

Core-Shell Columns

► BlueShell®



**Ultra high performance
without the need for ultra high pressure**

What's holding you back from taking advantage of modern UHPLC column performance today?

To obtain ultra high performance results comparable with sub-2 μm columns, without the disadvantage of high backpressure, our new BlueShell columns are your first choice. BlueShell columns are packed with special core-shell particles, developed to provide improved speed, higher resolution, and reduced eluent consumption, all while keeping moderate HPLC backpressures.

Particle size:	2.6 μm
Particle form:	spherical
Pore size:	80 Å
Specific surface:	130 m^2/g
Pore volume:	0.8 ml/g

Features:

- applicable for any type of LC
- highest separating power (~200.000 theoretical plates/meter)
- multiple columns can be combined for even higher resolution
- efficiency is comparable with fully porous sub-2 μm particles
- significantly lower backpressures than sub-2 μm particles
- high speed and ruggedness

HPLC · SMB · Osmometry



Take advantage of core-shell particle technology

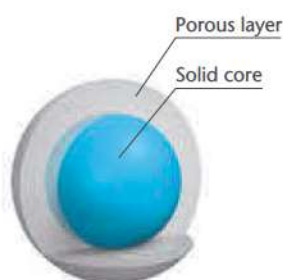
Compared to classical fully porous silica materials, BlueShell particles consist of a solid core and a porous shell. The 2.6 µm diameter particles enable high speed and high resolution separations without undesirable excessive backpressure. The reduced depth of the outer porous layer limits the diffusional path of analytes, leading to minimized mass transfer resistance and minimized peak broadening.

Highly uniform particle diameters

The particle diameter is tightly controlled by an enhanced selection process and an automated column packing process, resulting in a tight, highly uniform packed bed that minimizes eddy diffusion and leads to high efficiency separations. BlueShell 2.6 µm diameter core-shell particles produce much lower backpressures than typically seen with fully porous sub-2 µm stationary phases – the flow resistance is even lower than seen with 3 µm materials at the same flow rate.

Advanced bonding technology

Optimized phase bonding creates a series of high coverage robust phases with outstanding pH stability, especially for the BlueShell C18 phase



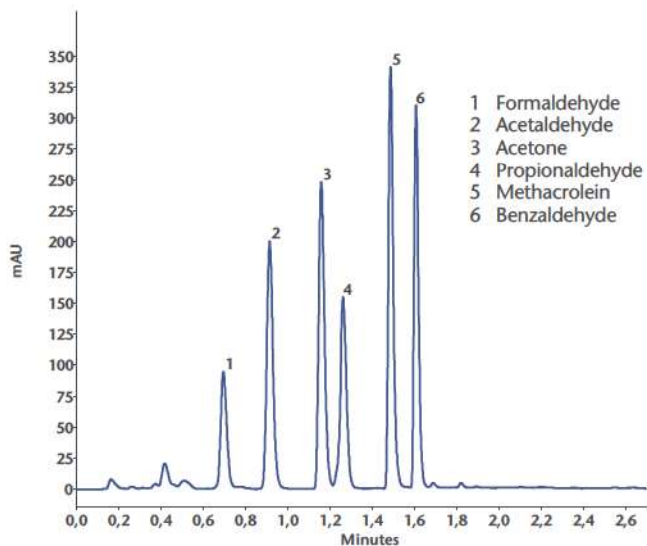
Modifications	Modification	USP code	% Carbon	pH range	Column code
	BlueShell C18	L1	9%	1–11	...D181SHA
	BlueShell C18 A	L1	9%	2–9	...D184SHA
	BlueShell HILIC	L3	–	2–8	...D120SHA

Other modifications upon request.



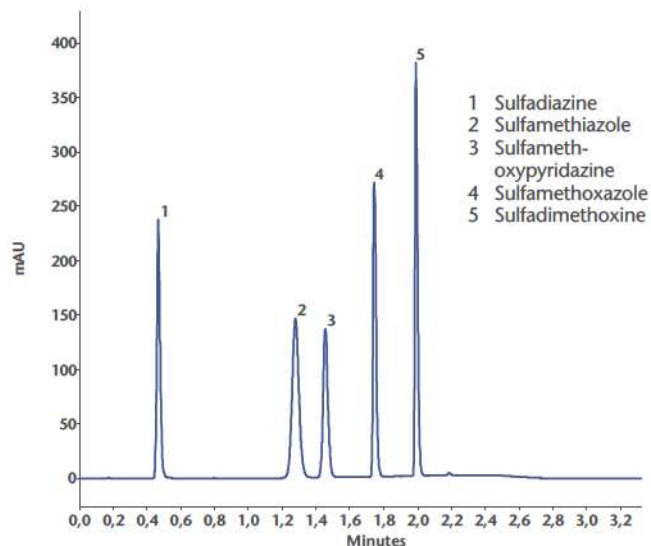
Applications	Modification	Application areas	Separation mechanism
	C18	for acidic, basic and neutral analytes in reversed phase mode (sulfonamides; anabolic steroids; anti-psychotics; beta blockers; Sudan dyes; phenols, preservatives etc.), excellent pH stability	hydrophobic interaction
	C18 A	polar endcapped C18 phase for alternative selectivity; designed for use with 100% aqueous eluents for analysis of very polar compounds, basic pharmaceutical ingredients, water soluble vitamins, catecholamines as well as organic acids	hydrophobic and polar interaction
	HILIC	enhanced retention of polar and hydrophilic analytes (carbohydrates, amino acids, purines, etc.)	hydrophilic interaction

Determination of DNPH Carbonyls



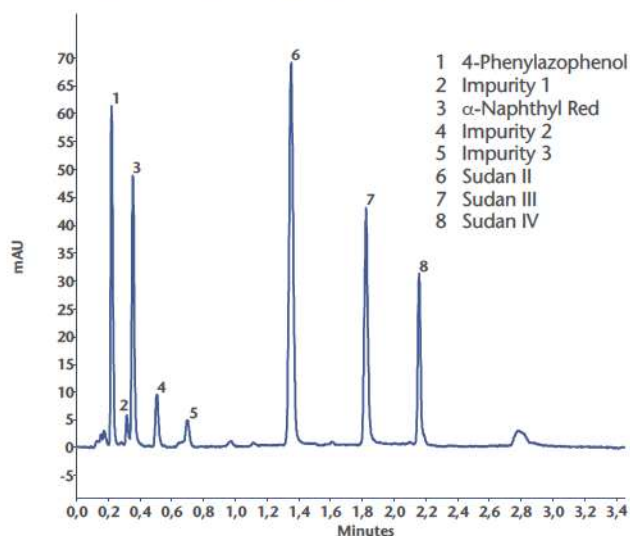
Column: BlueShell 80-2.6 C18 A core-shell,
100 x 2.0 mm ID
Eluent: A: H₂O; B: ACN
Gradient: 0–1 min 40–55% B
1–2 min 55–100% B
2–2.5 min 100% B
Flow rate: 1.2 ml/min
Pressure: approx. 625 bar
Inj. volume: 10 µl
Temperature: 40°C
Detection: PDA-1, 370 nm (50 Hz, 0.02 s)

Determination of Sulfa Drugs



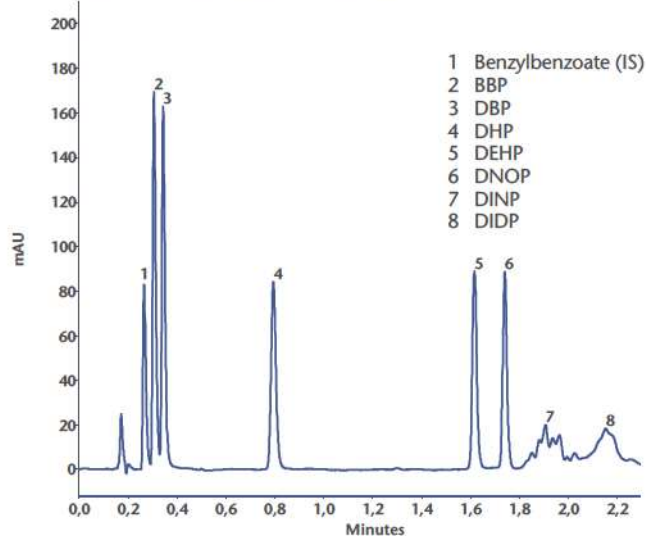
Column: BlueShell 80-2.6 C18 A core-shell,
100 x 2.0 mm ID
Eluent: A: 0.2 g/l NaH₂PO₄ pH 4; B: ACN
Gradient: 0–1.1 min 8% B
1.1–1.9 min 8–40% B
1.9–2.3 min 40% B
Flow rate: 1.7 ml/min
Pressure: approx. 870 bar
Inj. volume: 1 µl
Temperature: 40°C
Detection: PDA-1, 265 nm (50 Hz, 0.02 s)

Determination of Sudan Dyes



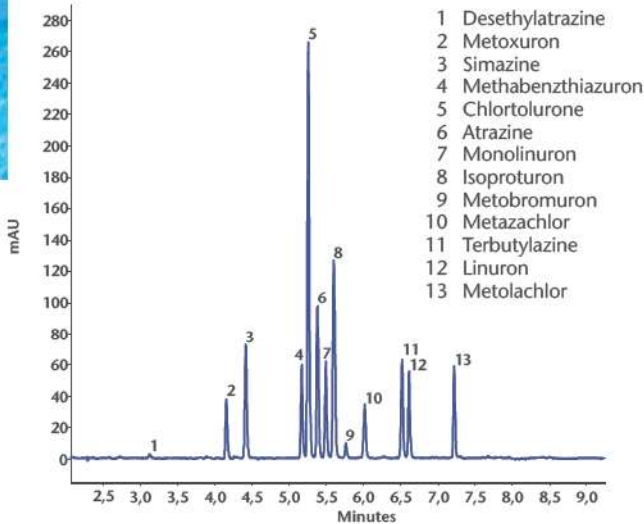
Column: BlueShell 80-2.6 C18 core-shell,
100 x 2.0 mm ID
Eluent: A: H₂O; B: ACN
Gradient: 0–0.6 min 70% B
0.6–1.9 min 70–100% B
1.9–2.5 min 100% B
Flow rate: 1.6 ml/min
Pressure: approx. 775 bar
Inj. volume: 1 µl
Temperature: 25°C
Detection: PDA-1, 240 nm (50 Hz, 0.02 s)

Determination of Phthalates



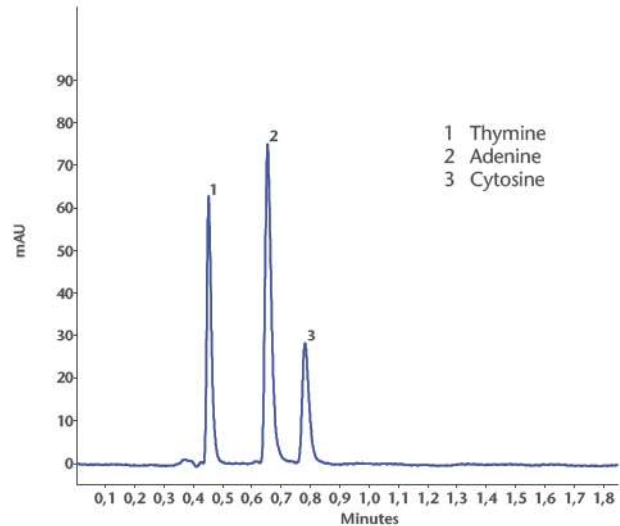
Column: BlueShell 80-2.6 C18 core-shell,
100 x 2.0 mm ID
Eluent: A: 5 mM NH₄Ac pH 2.9; B: ACN
Gradient: isocratic 20% A / 80% B
Flow rate: 0.6 ml/min
Pressure: approx. 220 bar
Inj. volume: 1 µl
Temperature: 30°C
Detection: PDA-1, 254 nm (50 Hz, 0.02 s)

Determination of Pesticides



Column: BlueShell 80-2.6 C18 core-shell, 100 x 2.0 mm ID
 Eluent: A: H₂O; B: ACN
 Gradient: 0–0.5 min 5% B
 0.5–6 min 5–45% B
 6–8 min 45–95% B
 Flow rate: 0.6 ml/min
 Pressure: approx. 380 bar
 Inj. volume: 1 µl
 Temperature: 40 °C
 Detection: PDA-1, 215 nm (50 Hz, 0.05 s)

Determination of Purines and Pyrimidines



Column: BlueShell 80-2.6 HILIC core-shell, 100 x 2.0 mm ID
 Eluent: A: 5 mM NH₄Ac pH 2.9; B: ACN
 Gradient: isocratic 20% A / 80% B
 Flow rate: 0.6 ml/min
 Pressure: approx. 220 bar
 Inj. volume: 1 µl
 Temperature: 30 °C
 Detection: PDA-1, 254 nm (50 Hz, 0.02 s)

Ordering information

Order no.	BlueShell C18
05BD181SHA	BlueShell 80-2.6 C18 core-shell, 50 x 2 mm ID
10BD181SHA	BlueShell 80-2.6 C18 core-shell, 100 x 2 mm ID
15BD181SHA	BlueShell 80-2.6 C18 core-shell, 150 x 2 mm ID
Order no.	BlueShell C18 A
05BD184SHA	BlueShell 80-2.6 C18 A core-shell, 50 x 2 mm ID
10BD184SHA	BlueShell 80-2.6 C18 A core-shell, 100 x 2 mm ID
15BD184SHA	BlueShell 80-2.6 C18 A core-shell, 150 x 2 mm ID
Order no.	BlueShell HILIC
05BD120SHA	BlueShell 80-2.6 HILIC core-shell, 50 x 2 mm ID
10BD120SHA	BlueShell 80-2.6 HILIC core-shell, 100 x 2 mm ID
15BD120SHA	BlueShell 80-2.6 HILIC core-shell, 150 x 2 mm ID

Other column sizes are available upon request.
 Technical data are subject to change without notice.

Visit www.knauer.net for details on complete HPLC systems, HPLC columns, and osmometers.

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Printed on paper awarded the EU Ecolabel
 EU Ecolabel : F/11/1