



HICHROM

Chromatography Columns and Supplies

LC COLUMNS
Thermo Scientific
Accucore

Catalogue 9

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In addition to the well-known classical Hypersil® and Hypersil BDS phases, Thermo Scientific manufactures a wide range of premium phases, including Hypersil GOLD® and Hypercarb®. Their newest development is the Accucore™ range, based on a core enhanced material.

Accucore™

Using Core Enhanced Technology™, Accucore HPLC Columns offer higher speed, higher resolution separations compared to traditional larger fully porous particles. They are available in a wide range of selectivities and compatible with almost any instrument.

Accucore HPLC Columns

These solid core particles have an overall diameter of 2.6µm with a porous layer thickness of 0.5µm and a very narrow particle size distribution. Accucore columns offer high speed, high resolution separations with significantly lower back pressures than those associated with UHPLC.

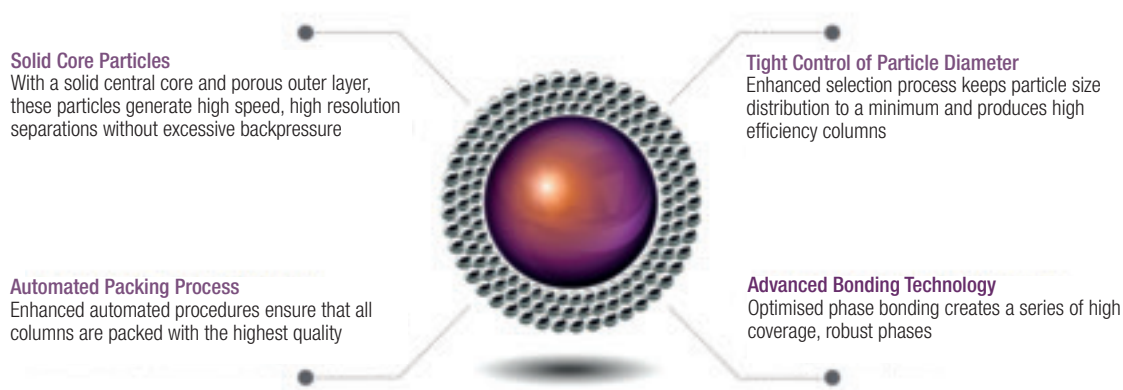
Accucore HPLC Columns for Biomolecules

The range of Accucore columns packed with 150Å pore diameter particles (2.6µm) enables biomolecule separations to benefit from the high resolution and speed provided by Core Enhanced Technology.

Accucore XL HPLC Columns

Using 4µm solid core particles, Accucore XL HPLC columns allow users of conventional HPLC methods to obtain superior performance to that of columns packed with 5, 4 or 3µm fully porous particles.

The key components of Core Enhanced Technology



Accucore Phases

Column	Phase	Bonding	Particle Size (µm)	Pore Size (Å)	Surface Area (m ² /g)	Carbon Load (%)	pH Range
Accucore HPLC Columns	RP-MS	Proprietary	2.6	80	130	7	2 - 9
	C18	C18	2.6	80	130	9	1 - 11
	C8	C8	2.6	80	130	5	2 - 9
	aQ	C18 with polar endcapping	2.6	80	130	9	2 - 9
	Polar Premium	Amide embedded C18	2.6	150	80	8	1.5 - 10
	Phenyl-Hexyl	Phenyl-Hexyl	2.6	80	130	5	2 - 8
	PFP	Pentafluorophenyl	2.6	80	130	5	2 - 8
	Phenyl-X	Proprietary	2.6	80	130	6	2 - 8
	C30	C30	2.6	150	80	5	2 - 8
	HILIC	-	2.6	80	130	-	2 - 8
Urea-HILIC	Urea	2.6	80	130	-	2 - 8	
Accucore Columns for Biomolecules	150-C18	C18	2.6	150	80	7	1 - 11
	150-C4	C4	2.6	150	80	2	2 - 9
	150-Amide-HILIC	Amide	2.6	150	80	-	2 - 8
Accucore XL HPLC Columns	C18	C18	4	80	90	7	1 - 11
	C8	C8	4	80	90	4	2 - 9

Accucore™ (continued)

Benefits of Accucore Columns

Efficient Separations

Two factors that strongly affect chromatographic efficiency are mass transfer and eddy diffusion. Resistance to mass transfer is minimised by the solid core design of Accucore™ particles, as the diffusional path of analytes is limited by the depth of the outer porous layer. In addition, the tight control of particle diameter and the automated packing process used result in a highly uniform packed bed that minimises eddy diffusion (see page 20).

Fast Separations

Using Accucore columns, excellent separations can be achieved in shorter times than for 3µm phases. Separation times can be reduced by increasing flow rates, whilst maintaining efficiency and resolution. In addition, shorter columns can be used, thereby increasing productivity and decreasing solvent costs.

High Peak Capacity

As an alternative to speeding up analysis, high resolution Accucore columns can be used to increase peak capacity for complex separations.

Low Back Pressure

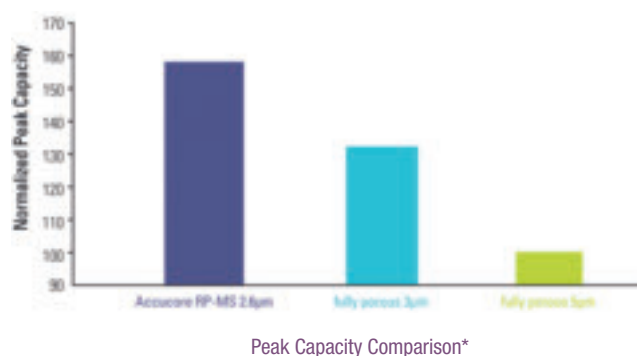
The solid core design and uniform packed bed enables Accucore columns to produce almost equivalent performance to sub 2µm columns, but generate considerably lower back pressure. This means that Accucore columns can be used with both UHPLC and HPLC systems.

Long Lasting Columns

The highly uniform packed bed in Accucore HPLC columns is created by the use of a tightly controlled particle size and an automated packing process, and has excellent stability. The advanced bonding technology used for Accucore HPLC columns creates robust bonded phases that are highly resistant to the effects of pH and temperature.

Column Protection

In order to extend the lifetime of 2.6µm Accucore columns, Defender™ guard cartridges have been designed specifically for use in high speed, high efficiency separations. They have been shown to have minimal impact on retention or efficiency.



*The comparative data presented here may not be representative for all applications.

Accucore Phases

Accucore C18 shows optimum retention of non-polar analytes via a predominantly hydrophobic interaction mechanism. Figure 1 shows the separation of triazines on Accucore C18.

Accucore C8 offers lower hydrophobic retention than C18 and is recommended for moderately polar analytes.

Accucore RP-MS uses an optimised alkyl chain length for more effective coverage of the silica surface. The phase offers slightly lower retention than the C18 phase and this, combined with high efficiencies and low peak tailing, makes it an ideal choice for use with MS detection.

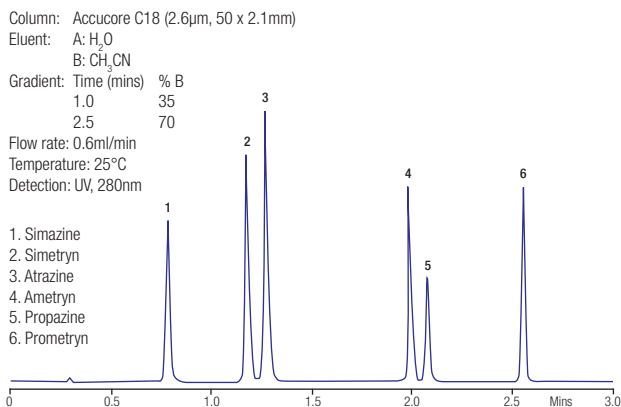


Figure 1. Separation of triazines on Accucore C18

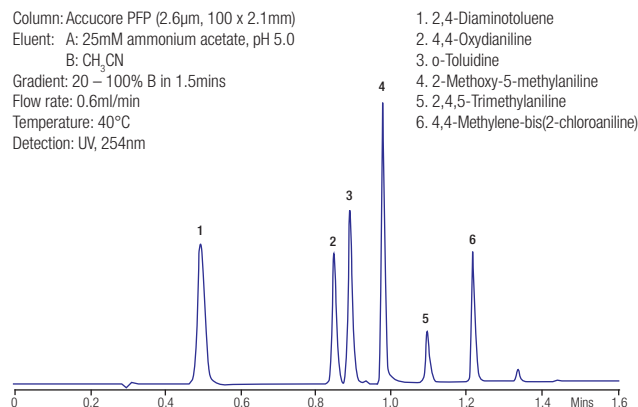


Figure 2. Separation of banned aromatic amines on Accucore PFP

Accucore™ Phases (continued)

Accucore™ aQ is compatible with 100% aqueous eluents and the polar functional group used in the endcapping provides an additional interaction mechanism by which polar compounds can be retained and resolved, making Accucore aQ ideal for the quantitative analysis of trace levels of polar analytes.

Accucore Polar Premium is a rugged amide-embedded C18 phase, corresponding to a USP L60 phase. It is compatible with 100% aqueous eluents and offers high efficiency, wider operating pH range and unique selectivity complementary to standard C18 phases. Figure 3 shows the fast separation of curcuminoids from turmeric.

Accucore Phenyl-Hexyl exhibits classical reversed-phase retention and selectivity characteristics due to the C6 chain, while the phenyl ring can add special selectivity by interacting with polar groups, resulting in a mixed-mode separation mechanism.

Accucore PFP columns show extra retention for halogenated species and are also well suited to the selective analysis of non-halogenated polar compounds. Figure 2 (page 224) shows the separation of banned aromatic amines on Accucore PFP.

Accucore Phenyl-X has proprietary alkyl aromatic bonding which provides a unique selectivity when compared to other reversed-phase materials such as C18 or Phenyl. It shows enhanced selectivity for aromatic compounds and is robust, with low column bleed.

Accucore C30 offers high shape selectivity for hydrophobic, long chain alkyl compounds and structurally related isomers, such as carotenoids and steroids. It is also an excellent alternative to normal-phase columns for lipid analysis. Figure 4 shows the separation of vitamin K compounds on Accucore C30.

Accucore HILIC shows enhanced retention of polar and hydrophilic analytes and alternative selectivity to C18.

Accucore Urea-HILIC is a bonded hydrophilic stationary phase which has an alternative selectivity and lower ion-exchange capacity than other HILIC phases. The phase shows good retention of a broad range of polar analytes using up to 20% aqueous eluents. Figure 5 shows the rapid analysis of analgesic compounds on Accucore Urea-HILIC.

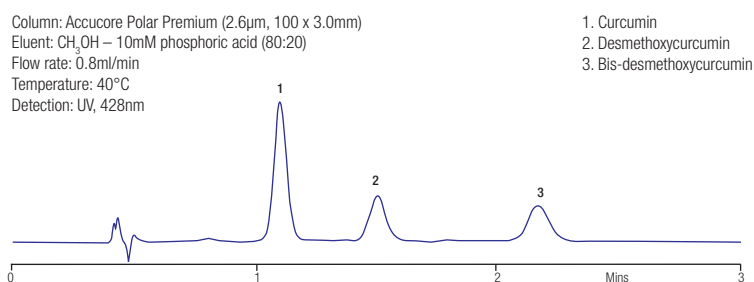


Figure 3. Separation of curcuminoids on Accucore Polar Premium

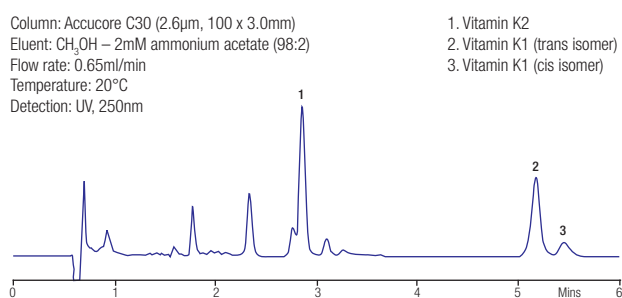


Figure 4. Separation of vitamin K compounds on Accucore C30

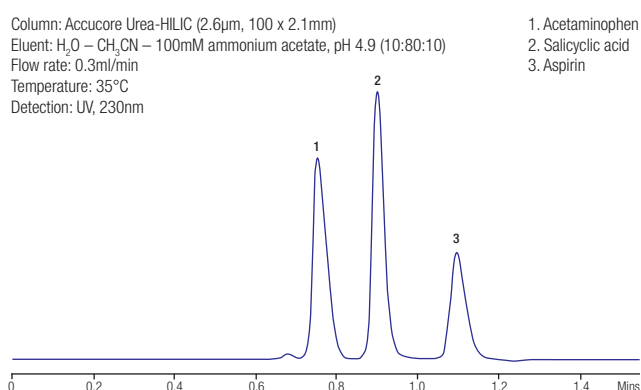


Figure 5. Separation of analgesic compounds on Accucore Urea-HILIC

Please see page 227 for ordering information for Accucore columns.

Accucore™ for Biomolecule Separations

The 150Å pore size solid core particles used in Accucore™ 150-C18, 150-C4 and 150-Amide-HILIC columns (see page 223) are designed specifically for optimum combination of retention and resolution for peptides and proteins. Accucore 150-Amide-HILIC shows high retention for a broad range of hydrophilic analytes in HILIC mode. It is particularly recommended for hydrophilic biomolecules such as glycans. Figure 6 shows a typical glycan ladder analysed on an Accucore 150-Amide-HILIC column.

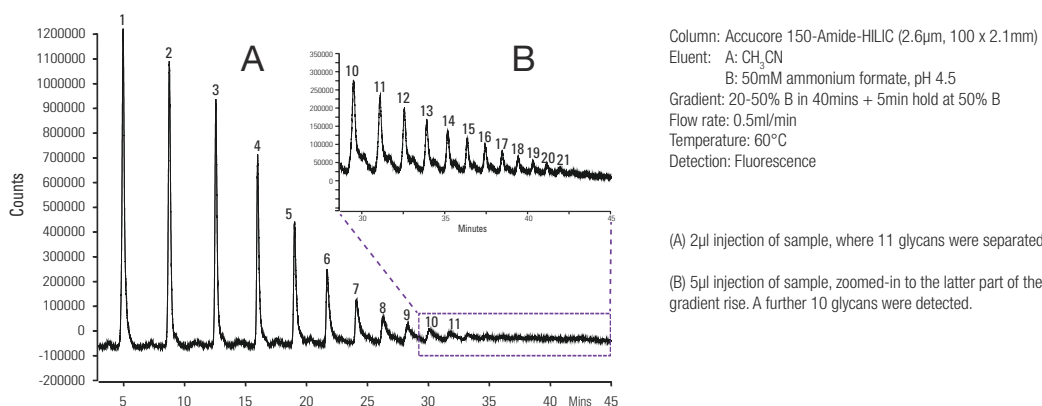


Figure 6. Glycan ladder on Accucore 150-Amide-HILIC

These 150Å pore size Accucore columns are available in analytical, microbore and nano formats (nanoViper) and demonstrate high peak capacity and excellent loading capacity. Accucore nanoViper columns are available in 150 and 500mm lengths and 75µm i.d. The preassembled nanoViper fingertight connection system can withstand pressures up to 1000bar.

Please see page 227 for ordering information for Accucore columns for biomolecule separations.

Accucore™ XL

- 4µm solid core particles
- Compatible with conventional HPLC systems
- Lower limits of detection
- High resolution and long column lifetime
- Robust, fast and easy to use

Accucore™ XL phases (C18 and C8) are based on the same Core Enhanced Technology™ as the Accucore 2.6µm phases, but with a particle size of 4µm. They are designed for direct conversion of conventional HPLC methods developed on 5µm fully porous columns, without changes in method parameters being required. Very high efficiencies can be achieved using these phases, with little decrease in efficiency as flow rate is increased. Efficiencies of up to 75% and 50% higher than with 5µm and 3µm fully porous columns respectively can be obtained. Backpressures are between those generated by 3µm and 5µm fully porous phases.

Impedance (E) combines retention time, efficiency and backpressure in a single term. Lower impedance values indicate fast and higher efficiency separations performed at lower backpressures. Figure 7 demonstrates 78% and 67% lower impedance values for Accucore XL C18 than for 5µm and 3µm fully porous phases respectively under the same conditions.

Accucore XL HPLC columns are offered in analytical and micro formats. Optimum conditions and ratings are shown below.

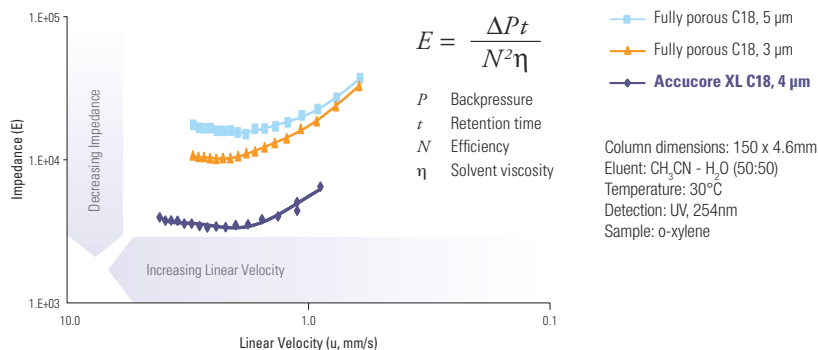


Figure 7. Comparison of impedance values*

*The comparative data presented here may not be representative for all applications.

Column i.d.	Optimum Flow Rate (ml/min)	Optimum Injection Volume (µl)	Backpressure Rating (bar)	Temperature Rating (°C)
2.1	0.3	2	600	70
3.0	0.6	5	600	70
4.6	1.3	10	600	70

Please see page 227 for ordering information for Accucore XL columns.

Ordering Information – Accucore

Accucore HPLC Columns and Accucore Columns for Biomolecules

When ordering please replace 'xxxxx' with the appropriate Accucore material code:

RP-MS=17626 C18=17126 C8=17226 aQ=17326 Phenyl-Hexyl=17926 PFP=17426 HILIC=17526 150-C18=16126 150-C4=16526

Column i.d. (mm)	Column Length ³ (mm)				Defender™ Guard Cartridges (4/pk)
	30	50	100	150	
2.1	xxxxx-032130 £312	xxxxx-052130 £380	xxxxx-102130 £446	xxxxx-152130 £513	xxxxx-012105 ¹ £268
3.0	xxxxx-033030 £312	xxxxx-053030 £380	xxxxx-103030 £446	xxxxx-153030 £513	xxxxx-013005 ¹ £268
4.6	xxxxx-034630 £312	xxxxx-054630 £380	xxxxx-104630 £446	xxxxx-154630 £513	xxxxx-014005 ² £268

¹ Use with Uniguard direct connect holder 852-00 (£75)

² Use with Uniguard direct connect holder 850-00 (£75)

³ Additional dimensions available for some phases – please enquire

For the following phases please enquire for ordering information:

Polar Premium = 28026 Phenyl-X = 27926 C30 = 27826 Urea-HILIC = 27726 150-Amide-HILIC = 16726

Accucore NanoViper Columns (2.6µm)

Accucore Phase	Column Dimensions	
	150mm x 75µm	500mm x 75µm
150-C18	16126-157569 £490	16126-507569 £636
150-C4	16526-157569 £490	16526-507569 £636
150-Amide-HILIC	16726-157569 £490	-



Accucore Kits (2.6µm)

Accucore kits (2.1mm i.d. columns) are also available as follows:

Accucore Validation Kit – contains 3 x Accucore C18

Accucore Narrow Selectivity Kit – contains 1x each Accucore C18, RP-MS and aQ

Accucore Wide Selectivity Kit – contains 1x each Accucore C18, Phenyl-Hexyl and PFP

Accucore Polar Selectivity Kit – contains 1x each Accucore aQ, PFP and HILIC

Please enquire for ordering information.



Accucore XL HPLC Columns

When ordering please replace 'xxxxx' with the appropriate Accucore XL material code:

C18 = 74104 C8 = 74204

Column i.d. (mm)	Column Length (mm)				Guard Cartridges (4/pk)
	50	100	150	250	
2.1	xxxxx-052130 £380	xxxxx-102130 £414	xxxxx-152130 £438	xxxxx-252130 £461	xxxxx-012101 ¹ £220
3.0	xxxxx-053030 £380	xxxxx-103030 £414	xxxxx-153030 £438	xxxxx-253030 £461	xxxxx-013001 ¹ £220
4.6	xxxxx-054630 £380	xxxxx-104630 £414	xxxxx-154630 £438	xxxxx-254630 £461	xxxxx-014001 ² £220

¹ Use with Uniguard direct connect holder 852-00 (£75)

² Use with Uniguard direct connect holder 850-00 (£75)