-C185  
150x0.8mm  
LS-15M8-C185  
150x0.5mm  
LS-15M5-C185  
150x0.3mm  
LS-15M3-C185

250x1.0mm  
LS-2501-C185  
250x0.8mm  
LS-25M8-C185  
250x0.5mm  
LS-25M5-C185  
250x0.3mm  
LS-25M3-C185



**PROTO 200 Microbore Columns**

200

<b>PROTO 200 C4 5µm</b>	<b>1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns</b>			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
RS-0301-D045	RS-0501-D045	RS-1001-D045	RS-1501-D045	RS-2501-D045
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
RS-03M8-D185	RS-05M8-D185	RS-10M8-D185	RS-15M8-D185	RS-25M8-D185
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
RS-03M5-D045	RS-05M5-D045	RS-10M5-D045	RS-15M5-D045	RS-25M5-D045
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
RS-03M3-D045	RS-05M3-D045	RS-10M3-D045	RS-15M3-D045	RS-25M3-D045

<b>PROTO 200 C18 5µm</b>	<b>1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns</b>			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
RS-0301-D185	RS-0501-D185	RS-1001-D185	RS-1501-D185	RS-2501-D185
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
RS-03M8-D185	RS-05M8-D185	RS-10M8-D185	RS-15M8-D185	RS-25M8-D185
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
RS-03M5-D185	RS-05M5-D185	RS-10M5-D185	RS-15M5-D185	RS-25M5-D185
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
RS-03M3-D185	RS-05M3-D185	RS-10M3-D185	RS-15M3-D185	RS-25M3-D185

**PROTO 300 Microbore Columns**



<b>PROTO 300 C4 5µm</b>	<b>1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns</b>			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
RS-0301-W045	RS-0501-W045	RS-1001-W045	RS-1501-W045	RS-2501-W045
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
RS-03M8-W045	RS-05M8-W045	RS-10M8-W045	RS-15M8-W045	RS-25M8-W045
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
RS-03M5-W045	RS-05M5-W045	RS-10M5-W045	RS-15M5-W045	RS-25M5-W045
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
RS-03M3-W045	RS-05M3-W045	RS-10M3-W045	RS-15M3-W045	RS-25M3-W045

<b>PROTO 300 C18 5µm</b>	<b>1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns</b>			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
RS-0301-W185	RS-0501-W185	RS-1001-W185	RS-1501-W185	RS-2501-W185
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
RS-03M8-W185	RS-05M8-W185	RS-10M8-W185	RS-15M8-W185	RS-25M8-W185
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
RS-03M5-W185	RS-05M5-W185	RS-10M5-W185	RS-15M5-W185	RS-25M5-W185
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
RS-03M3-W185	RS-05M3-W185	RS-10M3-W185	RS-15M3-W185	RS-25M3-W185

**PHALANX Microbore Columns (5µm PHALANX on following page)**



<b>PHALANX C18 3µm</b>	<b>1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns</b>			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
PS-0301-C183	PS-0501-C183	PS-1001-C183	PS-1501-C183	PS-2501-C183
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
PS-03M8-C183	PS-05M8-C183	PS-10M8-C183	PS-15M8-C183	PS-25M8-C183
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
PS-03M5-C183	PS-05M5-C183	PS-10M5-C183	PS-15M5-C183	PS-25M5-C183
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
PS-03M3-C183	PS-05M3-C183	PS-10M3-C183	PS-15M3-C183	PS-25M3-C183



## Microbore HPLC Columns (continued)

Wide Range of 1mm, 0.5mm, and 0.3mm Columns



Higgins Analytical manufactures the widest range of Microbore HPLC Columns in the world.

### PHALANX Microbore Columns (cont. - 3µm PHALANX on previous page)



PHALANX C18 5µm	1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
PS-0301-C185	PS-0501-C185	PS-1001-C185	PS-1501-C185	PS-2501-C185
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
PS-03M8-C185	PS-05M8-C185	PS-10M8-C185	PS-15M8-C185	PS-25M8-C185
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
PS-03M5-C185	PS-05M5-C185	PS-10M5-C185	PS-15M5-C185	PS-25M5-C185
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
PS-03M3-C185	PS-05M3-C185	PS-10M3-C185	PS-15M3-C185	PS-25M3-C185

### TARGA Microbore Columns



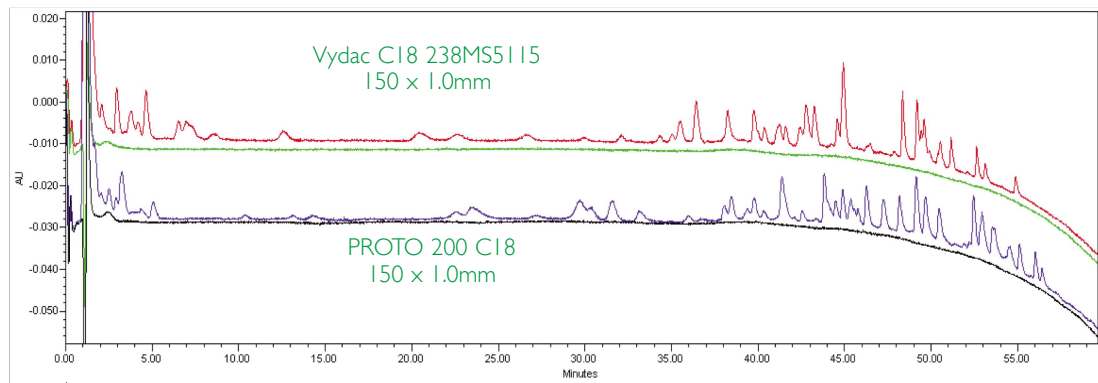
TARGA C8 5µm	1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
TS-0301-C085	TS-0501-C085	TS-1001-C085	TS-1501-C085	TS-2501-C085
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
TS-03M8-C085	TS-05M8-C085	TS-10M8-C085	TS-15M8-C085	TS-25M8-C085
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
TS-03M5-C085	TS-05M5-C085	TS-10M5-C085	TS-15M5-C085	TS-25M5-C085
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
TS-03M3-C085	TS-05M3-C085	TS-10M3-C085	TS-15M3-C085	TS-25M3-C085

TARGA C18 3µm	1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
TS-0301-C183	TS-0501-C183	TS-1001-C183	TS-1501-C183	TS-2501-C183
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
TS-03M8-C183	TS-05M8-C183	TS-10M8-C183	TS-15M8-C183	TS-25M8-C183
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
TS-03M5-C183	TS-05M5-C183	TS-10M5-C183	TS-15M5-C183	TS-25M5-C183
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
TS-03M3-C183	TS-05M3-C183	TS-10M3-C183	TS-15M3-C183	TS-25M3-C183

TARGA C18 5µm	1.0, 0.8, 0.5, and 0.3mm I.D. s.s. columns			
30x1.0mm	50x1.0mm	100x1.0mm	150x1.0mm	250x1.0mm
TS-0301-C185	TS-0501-C185	TS-1001-C185	TS-1501-C185	TS-2501-C185
30x0.8mm	50x0.8mm	100x0.8mm	150x0.8mm	250x0.8mm
TS-03M8-C185	TS-05M8-C185	TS-10M8-C185	TS-15M8-C185	TS-25M8-C185
30x0.5mm	50x0.5mm	100x0.5mm	150x0.5mm	250x0.5mm
TS-03M5-C185	TS-05M5-C185	TS-10M5-C185	TS-15M5-C185	TS-25M5-C185
30x0.3mm	50x0.3mm	100x0.3mm	150x0.3mm	250x0.3mm
TS-03M3-C185	TS-05M3-C185	TS-10M3-C185	TS-15M3-C185	TS-25M3-C185



Comparison of a Higgins to Another Manufacturer's Imm Column



Tryptic Digest of Carbamidomethylated BSA (see page 15 for details)



## Semi-Prep and Prep Columns

Wide Range of 10mm and 20mm i.d. columns



### Semi-Prep (10mm) and Prep (20mm) Columns

Not only does Higgins Analytical manufacture semi-prep and prep columns with our most popular phases, we also produce guard cartridges for these columns. See pages 56 - 57 (10mm) and 60 - 61 (20mm) for more information about guard cartridges, and pages 62 - 63 for cartridge holders.

### Guide to Semi-Prep and Prep Column Part Numbers

xS-xx10-xxxx 10mm I.D. columns

xS-xx20-xxxx 20mm I.D. columns

See Page 23 for complete Part Number information

### CLIQUEUS 10mm Semi-Prep and 20mm Prep Columns



CLIQUEUS C8 5µm	10 and 20mm I.D. s.s. columns			
	50x10mm	100x10mm	150x10mm	250x10mm
	CS-0510-C085	CS-1010-C085	CS-1510-C085	CS-2510-C085
	50x20mm	100x20mm	150x20mm	250x20mm
	CS-0520-C085	CS-1020-C085	CS-1520-C085	CS-2520-C085
CLIQUEUS C18 10µm	10 and 20mm I.D. s.s. columns			
	50x10mm	100x10mm	150x10mm	250x10mm
	CS-0510-C181	CS-1010-C181	CS-1510-C181	CS-2510-C181
	50x20mm	100x20mm	150x20mm	250x20mm
	CS-0520-C181	CS-1020-C181	CS-1520-C181	CS-2520-C181
CLIQUEUS C18 5µm	10 and 20mm I.D. s.s. columns			
	50x10mm	100x10mm	150x10mm	250x10mm
	CS-0510-C185	CS-1010-C185	CS-1510-C185	CS-2510-C185
	50x20mm	100x20mm	150x20mm	250x20mm
	CS-0520-C185	CS-1020-C185	CS-1520-C185	\$2360 CS-2520-C185
CLIQUEUS Silica 10µm	10 and 20mm I.D. s.s. columns			
	50x10mm	100x10mm	150x10mm	250x10mm
	CS-0510-SIL1	CS-1010-SIL1	CS-1510-SIL1	CS-2510-SIL1
	50x20mm	100x20mm	150x20mm	250x20mm
	CS-0520-SIL1	CS-1020-SIL1	CS-1520-SIL1	CS-2520-SIL1



**HAISIL 100 10mm Semi-Prep and 20mm Prep Columns**



<b>HAISIL 100 C8 5µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm HS-0510-M085	100x10mm HS-1010-M085	150x10mm HS-1510-M085	250x10mm HS-2510-M085
\$1310	50x20mm HS-0520-M085	100x20mm HS-1020-M085	150x20mm HS-1520-M085	250x20mm HS-2520-M085
	\$1260	0	\$2360	

<b>HAISIL 100 C18 5µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm HS-0510-M185	100x10mm HS-1010-M185	150x10mm HS-1510-M185	250x10mm HS-2510-M185
\$1310	50x20mm HS-0520-M185	100x20mm HS-1020-M185	150x20mm HS-1520-M185	250x20mm HS-2520-M185
	\$1260	0	\$2360	



**PHALANX 10mm Semi-Prep and 20mm Prep Columns**

<b>PHALANX C18 10µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm PS-0510-C181	100x10mm PS-1010-C181	150x10mm PS-1510-C181	250x10mm PS-2510-C181
\$2090	50x20mm PS-0520-C181	100x20mm PS-1020-C181	150x20mm PS-1520-C181	250x20mm PS-2520-C181
			\$1640	

<b>PHALANX C18 5µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm PS-0510-C185	100x10mm PS-1010-C185	150x10mm PS-1510-C185	250x10mm PS-2510-C185
\$1310	50x20mm PS-0520-C185	100x20mm PS-1020-C185	200 mm PS-1520-C185	250x20mm PS-2520-C185
	\$1260	0	\$2360	

**PROTO 200 10mm Semi-Prep and 20mm Prep Columns**

<b>PROTO 200 C4 10µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm RS-0510-D041	100x10mm RS-1010-D041	150x10mm RS-1510-D041	250x10mm RS-2510-D041
\$2090	50x20mm RS-0520-D041	100x20mm RS-1020-D041	150x20mm RS-1520-D041	250x20mm RS-2520-D041
			\$1640	

<b>PROTO 200 C4 5µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm RS-0510-D045	100x10mm RS-1010-D045	150x10mm RS-1510-D045	250x10mm RS-2510-D045
	50x20mm RS-0520-D045	100x20mm RS-1020-D045	150x20mm RS-1520-D045	250x20mm RS-2520-D045

<b>PROTO 200 C18 10µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm RS-0510-D181	100x10mm RS-1010-D181	150x10mm RS-1510-D181	250x10mm RS-2510-D181
	50x20mm RS-0520-D181	100x20mm RS-1020-D181	150x20mm RS-1520-D181	250x20mm RS-2520-D181



## SEMI-PREP AND PREP COLUMNS ORDERING INFORMATION

<b>PROTO 200 C18 5µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm	100x10mm	150x10mm	250x10mm
	RS-0510-D185	RS-1010-D185	RS-1510-D185	RS-2510-D185
	50x20mm	100x20mm	150x20mm	250x20mm
	RS-0520-D185	RS-1020-D185	RS-1520-D185	RS-2520-D185

### PROTO 300 10mm Semi-Prep and 20mm Prep Columns

<b>PROTO 300 C4 10µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm	100x10mm	150x10mm	250x10mm
	RS-0510-W041	RS-1010-W041	RS-1510-W041	RS-2510-W041
	50x20mm	100x20mm	150x20mm	250x20mm
	RS-0520-W041	RS-1020-W041	RS-1520-W041	RS-2520-W041

<b>PROTO 300 C4 5µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm	100x10mm	150x10mm	250x10mm
	RS-0510-W045	RS-1010-W045	RS-1510-W045	RS-2510-W045
	50x20mm	100x20mm	150x20mm	250x20mm
	RS-0520-W045	RS-1020-W045	RS-1520-W045	RS-2520-W045

<b>PROTO 300 C18 10µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm	100x10mm	150x10mm	250x10mm
	RS-0510-W181	RS-1010-W181	RS-1510-W181	RS-2510-W181
	50x20mm	100x20mm	150x20mm	250x20mm
	RS-0520-W181	RS-1020-W181	RS-1520-W181	RS-2520-W181

<b>PROTO 300 C18 5µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm	100x10mm	150x10mm	250x10mm
	RS-0510-W185	RS-1010-W185	RS-1510-W185	RS-2510-W185
	50x20mm	100x20mm	150x20mm	250x20mm
	RS-0520-W185	RS-1020-W185	RS-1520-W185	RS-2520-W185

### TARGA 10mm Semi-Prep and 20mm Prep Columns

<b>TARGA C18 10µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm	100x10mm	150x10mm	250x10mm
	TS-0510-C181	TS-1010-C181	TS-1510-C181	TS-2510-C181
	50x20mm	100x20mm	150x20mm	250x20mm
	TS-0520-C181	TS-1020-C181	TS-1520-C181	TS-2520-C181

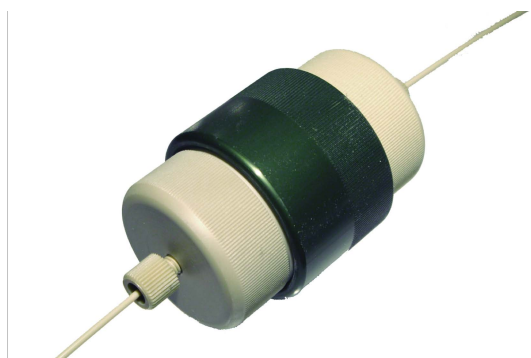
<b>TARGA C18 5µm</b>	<b>10 and 20mm I.D. s.s. columns</b>			
	50x10mm	100x10mm	150x10mm	250x10mm
	TS-0510-C185	TS-1010-C185	TS-1510-C185	TS-2510-C185
	50x20mm	100x20mm	150x20mm	250x20mm

See pages 56 - 57 and 60 - 61 for information about Guard Cartridges available for these Prep and Semi-Prep Columns

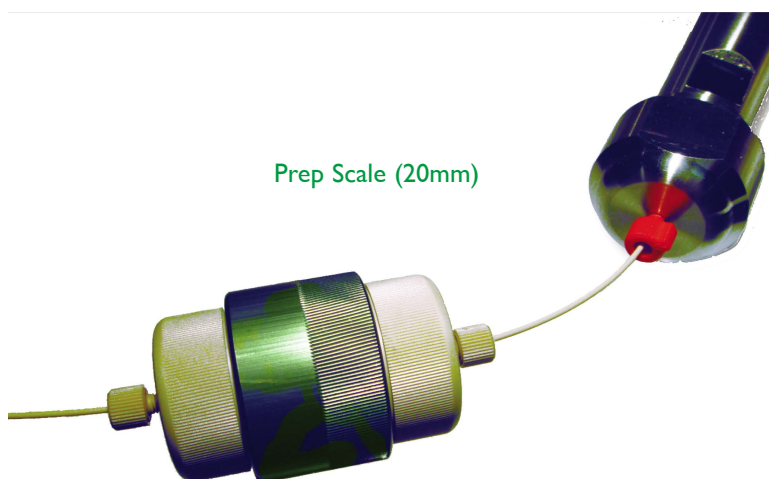




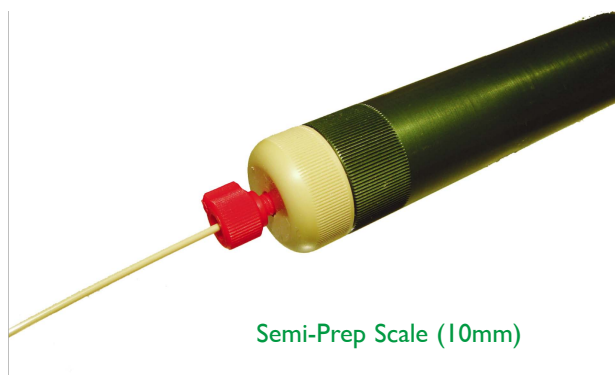
See pages 66 - 67 for information about the Prep and Semi-Prep Cartridge Holders



Prep Scale (20mm)



Prep Scale (20mm)



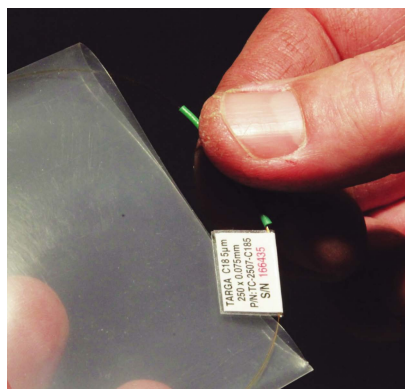
Semi-Prep Scale (10mm)



**Capillary™**  
**CAPILLARY HPLC COLUMNS**

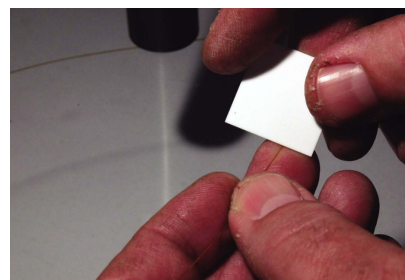
*A New Benchmark in Capillary Column Quality and Cost:*

Higgins Analytical's unique approach provides a flexible format and reasonably priced capillary HPLC column for LC-MS applications. Capillary,  $\pi$ , columns are all manufactured and tested as 250mm products and are offered for the reasonable price of \$314.16 for both 75 $\mu$ m and 150 $\mu$ m versions.



*Cutting and trimming a Capillary™ Column:*

The Capillaries can be used as is, or they can be easily cut to any required length, with a ceramic cutter that is included with each column. Capillary™ columns are nominally 25cm in length. Unless the capillary is going to be used in its full length, the white ceramic cutter is used to cut the column to the required size. Measure from the frit in the center of the green section. This technique can also be useful for removing a short section from the column inlet if it becomes contaminated or plugged. Similarly, the column outlet can be trimmed to a proper length before attaching it to the post-column device.

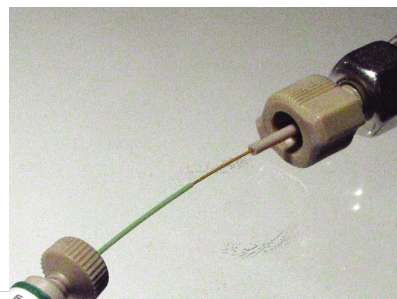
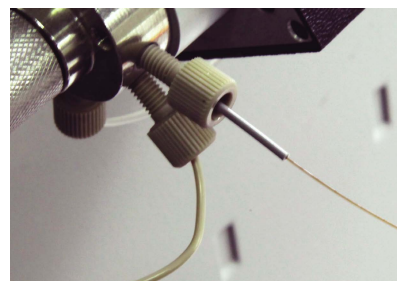


**\$314.16**

TARGA C18 5 $\mu$ m  
 250 x 0.075mm  
 P/N: TC-2507-C185  
 S/N 166435

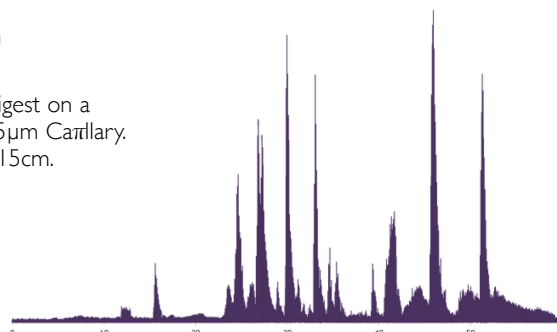
*Plumbing Considerations:*

The Capillary™ 75 and Capillary™ 150 columns have standard 360 $\mu$ m outer diameters which can be conveniently plumbed to HPLC systems in a wide variety of manners. The optional Higgins Micro Column Connection Kit (P/N MIC-KIT, see page 69) includes sleeves and finger-tight bushings to facilitate capillary column attachment to most injection valves, detectors, and MS source inlets.



**Robust design with High Performance:**

To the right, aBSA tryptic digest on a 150cm x 75 $\mu$ m Targa C18 5 $\mu$ m Capillary. P/N TC-2507-C185 cut to 15cm.





**HAISIL 300 C18 5µm**



250x0.075mm	
HC-2507-W185	\$314.16
250x0.150mm	
HC-2515-W185	\$314.16

**HAISIL HL C18 5µm**



250x0.075mm	
LC-2507-C185	\$314.16
250x0.150mm	
LC-2515-C185	\$314.16

**CLIQUEUS C8 5µm**



250x0.075mm	
CC-2507-C085	\$314.16
250x0.150mm	
CC-2515-C085	\$314.16

**CLIQUEUS C18 5µm**

250x0.075mm	
CC-2507-C185	\$314.16
250x0.150mm	
CC-2515-C185	\$314.16

**CLIQUEUS CYANO 5µm**

250x0.075mm	
CC-2507-CNP5	\$314.16
250x0.150mm	
CC-2515-CNP5	\$314.16

**CLIQUEUS PHENYL 5µm**

250x0.075mm	
CC-2507-PHN5	\$314.16
250x0.150mm	
CC-2515-PHN5	\$314.16

**CLIQUEUS SILICA 5µm**

250x0.075mm	
CC-2507-SIL5	\$314.16
250x0.150mm	
CC-2515-SIL5	\$314.16

**HAISIL 100 C8 5µm**



250x0.075mm	
HC-2507-M085	\$314.16
250x0.150mm	
HC-2515-M085	\$314.16

**HAISIL 100 C18 5µm**

250x0.075mm	
HC-2507-M185	\$314.16
250x0.150mm	
HC-2515-M185	\$314.16

**HAISIL 100 SILICA 5µm**

250x0.075mm	
HC-2507-SIL5	\$314.16
250x0.150mm	
HC-2515-SIL5	\$314.16

**PROTO 200 C4 5µm**



250x0.075mm	
RC-2507-D045	\$314.16
250x0.150mm	
RC-2515-D045	\$314.16

**PROTO 200 C18 5µm**

250x0.075mm	
RC-2507-D185	\$314.16
250x0.150mm	
RC-2515-D185	\$314.16

**PROTO 300 C4 5µm75µm and 150µm**



250x0.075mm	
RC-2507-W045	\$314.16
250x0.150mm	
RC-2515-W045	\$314.16

**PROTO 300 C18 5µm75µm and 150µm**

250x0.075mm	
RC-2507-W185	\$314.16
250x0.150mm	
RC-2515-W185	\$314.16

**PHALANX C18 5µm75µm and 150µm**



250x0.075mm	
PC-2507-C185	\$314.16
250x0.150mm	
PC-2515-C185	\$314.16

**TARGA C8 5µm75µm and 150µm**



250x0.075mm	
TC-2507-C085	\$314.16
250x0.150mm	
TC-2515-C085	\$314.16

**TARGA C18 5µm**

250x0.075mm	
TC-2507-C185	\$314.16
250x0.150mm	
TC-2515-C185	\$314.16

Catllary™ is a trademark of Higgins Analytical, Inc.

## CAPELLINI 6-32

### CAPILLARY HPLC COLUMNS with 6-32 Thread PEEK/Ti Fittings



#### Capillary HPLC Columns

Unique Features:

- 6-32 threads for capillary fittings
- PEEK/Titanium fittings
- Tested and supplied with CofA
- High performance
- Higgins Analytical Sorbents

Applications:

- LC-MS
- Microbore HPLC

Standard Sizes:

- 50 to 150 × 0.150mm
- 50 to 150 × 0.075mm
- Longer and shorter lengths available

#### Guide to CAPELLINI Part Numbers

xFS-xx07-xxxx 75µm CAPELLINI 6-32  
 xFS-xx15-xxxx 150µm CAPELLINI 6-32

See Page 23 for complete Part Number information

Higgins Analytical Capellini are robust, high performance capillary HPLC columns for LC-MS and other very small scale applications. The inert PEEK and titanium fittings complement the Higgins Analytical sorbents such as TARGA which was developed to enable LC-MS applications without TFA.

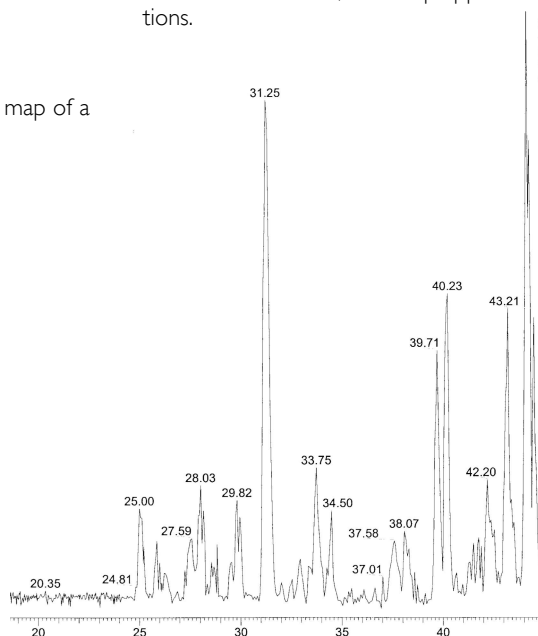
Our no nonsense testing procedure does not resort to sample and flow splitting techniques, inaccurate  $k'$  values, and miniscule chromatograms, as do some manufacturers, to illustrate column performance. The CofA's symmetrical peaks and the high resolution map speak for themselves.

#### Capellini - Back by Popular Demand

When Higgins Analytical introduced Capillary columns three years ago, we removed Capellini from our catalog, however, we continued to manufacture this design for customers that had been using it for several years. Somewhat to our surprise, Capellini sales have continued to grow and we still receive numerous product inquiries in spite of their absence from our literature. While Capillary columns are very efficient and cost effective (see page 40), we have found that many chromatographers prefer the symmetrical, flow reversible design and the 6-32 threaded end-fittings of Capellini. Even though Capellini are more expensive to manufacture and somewhat less efficient than Capillary columns, due to the end fitting design, they enjoy a wide variety of uses that involve flow reversal, such trap applications.

#### High Selectivity:

A partial 1.5µL/min LCMSMS map of a BSA tryptic digest.



**CLIQUEUS Capillary Columns with 6-32 threads**



**CLIQUEUS C8 5µm**

**75µm and 150µm Capillary columns**

50x0.075mm	100x0.075mm	150x0.075mm
CFS-0507-C085	CFS-1007-C085	CFS-1507-C085
50x0.150mm	100x0.150mm	150x0.150mm
CFS-0515-C085	CFS-1015-C085	CFS-1515-C085

**CLIQUEUS C18 5µm**

**75µm and 150µm Capillary columns**

50x0.075mm	100x0.075mm	150x0.075mm
CFS-0507-C185	CFS-1007-C185	CFS-1507-C185
50x0.150mm	100x0.150mm	150x0.150mm
CFS-0515-C185	CFS-1015-C185	CFS-1515-C185

**CLIQUEUS Cyano 5µm**

**75µm and 150µm Capillary columns**

50x0.075mm	100x0.075mm	150x0.075mm
CFS-0507-CNP5	CFS-1007-CNP5	CFS-1507-CNP5
50x0.150mm	100x0.150mm	150x0.150mm
CFS-0515-CNP5	CFS-1015-CNP5	CFS-1515-CNP5

**CLIQUEUS Phenyl 5µm**

**75µm and 150µm Capillary columns**

50x0.075mm	100x0.075mm	150x0.075mm
CFS-0507-PHN5	CFS-1007-PHN5	CFS-1507-PHN5
50x0.150mm	100x0.150mm	150x0.150mm
CFS-0515-PHN5	CFS-1015-PHN5	CFS-1515-PHN5

**CLIQUEUS Silica 5µm**

**75µm and 150µm Capillary columns**

50x0.075mm	100x0.075mm	150x0.075mm
CFS-0507-SIL5	CFS-1007-SIL5	CFS-1507-SIL5
50x0.150mm	100x0.150mm	150x0.150mm
CFS-0515-SIL5	CFS-1015-SIL5	CFS-1515-SIL5

**HAISIL100 Capillary Columns with 6-32 threads**



**HAISIL 100 C8 5µm**

**75µm and 150µm Capillary columns**

50x0.075mm	100x0.075mm	150x0.075mm
HFS-0507-M085	HFS-1007-M085	HFS-1507-M085
50x0.150mm	100x0.150mm	150x0.150mm
HFS-0515-M085	HFS-1015-M085	HFS-1515-M085

**HAISIL 100 C18 5µm**

**75µm and 150µm Capillary columns**

50x0.075mm	100x0.075mm	150x0.075mm
HFS-0507-M185	HFS-1007-M185	HFS-1507-M185
50x0.150mm	100x0.150mm	150x0.150mm
HFS-0515-M185	HFS-1015-M185	HFS-1515-M185

**HAISIL 100 Silica 5µm**

**75µm and 150µm Capillary columns**

50x0.075mm	100x0.075mm	150x0.075mm
HFS-0507-SIL5	HFS-1007-SIL5	HFS-1507-SIL5
50x0.150mm	100x0.150mm	150x0.150mm
HFS-0515-SIL5	HFS-1015-SIL5	HFS-1515-SIL5



## CAPELLINI 6-32 (cont.)

CAPILLARY HPLC COLUMNS with 6-32 Thread PEEK/Ti Fittings



### HAISIL300 Capillary Columns with 6-32 threads

HAISIL 300 C18 5µm	75µm and 150µm Capillary columns		
50x0.075mm	100x0.075mm	150x0.075mm	
HFS-0507-W185	HFS-1007-W185	HFS-1507-W185	
50x0.150mm	100x0.150mm	150x0.150mm	
HFS-0515-W185	HFS-1015-W185	HFS-1515-W185	

### PROTO 200 Capillary Columns with 6-32 threads



PROTO 200 C4 5µm	75µm and 150µm Capillary columns		
50x0.075mm	100x0.075mm	150x0.075mm	
RFS-0507-D045	RFS-1007-D045	RFS-1507-D045	
50x0.150mm	100x0.150mm	150x0.150mm	
RFS-0515-D045	RFS-1015-D045	RFS-1515-D045	

PROTO 200 C18 5µm	75µm and 150µm Capillary columns		
50x0.075mm	100x0.075mm	150x0.075mm	
RFS-0507-D185	RFS-1007-D185	RFS-1507-D185	
50x0.150mm	100x0.150mm	150x0.150mm	
RFS-0515-D185	RFS-1015-D185	RFS-1515-D185	

### PROTO 300 Capillary Columns with 6-32 threads



PROTO 300 C4 5µm	75µm and 150µm Capillary columns		
50x0.075mm	100x0.075mm	150x0.075mm	
RFS-0507-W045	RFS-1007-W045	RFS-1507-W045	
50x0.150mm	100x0.150mm	150x0.150mm	
RFS-0515-W045	RFS-1015-W045	RFS-1515-W045	

PROTO 300 C18 5µm	75µm and 150µm Capillary columns		
50x0.075mm	100x0.075mm	150x0.075mm	
RFS-0507-W185	RFS-1007-W185	RFS-1507-W185	
50x0.150mm	100x0.150mm	150x0.150mm	
RFS-0515-W185	RFS-1015-W185	RFS-1515-W185	



**PHALANX Capillary Columns with 6-32 threads**



<b>PHALANX C18 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
	50x0.075mm	100x0.075mm	150x0.075mm
	PFS-0507-C185	PFS-1007-C185	PFS-1507-C185
	50x0.150mm	100x0.150mm	150x0.150mm
	PFS-0515-C185	PFS-1015-C185	PFS-1515-C185

**TARGA Capillary Columns with 6-32 threads**



<b>TARGA C8 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
	50x0.075mm	100x0.075mm	150x0.075mm
	TFS-0507-C085	TFS-1007-C085	TFS-1507-C085
	50x0.150mm	100x0.150mm	150x0.150mm
	TFS-0515-C085	TFS-1015-C085	TFS-1515-C085

<b>TARGA C18 3µm</b>	<b>75µm and 150µm Capillary columns</b>		
	50x0.075mm	100x0.075mm	150x0.075mm
	TFS-0507-C183	TFS-1007-C183	TFS-1507-C183
	50x0.150mm	100x0.150mm	150x0.150mm
	TFS-0515-C183	TFS-1015-C183	TFS-1515-C183

<b>TARGA C18 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
	50x0.075mm	100x0.075mm	150x0.075mm
	TFS-0507-C185	TFS-1007-C185	TFS-1507-C185
	50x0.150mm	100x0.150mm	150x0.150mm
	TFS-0515-C185	TFS-1015-C185	TFS-1515-C185



## CAPELLINI 10-32

CAPILLARY HPLC COLUMNS with 10-32 Thread s.s. Fittings



### Capillary HPLC Columns

Unique Features:

- 10-32 threads for standard fittings
- s.s. End Fittings/Titanium Frits
- Tested and supplied with CofA
- High performance
- Higgins Analytical Sorbents

Applications:

- LC-MS
- Microbore HPLC

Standard Sizes:

- 50 to 150 x 0.150mm
- 50 to 150 x 0.075mm
- Longer and shorter lengths available

Higgins Analytical Capellini have been popular with chromatographers requiring an easy-to-use and robust capillary HPLC column. The original Capellini (now called Capellini 6-32) were available only with 6-32 fittings. Now, we have another version for chromatographers preferring 10-32 thread fittings - Capellini 10-32. Another difference between the two versions of Capellini is that the 10-32 threads are stainless steel rather than PEEK. Both types are made with titanium frits on each end, providing inertness and flow direction reversability.

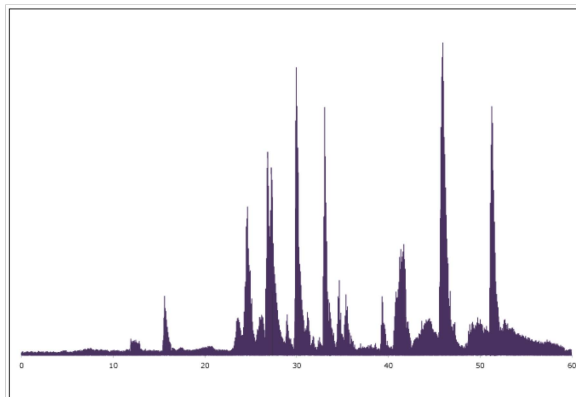
### Guide to CAPELLINI 10-32 Part Numbers

xPS-xx07-xxxx 75µm CAPELLINI 10-32  
 xPS-xx15-xxxx 150µm CAPELLINI 10-32

See Page 23 for complete Part Number information

### Robust design with High Performance:

To the right, aBSA tryptic digest on a 150cm x 75µm Targa C18 5µm Capellini. P/N TC-1507-C185







**CLIQUEUS Capillary Columns with 10-32 threads**

<b>CLIQUEUS C8 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
	50x0.075mm	100x0.075mm	150x0.075mm
	CPS-0507-C085	CPS-1007-C085	CPS-1507-C085
	50x0.150mm	100x0.150mm	150x0.150mm
	CPS-0515-C085	CPS-1015-C085	CPS-1515-C085

<b>CLIQUEUS C18 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
	50x0.075mm	100x0.075mm	150x0.075mm
	CPS-0507-C185	CPS-1007-C185	CPS-1507-C185
	50x0.150mm	100x0.150mm	150x0.150mm
	CPS-0515-C185	CPS-1015-C185	CPS-1515-C185

<b>CLIQUEUS Cyano 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
	50x0.075mm	100x0.075mm	150x0.075mm
	CPS-0507-CNP5	CPS-1007-CNP5	CPS-1507-CNP5
	50x0.150mm	100x0.150mm	150x0.150mm
	CPS-0515-CNP5	CPS-1015-CNP5	CPS-1515-CNP5

<b>CLIQUEUS Phenyl 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
	50x0.075mm	100x0.075mm	150x0.075mm
	CPS-0507-PHN5	CPS-1007-PHN5	CPS-1507-PHN5
	50x0.150mm	100x0.150mm	150x0.150mm
	CPS-0515-PHN5	CPS-1015-PHN5	CPS-1515-PHN5

<b>CLIQUEUS Silica 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
	50x0.075mm	100x0.075mm	150x0.075mm
	CPS-0507-SIL5	CPS-1007-SIL5	CPS-1507-SIL5
	50x0.150mm	100x0.150mm	150x0.150mm
	CPS-0515-SIL5	CPS-1015-SIL5	CPS-1515-SIL5



**HASIL100 Capillary Columns with 10-32 threads**

<b>HASIL 100 C8 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
	50x0.075mm	100x0.075mm	150x0.075mm
	HPS-0507-M085	HPS-1007-M085	HPS-1507-M085
	50x0.150mm	100x0.150mm	150x0.150mm
	HPS-0515-M085	HPS-1015-M085	HPS-1515-M085

<b>HASIL 100 C18 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
	50x0.075mm	100x0.075mm	150x0.075mm
	HPS-0507-M185	HPS-1007-M185	HPS-1507-M185
	50x0.150mm	100x0.150mm	150x0.150mm
	HPS-0515-M185	HPS-1015-M185	HPS-1515-M185

<b>HASIL 100 Silica 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
	50x0.075mm	100x0.075mm	150x0.075mm
	HPS-0507-SIL5	HPS-1007-SIL5	HPS-1507-SIL5
	50x0.150mm	100x0.150mm	150x0.150mm
	HPS-0515-SIL5	HPS-1015-SIL5	HPS-1515-SIL5



## CAPELLINI 10-32 (cont.)

CAPILLARY HPLC COLUMNS with 10-32 Thread s.s. Fittings



### HAISIL300 Capillary Columns with 10-32 threads

HAISIL 300 C18 5µm	75µm and 150µm Capillary columns		
50x0.075mm HPS-0507-W185	100x0.075mm HPS-1007-W185	150x0.075mm HPS-1507-W185	
50x0.150mm HPS-0515-W185	100x0.150mm HPS-1015-W185	150x0.150mm HPS-1515-W185	

### PROTO 200 Capillary Columns with 10-32 threads

200

PROTO 200 C4 5µm	75µm and 150µm Capillary columns		
50x0.075mm RPS-0507-D045	100x0.075mm RPS-1007-D045	150x0.075mm RPS-1507-D045	
50x0.150mm RPS-0515-D045	100x0.150mm RPS-1015-D045	150x0.150mm RPS-1515-D045	

PROTO 200 C18 5µm	75µm and 150µm Capillary columns		
50x0.075mm RPS-0507-D185	100x0.075mm RPS-1007-D185	150x0.075mm RPS-1507-D185	
50x0.150mm RPS-0515-D185	100x0.150mm RPS-1015-D185	150x0.150mm RPS-1515-D185	

### PROTO 300 Capillary Columns with 10-32 threads



PROTO 300 C4 5µm	75µm and 150µm Capillary columns		
50x0.075mm RPS-0507-W045	100x0.075mm RPS-1007-W045	150x0.075mm RPS-1507-W045	
50x0.150mm RPS-0515-W045	100x0.150mm RPS-1015-W045	150x0.150mm RPS-1515-W045	

PROTO 300 C18 5µm	75µm and 150µm Capillary columns		
50x0.075mm RPS-0507-W185	100x0.075mm RPS-1007-W185	150x0.075mm RPS-1507-W185	
50x0.150mm RPS-0515-W185	100x0.150mm RPS-1015-W185	150x0.150mm RPS-1515-W185	



**PHALANX Capillary Columns with 10-32 threads**



<b>PHALANX C18 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
50x0.075mm	100x0.075mm	150x0.075mm	
PPS-0507-C185	PPS-1007-C185	PPS-1507-C185	
50x0.150mm	100x0.150mm	150x0.150mm	
PPS-0515-C185	PPS-1015-C185	PPS-1515-C185	

**TARGA Capillary Columns with 10-32 threads**



<b>TARGA C8 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
50x0.075mm	100x0.075mm	150x0.075mm	
TPS-0507-C085	TPS-1007-C085	TPS-1507-C085	
50x0.150mm	100x0.150mm	150x0.150mm	
TPS-0515-C085	TPS-1015-C085	TPS-1515-C085	

<b>TARGA C18 3µm</b>	<b>75µm and 150µm Capillary columns</b>		
50x0.075mm	100x0.075mm	150x0.075mm	
TPS-0507-C183	TPS-1007-C183	TPS-1507-C183	
50x0.150mm	100x0.150mm	150x0.150mm	
TPS-0515-C183	TPS-1015-C183	TPS-1515-C183	

<b>TARGA C18 5µm</b>	<b>75µm and 150µm Capillary columns</b>		
50x0.075mm	100x0.075mm	150x0.075mm	
TPS-0507-C185	TPS-1007-C185	TPS-1507-C185	
50x0.150mm	100x0.150mm	150x0.150mm	
TPS-0515-C185	TPS-1015-C185	TPS-1515-C185	



## SPRITE

### DIRECT CONNECT HPLC COLUMN



#### Guide to SPRITE Part Numbers

xR-0121-xxxx 10 x 2.1mm Sprite

xR-0221-xxxx 20 x 2.1mm Sprite

xR-0421-xxxx 40 x 2.1mm Sprite

See Page 23 for complete Part Number information

The Sprite family of narrowbore HPLC columns is a unique high performance product for LC-MS and other high-speed, small volume applications. All three sizes of 2.1mm I.D Sprite HPLC columns are individually tested. A Certificate of Analysis accompanies each column. The Sprite's certificate includes the original chromatogram and comprehensive testing and sorbent documentation.

The inert PEEK and titanium design has been proven to be structurally sound to over 5,000 PSI (340Bar).

The optional Higgins *Micro Column Connection Kit* (PIN MIC-KIT, see page 69) includes sleeves and finger-tight bushings to facilitate the attachment of a Sprite to most injection valves, detectors, and MS source inlets.

## CLIQUEUS Sprite



### CLIQUEUS C8 5µm

10X2.1mm CR-0121-C085	20X2.1mm CR-0221-C085	40X2.1mm CR-0421-C085
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### CLIQUEUS C18 5µm

10X2.1mm CR-0121-C185	20X2.1mm CR-0221-C185	40X2.1mm CR-0421-C185
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### CLIQUEUS Cyano 5µm

10X2.1mm CR-0121-CNP5	20X2.1mm CR-0221-CNP5	40X2.1mm CR-0421-CNP5
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### CLIQUEUS Phenyl 5µm

10X2.1mm CR-0121-PHN5	20X2.1mm CR-0221-PHN5	40X2.1mm CR-0421-PHN5
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### CLIQUEUS Silica 5µm

10X2.1mm CR-0121-SIL5	20X2.1mm CR-0221-SIL5	40X2.1mm CR-0421-SIL5
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## HAISIL 100 Sprite



### HAISIL 100 C8 5µm

10X2.1mm HR-0121-M085	20X2.1mm HR-0221-M085	40X2.1mm HR-0421-M085
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### HAISIL 100 C18 5µm

10X2.1mm HR-0121-M185	20X2.1mm HR-0221-M185	40X2.1mm HR-0421-M185
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## HAISIL 300 Sprite



### HAISIL 300 C18 5µm

10X2.1mm HR-0121-W185	20X2.1mm HR-0221-W185	40X2.1mm HR-0421-W185
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### HAISIL HL Sprite



#### HAISIL HL C18 5µm

10X2.1mm  
LR-0121-C185

20X2.1mm  
LR-0221-C185

40X2.1mm  
LR-0421-C185

### PHALANX Sprite



#### PHALANX C18 5µm

10X2.1mm  
PR-0121-C185

20X2.1mm  
PR-0221-C185

40X2.1mm  
PR-0421-C185

### PROTO 200 Sprite

200

#### PROTO 200 C4 5µm

10X2.1mm  
RR-0121-D045

20X2.1mm  
RR-0221-D045

40X2.1mm  
RR-0421-D045

#### PROTO 200 C18 5µm

10X2.1mm  
RR-0121-D185

20X2.1mm  
RR-0221-D185

40X2.1mm  
RR-0421-D185

### PROTO 300 Sprite



#### PROTO 300 C4 5µm

10X2.1mm  
RR-0121-W045

20X2.1mm  
RR-0221-W045

40X2.1mm  
RR-0421-W045

#### PROTO 300 C18 5µm

10X2.1mm  
RR-0121-W185

20X2.1mm  
RR-0221-W185

40X2.1mm  
RR-0421-W185

### TARGA Sprite



#### TARGA C8 5µm

10X2.1mm  
TR-0121-C085

20X2.1mm  
TR-0221-C085

40X2.1mm  
TR-0421-C085

#### TARGA C18 5µm

10X2.1mm  
TR-0121-C185

20X2.1mm  
TR-0221-C185

40X2.1mm  
TR-0421-C185



### SPRITE is Designed to Operate in Either Flow Direction

A SPRITE is made of PEEK and titanium and can be connected directly to a sample injection valve or directly to a mass spectrometer's source inlet.



## PICCOLO

### SHORT MICROBORE TRAPS AND COLUMNS



The Piccolo family of microbore HPLC columns is a unique high performance product for LC-MS and other high-speed, small volume applications. These efficient columns are the only products of their type that are individually tested. A Certificate of Analysis accompanies each column.

In addition to analytical microbore applications Piccolo columns are ideal guards for protecting longer microbore HPLC columns.

Piccolo column void volumes range from approximately 5µl to 300nL, making them perfect for a wide variety of trapping, desalting, and trace enrichment applications. These small columns can be conveniently used with micro injection and switching valves as pictured on the left.

The optional Higgins *Micro Column Connection Kit* (P/N MIC-KIT, see page 69) includes sleeves and finger-tight bushings to facilitate the attachment of a Piccolo's 6-32 threads to most injection valves, detectors, and MS source inlets.

#### Guide to PICCOLO Part Numbers

- xP-M2M3-xxxx 2.5 x 0.3mm PICCOLO
- xP-M2M5-xxxx 2.5 x 0.5mm PICCOLO
- xP-M501-xxxx 5 x 1mm PICCOLO
- xP-0101-xxxx 10 x 1mm PICCOLO
- xP-0301-xxxx 30 x 1mm PICCOLO

See Page 23 for complete Part Number information

### CLIQUEUS Piccolo



#### CLIQUEUS C8 5µm

2.5X0.3mm CP-M2M3-C085	2.5X0.5mm CP-M2M5-C085	5X1mm CP-M501-C085	10x1mm CP-0101-C085	30x1mm CP-0301-C085
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#### CLIQUEUS C18 5µm

2.5X0.3mm CP-M2M3-C185	2.5X0.5mm CP-M2M5-C185	5X1mm CP-M501-C185	10x1mm CP-0101-C185	30x1mm CP-0301-C185
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#### CLIQUEUS Cyano 5µm

2.5X0.3mm CP-M2M3-CNP5	2.5X0.5mm CP-M2M5-CNP5	5X1mm CP-M501-CNP5	10x1mm CP-0101-CNP5	30x1mm CP-0301-CNP5
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#### CLIQUEUS Phenyl 5µm

2.5X0.3mm CP-M2M3-PHN5	2.5X0.5mm CP-M2M5-PHN5	5X1mm CP-M501-PHN5	10x1mm CP-0101-PHN5	30x1mm CP-0301-PHN5
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#### CLIQUEUS Silica 5µm

2.5X0.3mm CP-M2M3-SIL5	2.5X0.5mm CP-M2M5-SIL5	5X1mm CP-M501-SIL5	10x1mm CP-0101-SIL5	30x1mm CP-0301-SIL5
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### HAISIL 100 Piccolo



#### HAISIL 100 C8 5µm

2.5X0.3mm HP-M2M3-M085	2.5X0.5mm HP-M2M5-M085	5X1mm HP-M501-M085	10x1mm HP-0101-M085	30x1mm HP-0301-M085
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#### HAISIL 100 C18 5µm

2.5X0.3mm HP-M2M3-M185	2.5X0.5mm HP-M2M5-M185	5X1mm HP-M501-M185	10x1mm HP-0101-M185	30x1mm HP-0301-M185
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### HAISIL 300 Piccolo



#### HAISIL 300 C18 5µm

2.5X0.3mm HP-M2M3-W185	2.5X0.5mm HP-M2M5-W185	5X1mm HP-M501-W185	10x1mm HP-0101-W185	30x1mm HP-0301-W185
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## PICCOLO (continued)

### SHORT MICROBORE COLUMNS



### HAISIL HL Piccolo

#### HAISIL HL C18 5µm

2.5X0.3mm LP-M2M3-C185	2.5X0.5mm LP-M2M5-C185	5X1mm LP-M501-C185	10x1mm LP-0101-C185	30x1mm LP-0301-C185
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### PHALANX Piccolo

#### PHALANX C18 5µm

2.5X0.3mm PP-M2M3-C185	2.5X0.5mm PP-M2M5-C185	5X1mm PP-M501-C185	10x1mm PP-0101-C185	30x1mm PP-0301-C185
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### PROTO 200 Piccolo 200

#### PROTO 200 C4 5µm

2.5X0.3mm RP-M2M3-D045	2.5X0.5mm RP-M2M5-D045	5X1mm RP-M501-D045	10x1mm RP-0101-D045	30x1mm RP-0301-D045
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#### PROTO 200 C18 5µm

2.5X0.3mm RP-M2M3-D185	2.5X0.5mm RP-M2M5-D185	5X1mm RP-M501-D185	10x1mm RP-0101-D185	30x1mm RP-0301-D185
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### PROTO 300 Piccolo

#### PROTO 300 C4 5µm

2.5X0.3mm RP-M2M3-W045	2.5X0.5mm RP-M2M5-W045	5X1mm RP-M501-W045	10x1mm RP-0101-W045	30x1mm RP-0301-W045
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#### PROTO 300 C18 5µm

2.5X0.3mm RP-M2M3-W185	2.5X0.5mm RP-M2M5-W185	5X1mm RP-M501-W185	10x1mm RP-0101-W185	30x1mm RP-0301-W185
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### TARGA Piccolo

#### TARGA C8 5µm

2.5X0.3mm TP-M2M3-C085	2.5X0.5mm TP-M2M5-C085	5X1mm TP-M501-C085	10x1mm TP-0101-C085	30x1mm TP-0301-C085
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#### TARGA C18 5µm

2.5X0.3mm TP-M2M3-C185	2.5X0.5mm TP-M2M5-C185	5X1mm TP-M501-C185	10x1mm TP-0101-C185	30x1mm TP-0301-C185
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## HAICART CARTRIDGES

### STAINLESS STEEL CARTRIDGE COLUMNS



#### Guide to HAICART Analytical Cartridge Part Numbers

xF-0421-xxxx	40 × 3.2mm stainless steel cartridge
xF-0532-xxxx	50 × 3.2mm stainless steel cartridge
xF-1032-xxxx	100 × 3.2mm stainless steel cartridge
xF-0446-xxxx	40 × 4.6mm stainless steel cartridge
xF-0546-xxxx	50 × 4.6mm stainless steel cartridge
xF-1046-xxxx	100 × 4.6mm stainless steel cartridge

See Page 23 for complete Part Number information

The HAICART family of HPLC cartridge columns provides a convenient and economical approach to guard column, trace enrichment, and fast analysis applications. These stainless steel cartridges are available with 3.2mm and 4.6mm internal diameters and with 2, 4, 5, or 10cm lengths. This wide selection makes it possible to address numerous analytical needs. See pages 66 - 67 for information about the cartridge holders required for Higgins Analytical's HAICART Cartridge Columns. HAICART cartridges are also compatible with PE/Brownlee MPLC cartridge holders.

### CLIQUEUS 3.2 and 4.6mm I.D. S.S. Cartridges



#### CLIQUEUS C8 5µm

20X3.2mm	5/pkg	40X3.2mm	2/pkg	50X3.2mm	2/pkg	100X3.2mm	1/pkg
CF-0232-C085		CF-0432-C085		CF-0532-C085		CF-1032-C085	
		40X4.6mm	2/pkg	50X4.6mm	2/pkg	100X4.6mm	1/pkg
		CF-0446-C085		CF-0546-C085		CF-1046-C085	

#### CLIQUEUS C18 5µm

20X3.2mm	5/pkg	40X3.2mm	2/pkg	50X3.2mm	2/pkg	100X3.2mm	1/pkg
CF-0232-C185		CF-0432-C185		CF-0532-C185		CF-1032-C185	
		40X4.6mm	2/pkg	50X4.6mm	2/pkg	100X4.6mm	1/pkg
		CF-0446-C185		CF-0546-C185		CF-1046-C185	

#### CLIQUEUS Cyano 5µm

20X3.2mm	5/pkg	40X3.2mm	2/pkg	50X3.2mm	2/pkg	100X3.2mm	1/pkg
CF-0232-CNP5		CF-0432-CNP5		CF-0532-CNP5		CF-1032-CNP5	
		40X4.6mm	2/pkg	50X4.6mm	2/pkg	100X4.6mm	1/pkg
		CF-0446-CNP5		CF-0546-CNP5		CF-1046-CNP5	

#### CLIQUEUS Phenyl 5µm

20X3.2mm	5/pkg	40X3.2mm	2/pkg	50X3.2mm	2/pkg	100X3.2mm	1/pkg
CF-0232-PHN5		CF-0432-PHN5		CF-0532-PHN5		CF-1032-PHN5	
		40X4.6mm	2/pkg	50X4.6mm	2/pkg	100X4.6mm	1/pkg
		CF-0446-PHN5		CF-0546-PHN5		CF-1046-PHN5	

#### CLIQUEUS Silica 5µm

20X3.2mm	5/pkg	40X3.2mm	2/pkg	50X3.2mm	2/pkg	100X3.2mm	1/pkg
CF-0232-SIL5		CF-0432-SIL5		CF-0532-SIL5		CF-1032-SIL5	
		40X4.6mm	2/pkg	50X4.6mm	2/pkg	100X4.6mm	1/pkg
		CF-0446-SIL5		CF-0546-SIL5		CF-1046-SIL5	





**HAISIL 100 C8 3.2 and 4.6mm I.D. S.S.Cartridges**



**HAISIL 100 C8 5µm**

20X3.2mm HF-0232-M085	5/pkg	40X3.2mm HF-0432-M085	2/pkg	50X3.2mm HF-0532-M085	2/pkg	100X3.2mm HF-1032-M085	1/pkg
		40X4.6mm HF-0446-M085	2/pkg	50X4.6mm HF-0546-M085	2/pkg	100X4.6mm HF-1046-M085	1/pkg
					\$310		
					\$310		

**HAISIL 100 C18 3.2 and 4.6mm I.D. S.S.Cartridges**

**HAISIL 100 C18 5µm**

20X3.2mm HF-0232-M185	5/pkg	40X3.2mm HF-0432-M185	2/pkg	50X3.2mm HF-0532-M185	2/pkg	100X3.2mm HF-1032-M185	1/pkg
		40X4.6mm HF-0446-M185	2/pkg	50X4.6mm HF-0546-M185	2/pkg	100X4.6mm HF-1046-M185	1/pkg
					\$310		
					\$310		



**HAISIL 300 3.2 and 4.6mm I.D. S.S.Cartridges**

**HAISIL 300 C18 5µm**

20X3.2mm HF-0232-W185	5/pkg	40X3.2mm HF-0432-W185	2/pkg	50X3.2mm HF-0532-W185	2/pkg	100X3.2mm HF-1032-W185	1/pkg
		40X4.6mm HF-0446-W185	2/pkg	50X4.6mm HF-0546-W185	2/pkg	100X4.6mm HF-1046-W185	1/pkg

**HAISIL HL 3.2 and 4.6mm I.D. S.S.Cartridges**



**HAISIL HL C18 5µm**

20X3.2mm LF-0232-C185	5/pkg	40X3.2mm LF-0432-C185	2/pkg	50X3.2mm LF-0532-C185	2/pkg	100X3.2mm LF-1032-C185	1/pkg
		40X4.6mm LF-0446-C185	2/pkg	50X4.6mm LF-0546-C185	2/pkg	100X4.6mm LF-1046-C185	1/pkg

**PROTO 200 3.2 and 4.6mm I.D. S.S.Cartridges**

200

**PROTO 200 C4 5µm**

20X3.2mm RF-0232-D045	5/pkg	40X3.2mm RF-0432-D045	2/pkg	50X3.2mm RF-0532-D045	2/pkg	100X3.2mm RF-1032-D045	1/pkg
		40X4.6mm RF-0446-D045	2/pkg	50X4.6mm RF-0546-D045	2/pkg	100X4.6mm RF-1046-D045	1/pkg

**PROTO 200 C18 5µm**

20X3.2mm RF-0232-D185	5/pkg	40X3.2mm RF-0432-D185	2/pkg	50X3.2mm RF-0532-D185	2/pkg	100X3.2mm RF-1032-D185	1/pkg
		40X4.6mm RF-0446-D185	2/pkg	50X4.6mm RF-0546-D185	2/pkg	100X4.6mm RF-1046-D185	1/pkg

**PROTO 300 3.2 and 4.6mm I.D. S.S.Cartridges**



**PROTO 300 C4 5µm**

20X3.2mm RF-0232-W045	5/pkg	40X3.2mm RF-0432-W045	2/pkg	50X3.2mm RF-0532-W045	2/pkg	100X3.2mm RF-1032-W045	1/pkg
		40X4.6mm RF-0446-W045	2/pkg	50X4.6mm RF-0546-W045	2/pkg	100X4.6mm RF-1046-W045	1/pkg

**PROTO 300 C18 5µm**

20X3.2mm RF-0232-W185	5/pkg	40X3.2mm RF-0432-W185	2/pkg	50X3.2mm RF-0532-W185	2/pkg	100X3.2mm RF-1032-W185	1/pkg
		40X4.6mm RF-0446-W185	2/pkg	50X4.6mm RF-0546-W185	2/pkg	100X4.6mm RF-1046-W185	1/pkg



## HAICART CARTRIDGES (continued)

### STAINLESS STEEL CARTRIDGE COLUMNS



#### PHALANX 3.2 and 4.6mm I.D. S.S. Cartridges



##### PHALANX C18 5µm

20X3.2mm PF-0232-C185	5/pkg	40X3.2mm PF-0432-C185	2/pkg	50X3.2mm PF-0532-C185	2/pkg	100X3.2mm PF-1032-C185	1/pkg
		40X4.6mm PF-0446-C185	2/pkg	50X4.6mm PF-0546-C185	2/pkg	100X4.6mm PF-1046-C185	1/pkg

#### TARGA 3.2 and 4.6mm I.D. S.S. Cartridges



##### TARGA C8 5µm

20X3.2mm TF-0232-C085	5/pkg	40X3.2mm TF-0432-C085	2/pkg	50X3.2mm TF-0532-C085	2/pkg	100X3.2mm TF-1032-C085	1/pkg
		40X4.6mm TF-0446-C085	2/pkg	50X4.6mm TF-0546-C085	2/pkg	100X4.6mm TF-1046-C085	1/pkg

##### TARGA C18 5µm

20X3.2mm TF-0232-C185	5/pkg	40X3.2mm TF-0432-C185	2/pkg	50X3.2mm TF-0532-C185	2/pkg	100X3.2mm TF-1032-C185	1/pkg
		40X4.6mm TF-0446-C185	2/pkg	50X4.6mm TF-0546-C185	2/pkg	100X4.6mm TF-1046-C185	1/pkg



## HAICART STAINLESS STEEL CARTRIDGE COLUMNS

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See pages 66 - 67 for information about the Cartridge Holders required for these Cartridges



## HAIPEEK CARTRIDGES

### PEEK/TITANIUM CARTRIDGE COLUMNS



#### Guide to HAIPEEK Analytical Cartridge Part Numbers

xK-0421-xxxx 40 x 2.1mm PEEK/titanium cartridge

xK-0521-xxxx 50 x 2.1mm PEEK/titanium cartridge

See Page 23 for complete Part Number information

#### PEEK and Titanium Cartridges

The HAIPEEK family of narrowbore HPLC cartridge columns is a unique high performance product for LC-MS and other high-speed, small volume applications. The 40 and 50mm sizes of 2.1mm I.D HAIPEEK HPLC Cartridges are individually tested. A Certificate of Analysis, which includes the original chromatogram and comprehensive testing and sorbent documentation, accompanies each column. The 20mm x 2.1mm cartridges excel as narrowbore guard columns, yet even though they are not individually tested, the majority are routinely used as very economical and efficient columns for high speed HPLC screening and LC-MS applications. See pages 66 - 67 for information about the cartridge holders required for Higgins Analytical's HAIPEEK Cartridge Columns. HAIPEEK cartridges are also compatible with PE/Brownlee MPLC cartridge holders.

### CLIQUEUS 2.1mm I.D. PEEK/Titanium Cartridges



#### CLIQUEUS C8 5µm

20X2.1mm CK-0221-C085	5/pkg	40X2.1mm CK-0421-C085	2/pkg	50X2.1mm CK-0521-C085	2/pkg
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#### CLIQUEUS C18 5µm

20X2.1mm CK-0221-C185	5/pkg	40X2.1mm CK-0421-C185	2/pkg	50X2.1mm CK-0521-C185	2/pkg
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#### CLIQUEUS Cyano 5µm

20X2.1mm CK-0221-CNP5	5/pkg	40X2.1mm CK-0421-CNP5	2/pkg	50X2.1mm CK-0521-CNP5	2/pkg
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#### CLIQUEUS Phenyl 5µm

20X2.1mm CK-0221-PHN5	5/pkg	40X2.1mm CK-0421-PHN5	2/pkg	50X2.1mm CK-0521-PHN5	2/pkg
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#### CLIQUEUS Silica 5µm

20X2.1mm CK-0221-SIL5	5/pkg	40X2.1mm CK-0421-SIL5	2/pkg	50X2.1mm CK-0521-SIL5	2/pkg
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### HASIL 100 2.1mm I.D. PEEK/Titanium Cartridges



#### HASIL 100 C8 5µm

20X2.1mm HK-0221-M085	5/pkg	40X2.1mm HK-0421-M085	2/pkg	50X2.1mm HK-0521-M085	2/pkg
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#### HASIL 100 C18 5µm

20X2.1mm HK-0221-M185	5/pkg	40X2.1mm HK-0421-M185	2/pkg	50X2.1mm HK-0521-M185	2/pkg
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See pages 66 - 67 for information about the Cartridge Holders required for these Cartridges



**HASIL 300 2.1mm I.D. PEEK/Titanium Cartridges**

**HASIL 300 C18 5µm**

20X2.1mm HK-0221-W185	5/pkg	40X2.1mm HK-0421-W185	2/pkg \$310	50X2.1mm HK-0521-W185	2/pkg
--------------------------	-------	--------------------------	----------------	--------------------------	-------



**HASIL HL 2.1mm I.D. PEEK/Titanium Cartridges**

**HASIL HL C18 5µm**

20X2.1mm LK-0221-C185	5/pkg	40X2.1mm LK-0421-C185	2/pkg	50X2.1mm LK-0521-C185	2/pkg
--------------------------	-------	--------------------------	-------	--------------------------	-------



**PHALANX 2.1mm I.D. PEEK/Titanium Cartridges**

**PHALANX C18 5µm**

20X2.1mm PK-0221-C185	5/pkg	40X2.1mm PK-0421-C185	2/pkg	50X2.1mm PK-0521-C185	2/pkg
--------------------------	-------	--------------------------	-------	--------------------------	-------

**PROTO 200 2.1mm I.D. PEEK/Titanium Cartridges**

**PROTO 200 C4 5µm**

20X2.1mm RK-0221-D045	5/pkg	40X2.1mm RK-0421-D045	2/pkg	50X2.1mm RK-0521-D045	2/pkg
--------------------------	-------	--------------------------	-------	--------------------------	-------



**PROTO 200 C18 5µm**

20X2.1mm RK-0221-D185	5/pkg	40X2.1mm RK-0421-D185	2/pkg	50X2.1mm RK-0521-D185	2/pkg
--------------------------	-------	--------------------------	-------	--------------------------	-------



**PROTO 300 2.1mm I.D. PEEK/Titanium Cartridges**

**PROTO 300 C4 5µm**

20X2.1mm RK-0221-W045	5/pkg	40X2.1mm RK-0421-W045	2/pkg	50X2.1mm RK-0521-W045	2/pkg
--------------------------	-------	--------------------------	-------	--------------------------	-------

**PROTO 300 C18 5µm**

20X2.1mm RK-0221-W185	5/pkg	40X2.1mm RK-0421-W185	2/pkg	50X2.1mm RK-0521-W185	2/pkg
--------------------------	-------	--------------------------	-------	--------------------------	-------



**TARGA 2.1mm I.D. PEEK/Titanium Cartridges**

**TARGA C8 5µm**

20X2.1mm TK-0221-C085	5/pkg	40X2.1mm TK-0421-C085	2/pkg	50X2.1mm TK-0521-C085	2/pkg
--------------------------	-------	--------------------------	-------	--------------------------	-------

**TARGA C18 5µm**

20X2.1mm TK-0221-C185	5/pkg	40X2.1mm TK-0421-C185	2/pkg	50X2.1mm TK-0521-C185	2/pkg
--------------------------	-------	--------------------------	-------	--------------------------	-------



## HAISpeed 10 CARTRIDGES

10mm I.D. Semi-Prep Cartridge Columns



### Guide to HAISpeed 10 Cartridge Part Numbers

xF-0310-xxxx 30 x 10mm cartridge  
 xF-0510-xxxx 50 x 10mm cartridge  
 xF-1010-xxxx 100 x 10mm cartridge

See Page 23 for complete Part Number information

## HAISpeed 10 - A high performance 10mm I.D. Cartridge System

High throughput requirements for combinatorial chemistry applications often call for 10mm I.D. columns. Higgins Analytical has developed a convenient cartridge system that offers an economical solution for demanding combinatorial and semi-preparative needs. Even though a HAISpeed 10 cartridge costs a fraction of conventional 10mm HPLC column of the same length, they have the same consistently high performance of other Higgins Analytical columns.

Each 5cm and 10cm cartridge column is tested and is shipped with a CoFA.

## CLIQUEUS 10mm I.D. Semi-Prep Cartridges



### CLIQUEUS C18 10µm

#### 10mm I.D. s.s. Guard Cartridges

30x10mm 2/pkg  
 CF-0310-C181

#### 10mm I.D. s.s. Semi-Prep Cartridges

50x10mm 1/pkg 100x10mm 1/pkg  
 CF-0510-C181 CF-1010-C181

### CLIQUEUS C18 5µm

#### 10mm I.D. s.s. Semi-Prep Cartridges

50x10mm 1/pkg 100x10mm 1/pkg  
 CF-0510-C185 CF-1010-C185

## HAISIL 100 10mm I.D. Semi-Prep Cartridges



### HAISIL 300 C18 10µm

#### 10mm I.D. s.s. Guard Cartridges

30x10mm 2/pkg  
 HF-0310-W181

#### 10mm I.D. s.s. Semi-Prep Cartridges

50x10mm 1/pkg 100x10mm 1/pkg  
 HF-0510-W181 HF-1010-W181

## HAISIL 300 10mm I.D. Semi-Prep Cartridges



### HAISIL 300 C18 5µm

#### 10mm I.D. s.s. Semi-Prep Cartridges

50x10mm 1/pkg 100x10mm 1/pkg  
 HF-0510-W185 HF-1010-W185

## PROTO 200 10mm I.D. Semi-Prep Cartridges



### PROTO 200 C4 10µm

#### 10mm I.D. s.s. Guard Cartridges

30x10mm 2/pkg  
 RF-0310-D041

#### 10mm I.D. s.s. Semi-Prep Cartridges

50x10mm 1/pkg 100x10mm 1/pkg  
 RF-0510-D041 RF-1010-D041

### PROTO 200 C4 5µm

#### 10mm I.D. s.s. Semi-Prep Cartridges

50x10mm 1/pkg 100x10mm 1/pkg  
 RF-0510-D045 RF-1010-D045

### PROTO 200 C18 10µm

#### 10mm I.D. s.s. Guard Cartridges

30x10mm 2/pkg  
 RF-0310-D181

#### 10mm I.D. s.s. Semi-Prep Cartridges

50x10mm 1/pkg 100x10mm 1/pkg  
 RF-0510-D181 RF-1010-D181

### PROTO 200 C18 5µm

#### 10mm I.D. s.s. Semi-Prep Cartridges

50x10mm 1/pkg 100x10mm 1/pkg  
 RF-0510-D185 RF-1010-D185



**PROTO 300 10mm I.D. Semi-Prep Cartridges**



**PROTO 300 C4 10µm**

**10mm I.D. s.s. Guard Cartridges**

30x10mm 2/pkg  
RF-0310-W041

**10mm I.D. s.s. Semi-Prep Cartridges**

50x10mm 1/pkg 100x10mm 1/pkg  
RF-0510-W041 RF-1010-W041

**PROTO 300 C4 5µm**

**10mm I.D. s.s. Semi-Prep Cartridges**

50x10mm 1/pkg 100x10mm 1/pkg  
RF-0510-W045 RF-1010-W045

**PROTO 300 C18 10µm**

**10mm I.D. s.s. Guard Cartridges**

30x10mm 2/pkg  
RF-0310-W181

**10mm I.D. s.s. Semi-Prep Cartridges**

50x10mm 1/pkg 100x10mm 1/pkg  
RF-0510-W181 RF-1010-W181

**PROTO 300 C18 5µm**

**10mm I.D. s.s. Semi-Prep Cartridges**

50x10mm 1/pkg 100x10mm 1/pkg  
RF-0510-W185 RF-1010-W185

**PHALANX 10mm I.D. Semi-Prep Cartridges**



**PHALANX C18 10µm**

**10mm I.D. s.s. Guard Cartridges**

30x10mm 2/pkg  
PF-0310-C181

**10mm I.D. s.s. Semi-Prep Cartridges**

50x10mm 1/pkg 100x10mm 1/pkg  
PF-0510-C181 PF-1010-C181

**PHALANX C18 5µm**

**10mm I.D. s.s. Semi-Prep Cartridges**

50x10mm 1/pkg 100x10mm 1/pkg  
PF-0510-C185 PF-1010-C185

**TARGA 10mm I.D. Semi-Prep Cartridges**



**TARGA C18 10µm**

**10mm I.D. s.s. Guard Cartridges**

30x10mm 2/pkg  
TF-0310-C181

**10mm I.D. s.s. Semi-Prep Cartridges**

50x10mm 1/pkg 100x10mm 1/pkg  
TF-0510-C181 TF-1010-C181

**TARGA C18 5µm**

**10mm I.D. s.s. Semi-Prep Cartridges**

50x10mm 1/pkg 100x10mm 1/pkg  
TF-0510-C185 TF-1010-C185

See pages 66 - 67 for information about Cartridge Holders required for these Cartridges



## HAIPEEK & HAICART Guards

PEEK/TITANIUM and s.s. Guard Cartridges



### Guide to HAIPEEK and HAICART Guard Cartridge Part Numbers

xK-0221-xxxx 20 x 2.1mm PEEK/titanium guard cartridge  
 xF-0232-xxxx 20 x 3.2mm stainless steel guard cartridge

See Page 23 for complete Part Number information

Note: Old HAICART P/INs such as H118, T118, C1PH, etc. can still be used when ordering.

### Analytical Guard Cartridges

The complete range of sorbents manufactured by Higgins Analytical is available in 2cm x 2.1 or 3.2mm I.D. guard cartridges. Not only does this provide a wide selection of products for protecting analytical and narrowbore HPLC columns, it also facilitates a wide variety of trace enrichment, column switching, and ballistic gradient applications.

These 2cm long cartridges require a reusable holder and are compatible with Higgins Analytical's HAIPEEK Guard Holders as well as PE/Brownlee's NewGuard Holder.

## CLIQUEUS Guard Cartridges



### CLIQUEUS C8 5µm

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 CK-0221-C085

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 CF-0232-C085

### CLIQUEUS C18 5µm

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 CK-0221-C185

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 CF-0232-C185

### CLIQUEUS Cyano 5µm

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 CK-0221-CNP5

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 CF-0232-CNP5

### CLIQUEUS Phenyl 5µm

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 CK-0221-PHN5

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 CF-0232-PHN5

### CLIQUEUS Silica 5µm

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 CK-0221-SIL5

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 CF-0232-SIL5

## HASIL 100 Guard Cartridges



### HASIL 100 C8 5µm

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 HK-0221-M085

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 HF-0232-M085

### HASIL 100 C18 5µm

**2.1mm I.D. Peek/Steel**  
 20X2.1mm 5/pkg  
 HK-0221-M185

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 HF-0232-M185





**HAISIL 300 Guard Cartridges**



**HAISIL 300 C18 5µm**

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 HK-0221-W185

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 HF-0232-W185

**HAISIL HL Guard Cartridges**



**HAISIL HL C18 5µm**

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 LK-0221-C185

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 LF-0232-C185

**HEAVY Guard Cartridges**



**HEAVY C18 5µm**

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 VK-0221-C185

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 VF-0232-C185

**PHALANX Guard Cartridges**



**PHALANX C18 5µm**

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 PK-0221-C185

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 PF-0232-C185

**PROTO 200 Guard Cartridges**

200

**PROTO 200 C4 5µm**

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 RK-0221-D045

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 RF-0232-D045

**PROTO 200 C18 5µm**

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 RK-0221-D185

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 RF-0232-D185

**PROTO 300 Guard Cartridges**



**PROTO 300 C4 5µm**

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 RK-0221-W045

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 RF-0232-W045

**PROTO 300 C18 5µm**

**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 RK-0221-W185

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 RF-0232-W185

**TARGA Guard Cartridges**



**TARGA C8 5µm**

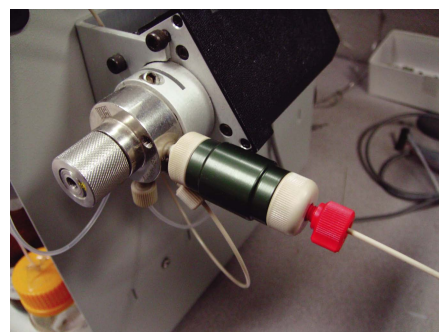
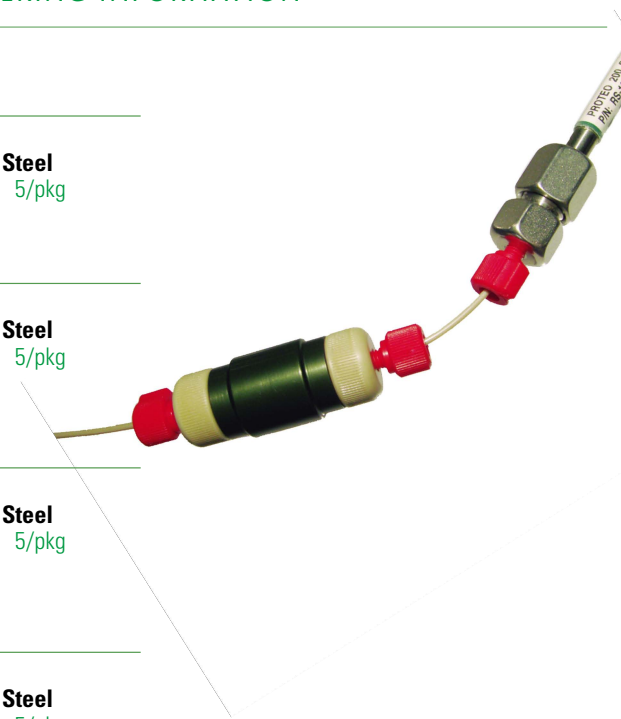
**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 TK-0221-C085

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 TF-0232-C085

**TARGA C18 5µm**

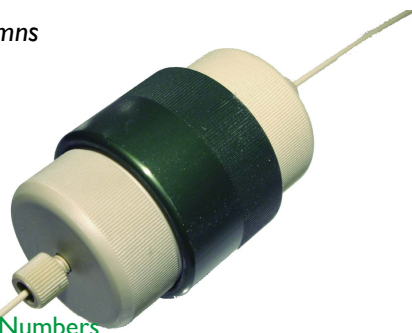
**2.1mm I.D. Peek/Titanium**  
 20X2.1mm 5/pkg  
 TK-0221-C185

**3.2mm I.D. Stainless Steel**  
 20X3.2mm 5/pkg  
 TF-0232-C185



## HAISpeed20 CARTRIDGES

20mm I.D. Prep Guard Cartridge Columns



HAISpeed20 guard cartridges provide unique Protection for 20mm I.D. prep columns.

“Prep is a dirty business,” and expensive columns can be quickly destroyed by crude samples if proper precautions are not taken. Higgins Analytical's HAI Speed20 Prep Guard System provides effective column protection without compromising performance. In addition to an efficiently packed bed which retains strongly absorbing junk that would change the selectivity of the prep column, these unique guard cartridges have 0.5µm frits that remove particulate contaminants as well.

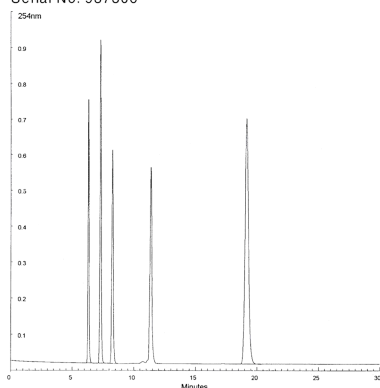
### Guide to HAI Speed 20 Cartridge Part Numbers

xF-0220-xxxx 25 x 20mm cartridge

See Page 23 for complete Part Number information

HAISpeed20 guard cartridges provide convenience and performance

HAISIL 100 C18 5µm  
Dimensions 250 x 20mm  
Catalog No. HS-2520-M185  
Serial No. 937306



Catalog No. HS-2520-M185  
Description: HAISIL 100 C18 5µm  
Dimensions: 250 x 20mm  
Sorbent Lot#: A18143 Monofunctional/Endcapped  
Particle Size: 5µm  
Pore Size: 100 Å

Mobile Phase: 70% Acetonitrile in Water  
Flow Rate: 10mL/min  
Pressure: 33 bar Temp: 29.5 °C  
Peak: IR(min) Plates(N) Skewness  
# 1 6.31 Dimethyl Phthalate 21,383 0.217  
# 2 7.28 Nitrobenzene 21,020 0.164  
# 3 8.25 Anisole 20,183 0.190  
# 4 11.36 Diphenylamine  
# 5 19.16 Fluorene 18,694 0.161

File: 072 26/3

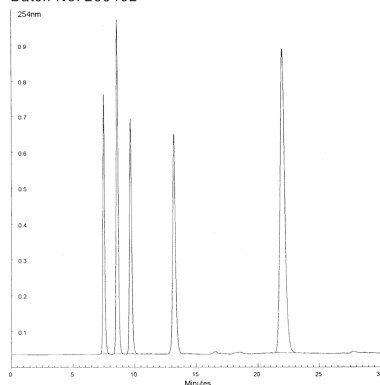


Typical 250x20mm HAISIL 100 C18 5µm Test Chromatogram.

HAISIL 300 C18 12µm  
Dimensions 25 x 20mm  
Catalog No. HF-0220-W182  
Batch No. 260402

Coupled to

HAISIL 100 C18 5µm  
Dimensions 250 x 20mm  
Catalog No. HS-2520-M185



Catalog No. HF-0220-W182  
Description: HAISIL 300 C18 12µm  
Dimensions: 25 x 20mm  
Sorbent Lot#: P25076 Monofunctional/Endcapped  
Particle Size: 12µm  
Pore Size: 300 Å

Mobile Phase: 70% Acetonitrile in Water  
Flow Rate: 10mL/min  
Pressure: bar Temp: 28.5 °C  
Peak: IR(min) Plates(N) Skewness  
# 1 7.50 Dimethyl Phthalate 10,655 0.328  
# 2 8.59 Nitrobenzene 10,725 0.298  
# 3 9.67 Anisole 11,094 0.294  
# 4 13.19 Diphenylamine  
# 5 22.01 Fluorene 12,866 0.238

File: 172 26/4



The same 250x20mm 5µm column shown in the top chromatogram retested with a HAI SPEED 20 Guard Cartridge in line.



**HAISIL 100 20mm I.D. Prep Guard Cartridges** 

<b>HAISIL 100 C18 10µm</b>	<b>20mm I.D. s.s. Prep Guard Cartridges</b>					
	25x20mm HF-0220-M181	2/pkg	35x20mm HF-0320-M181	1/pk	50x20mm HF-0520-M181	1/pk

**CLIQUEUS 20mm I.D. Prep Guard Cartridges** 

<b>CLIQUEUS C18 10µm</b>	<b>20mm I.D. s.s. Prep Guard Cartridges</b>					
	25x20mm CF-0220-C181	2/pkg	35x20mm CF-0320-C181	1/pk	50x20mm CF-0520-C181	1/pk

**HAISIL 300 20mm I.D. Prep Guard Cartridges** 

<b>HAISIL 300 C18 10µm</b>	<b>20mm I.D. s.s. Prep Guard Cartridges</b>					
	25x20mm HF-0220-W181	2/pkg	35x20mm HF-0320-W181	1/pk	50x20mm HF-0520-W181	1/pk

**PROTO 200 20mm I.D. Prep Guard Cartridges** 200 

<b>PROTO 200 C4 10µm</b>	<b>20mm I.D. s.s. Prep Guard Cartridges</b>					
	25x20mm RF-0220-D041	2/pkg	35x20mm RF-0320-D041	1/pk	50x20mm RF-0520-D041	1/pk

<b>PROTO 200 C18 10µm</b>	<b>20mm I.D. s.s. Prep Guard Cartridges</b>					
	25x20mm RF-0220-D181	2/pkg	35x20mm RF-0320-D181	1/pk	50x20mm RF-0520-D181	1/pk

**PROTO 300 20mm I.D. Prep Guard Cartridges** 

<b>PROTO 300 C4 10µm</b>	<b>20mm I.D. s.s. Prep Guard Cartridges</b>					
	25x20mm RF-0220-W041	2/pkg	35x20mm RF-0320-W041	1/pk	50x20mm RF-0520-W041	1/pk

<b>PROTO 300 C18 10µm</b>	<b>20mm I.D. s.s. Prep Guard Cartridges</b>					
	25x20mm RF-0220-W181	2/pkg	35x20mm RF-0320-W181	1/pk	50x20mm RF-0520-W181	1/pk

**PHALANX 20mm I.D. Prep Guard Cartridges** 

<b>PHALANX C18 10µm</b>	<b>20mm I.D. s.s. Prep Guard Cartridges</b>					
	25x20mm PF-0220-C181	2/pkg	35x20mm PF-0320-C181	1/pk	50x20mm PF-0520-C181	1/pk

**TARGA 20mm I.D. Prep Guard Cartridges** 

<b>TARGA C18 10µm</b>	<b>20mm I.D. s.s. Prep Guard Cartridges</b>					
	25x20mm TF-0220-C181	2/pkg	35x20mm TF-0320-C181	1/pk	50x20mm TF-0520-C181	1/pk

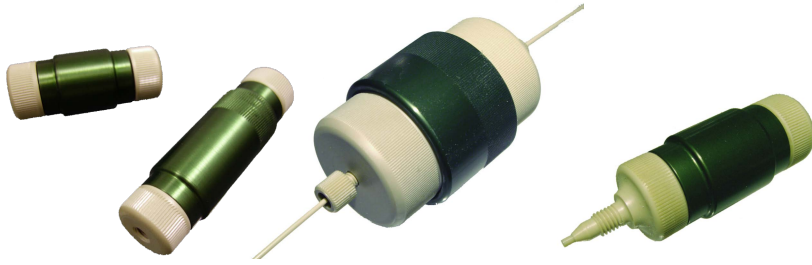
**Both a Filter and a Guard**

The 0.5µm pore size frits on HAI Speed20 cartridges provide unique built-in filtration for maximum column protection. These cartridges are shipped with end caps that prevent solvent loss and protect the cartridge and frits.



## Cartridge Holders

Holders for 2.1, 3.2, 4.6, 10, and 20mm I.D. Cartridges



No Tools Required for Leak-Free Operation

Even though Higgins Analytical cartridge holders do not require any tools for assembly and disassembly, their leak-free operation assures that maximum performance will be achieved in your demanding, high-speed separations.

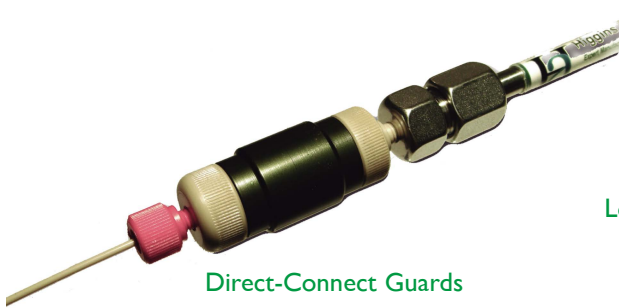
The Holder's light weight also makes it easy to handle and assures its compatibility in challenging plumbing situations.

### Guide to Cartridge Holder Part Numbers

HK-GUARD-FF	Female/Female Holder for 2cm cartridge
HK-GUARD-FM	Female/Male Direct Connect Holder for 2cm cartridge
HK-HOLD-40	Holder for 4cm x 2.1, 3.2, 4.6mm cartridge
HK-HOLD-50	Holder for 5cm x 2.1, 3.2, 4.6mm cartridge
HK-HOLD-100	Holder for 10cm x 2.1, 3.2, 4.6mm cartridge
10-HOLD-30	Holder for 30x10mm cartridge
10-HOLD-50	Holder for 50x10mm cartridge
10-HOLD-100	Holder for 100x10mm cartridge
20-HOLD-25	Holder for 20 x 25mm cartridge

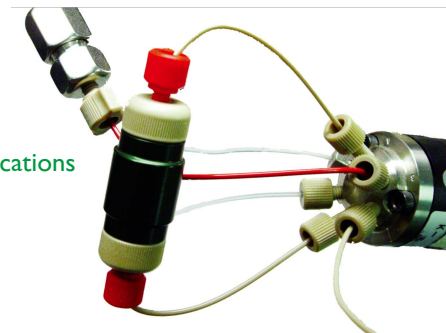


Higgins Analytical Cartridges and Holders enable a wide range of applications and techniques



Direct-Connect Guards

Loop-Column applications



## 2cm Guard Cartridge Holders

### Direct Connect Holders

Female/Male Standard  
HK-GUARD-FM

Female/Male for Waters Column  
WK-GUARD-FM

### Symmetrical Connection Holders

Female/Female Holder  
HK-GUARD-FF

## Holders for Analytical Cartridge Columns

### Analytical Cartridge Holders

2cm Cartridges  
HK-HOLD-20

4cm Cartridges  
HK-HOLD-40

5cm Cartridges  
HK-HOLD-50

10cm Cartridges  
HK-HOLD-100

Note: HK-HOLD-20 is the same as HK-GUARD-FF

## Holders for 10mm I.D. Semi-Prep Guards and Cartridges

### HAISPEED 10 Cartridge Holders

3cm Cartridges  
10-HOLD-30

5cm Cartridges  
10-HOLD-50

10cm Cartridges  
10-HOLD-100

## Holders for 20mm I.D. Prep Guard Cartridges

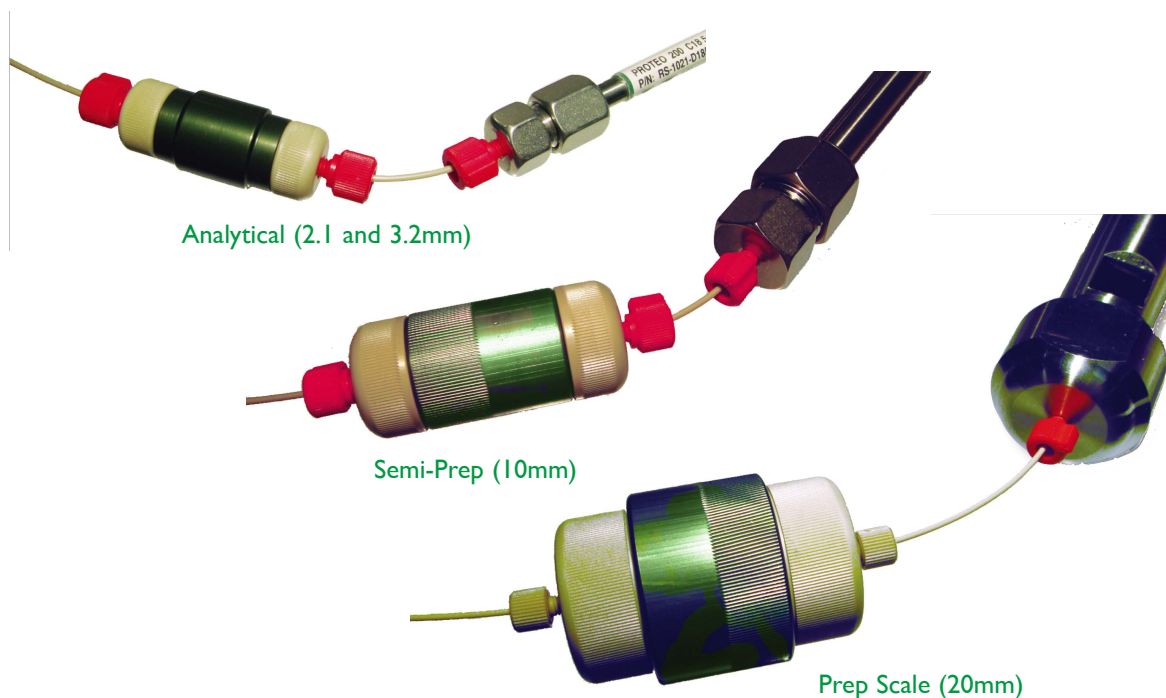
### HAISPEED 20 Guard Cartridge Holders

20x25mm Cartridges  
20-HOLD-25

20x35mm Cartridges  
20-HOLD-35

20x50mm Cartridges  
20-HOLD-50

Higgins Analytical manufactures the widest range of guard cartridges in the world



## HAIFILTER

*“We found the HAIFILTER to be an ideal solution for our high performance in-line filtration needs, and it doesn’t require any tools or wrenches!”*



**KEY FEATURES:**

- Low cost, yet effective column protection
- Direct column connection and symmetrical versions
- No tools required • Leak free operation
- 0.5µm filters in stainless steel, titanium or PEEK
- Inert construction's threads won't oxidize or gall

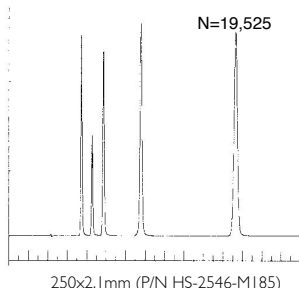
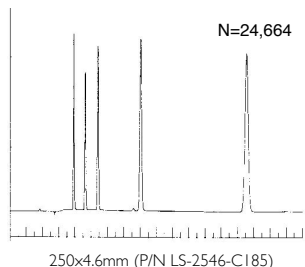
*A simple, yet effective, means of protection is to place a filter in the flow path between the sample injection valve and the HPLC column. While this technique is commonly used, it is also commonly plagued by leaky holders and significant performance loss. The Higgins Analytical HAIFILTER resolves all of these problems!*

### Simplicity and Convenience

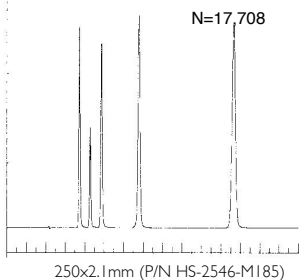
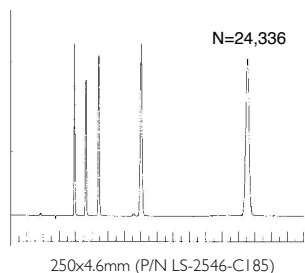
The Higgins Analytical HAIFILTER provides efficient and leak-free in-line filtration, yet it does not require any tools. To make it even more convenient, the HAIFILTER is designed to connect directly to the inlet fitting on the HPLC column, maximizing performance, and minimizing hardware. The 0.5µm porosity frits will remove much of the particulate contamination that is largely responsible for column pressure build up and plugging. The holder's inert construction, and the availability of PEEK and titanium as well as stainless steel frits, insures that the HAIFILTER can address all of your in-line filtration needs.



**HPLC Columns without a HAIFILTER**



**HPLC Columns with a HAIFILTER**



### Performance

Try the experiment summarized by the chromatograms above with another manufacturer's in-line filter. You may be very surprised how much more other inline filters contribute to peak broadening when comparison to the miniscule 28µL<sup>2</sup> at 200µL/min volume-variance that is

obtained with the HAIFILTER. This exceptional efficiency is confirmed by chromatographers reporting that using a HAIFILTER permits the routine analysis of solid-phase sample extracts by LC/MS with good efficiency and greatly enhanced HPLC column life.

### Two Convenient Formats

HAIFILTER is now available in two formats. The leak-free, finger-tight, and efficient performance are qualities of the HAIFILTER that have made it a popular product, replacing the competition's awkward and leaky alternatives in hundreds of laboratories worldwide. The direct-connect feature in the original design makes the HAIFILTER FM ideal for protecting HPLC columns while the symmetrical female thread fittings on each end of HAIFILTER FF provide unequaled flexibility to address your HPLC system's filtration requirements.

## HAIFILTER Holders and Replacement Filters



### HAIFILTER FM (Female/Male) Starter Kits

- HF-FKIT HAIFILTER FM (Standard)
- HF-WKIT HAIFILTER FM (for Waters HPLC columns)
- HF-RKIT HAIFILTER FM (for Rheodyne injection valves - Specify valve model when ordering)

Note: HAIFILTER FM Starter Kits include a package of 10 filters (HF-SFILT), a 10cm piece of PEEK tubing, and a Delrin bushing and a PEEK ferrule.



### HAIFILTER FF (Female/Female) Starter Kit

- FF-FKIT HAIFILTER FF

Note: The HAIFILTER FF Starter Kit includes a package of 10 filters (HF-SFILT), two 10cm pieces of PEEK tubing, and two Delrin bushings and two PEEK ferrules.



### Replacement Filters

All replacement kits contain 10 filters per package

- |          |   |           |
|----------|---|-----------|
| HF-SFILT | Stainless steel HAIFILTER replacement filters | pkg of 10 |
| HF-TFILT | Titanium HAIFILTER replacements filters       | pkg of 10 |
| HF-PFILT | PEEK HAIFILTER replacements filters           | pkg of 10 |



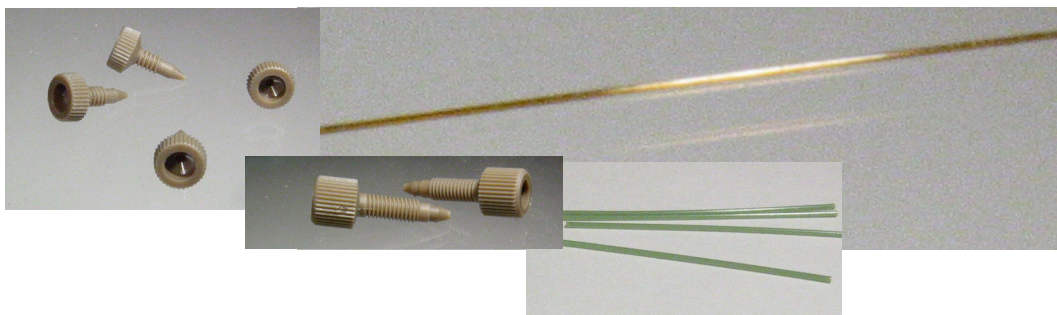
*FILTER replacement is easy and requires no tools*

### Flexibility

Not only is the HAIFILTER available in two formats, it can also be directly connected to a sample injection or switching valve. The photograph to the right demonstrates how the HAIFILTER has been designed to clear the bushings on a popular Rheodyne sample injection valve.



## PARTS AND ACCESSORIES



### Micro Column Connector Kit

Kit facilitates plumbing a Piccolo, Sprite, Capellini 6-32, or a Capillary to your instrument

MIC-KIT

Kit Contains:

- 6-32 PEEK Bushings (4 each)
- 10-32 PEEK Long Bushings (2 each)
- Green Sleeve 0.155 x 0.025" (4 each)
- Brown Sleeve 0.062 x 0.015" (2 each)
- Fused Silica Capillaries 10cm x 150µm (4 each)

### 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 (1-650-988-8931) or e-mailing ([hplc@higanalyt.com](mailto:hplc@higanalyt.com)) your question to our Technical Support Group, you will receive a prompt written response. If we don't know the answer, we 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 our web site. [www.higanalyt.com](http://www.higanalyt.com)

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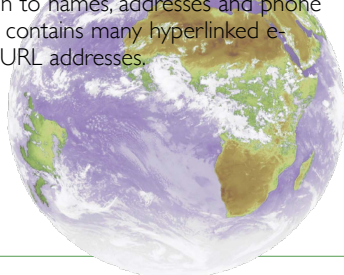
In order to further simplify the process for you and your purchasing department,



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Higgins Analytical develops and manufactures a wide range of stainless steel and PEEK (polyetheretherketone) High Performance Liquid Chromatography (HPLC) columns and cartridges. These unique offerings address many needs of chromatographers desiring fast analysis times, efficient system and column protection, and chemical inertness.

Special application areas include LC/MS, combinatorial chemistry, column switching techniques, in-line filtration, and guard column requirements. Products are supplied and supported worldwide by a network of responsive distributors.

We are a quality-oriented chromatography company dedicated to providing performance products, expert support, and rapid delivery to research and quality control laboratories worldwide.



## Higgins Analytical

*Expert Manufacturers of  
HPLC Consumables*

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