

The background of the advertisement is a microscopic image showing several cells with prominent red, spiky projections. A metallic, cylindrical chromatography column is positioned diagonally across the center of the image, pointing towards the bottom left. The overall color palette is dominated by deep blues and reds.

Cole-Parmer®

Cole-Parmer BIO UHPLC & HPLC Columns

coleparmer.com

Cole-Parmer BIO Columns

Biomolecules are a diverse range of compounds, amino acids, proteins, peptides, nucleic acids, vitamins and obtaining quality separations is paramount. Cole-Parmer BIO C18 and C4 are optimized stationary phases with a large 300 Å pore size providing improved selectivity, throughput, sensitivity, and column robustness for biomolecules. Sharp efficient peak shapes lead to improved resolution

Cole-Parmer BIO C18 is the preferred choice for peptide mapping and hydrophilic proteins, while Cole-Parmer BIO C4 is ideal for analyzing large hydrophobic molecules.

Available in 3 µm and 5 µm particle sizes for HPLC. The 1.7 µm particle size allows ultra-high performance separation of proteins and peptides.

300 Å pore is optimal for peptides & proteins

Sharp efficient peaks for improved resolution

Choose from C18 or C4 ligands

1.7 µm particle for BIO UHPLC

3 and 5 µm particle for analytical scaling

Cole-Parmer BIO C18

Cole-Parmer BIO C18 is a 300 Å material specifically optimized for the retention and resolution of peptides and proteins. Sharp peak shapes, excellent analyte recovery, and high sensitivity can all be achieved in analytical and UHPLC scale.

- 300 Å pore size optimized for peptides and proteins
- 1.7 µm UHPLC particle size increases sensitivity options
- Sharp efficient peak shapes
- Fully scaleable 1.7 µm to 5 µm particle sizes for method transfer

Phase Characteristics

Chemistry	BIO C18
Carbon loading	11.5%
Particle size	1.7, 3, or 5 µm
Specific area	150 m ² /g
Pore size	300 Å
pH range	2 to 9
USP classification	L1

1.7 µm Cole-Parmer BIO C18 — Increased Sensitivity

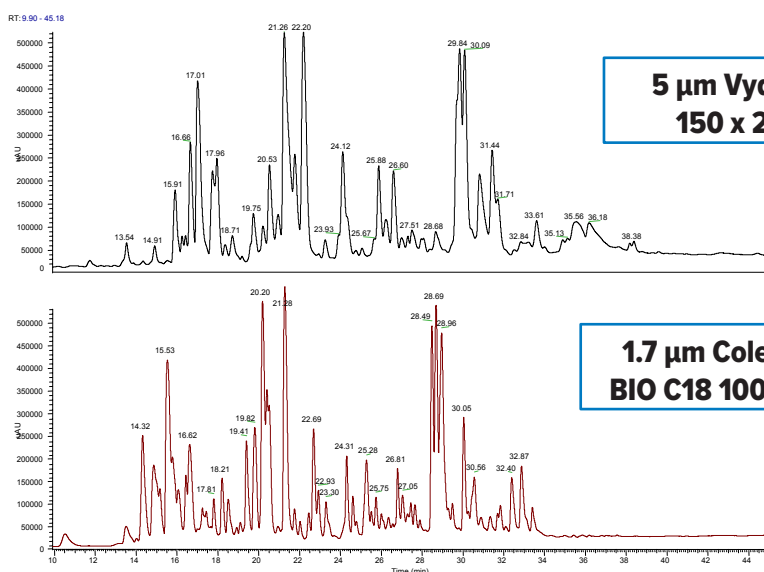
Cole-Parmer BIO C18 is available as 1.7 µm particle size for UHPLC, allowing improved sensitivity and resolution of complex mixtures such as tryptic digest and closely related peptides.

– Sharp Peaks

1.7 µm Cole-Parmer BIO's sharp peak shapes provide a high level of resolution between compounds. Efficiency of this small particle and its ability to work at high pressure means that methods can now be developed with more speed.

– Increased Sensitivity

Sensitivity of low abundance peptides will be enhanced.

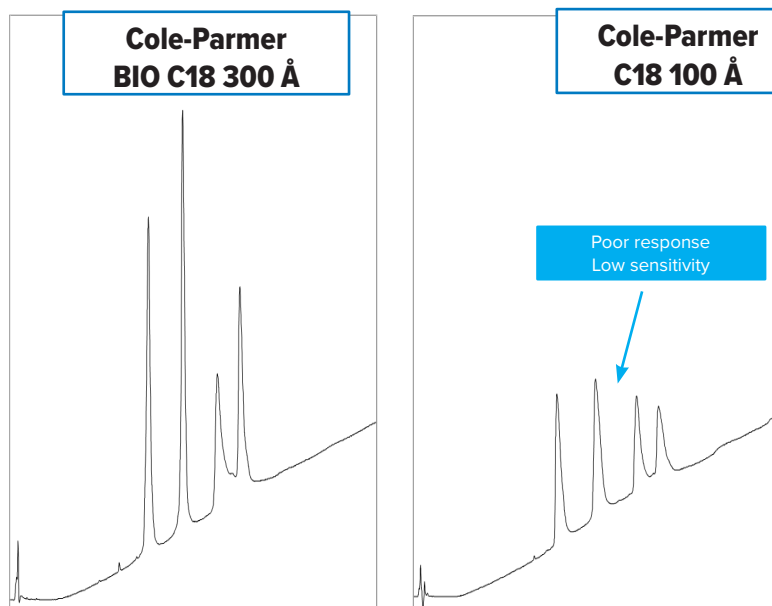


Pore Size — 100 Å vs 300 Å

The importance of pore size is critical in the separation of large peptides and proteins. In 'normal' analytical small molecule work, a 100 Å silica template is typically used, however this can lead to poor resolution, sensitivity, and recovery of biomolecules.

More common therefore for biomolecule work of analytes >2 KDa would be the use of a 300 Å silica particle.

Even with this wider pore size, Cole-Parmer BIO 1.7 µm columns will still operate at the higher pressures required by UHPLC systems.



Cole-Parmer BIO C18

Cole-Parmer BIO C18 — Peptides

The excellent surface coverage of the C18 ligand on the Cole-Parmer BIO 300 Å material gives multiple benefits for peptide analysis:

– Improved Peak Shape

Cole-Parmer BIO C18 is using the same bonding technology as our small molecule C18 hence superior peak shapes are achieved.

– Improved Sensitivity

Improvement of peak shape results in improvement of both resolution and sensitivity of the method.

1. GLY-TYR (238.2 MW)
2. VAL-TYR-VAL (379.5 MW)
3. MET-Enkephalin (573.7)
4. LEU-Enkephalin (555.6 MW)
5. Angiotensin II (1046.2 MW)

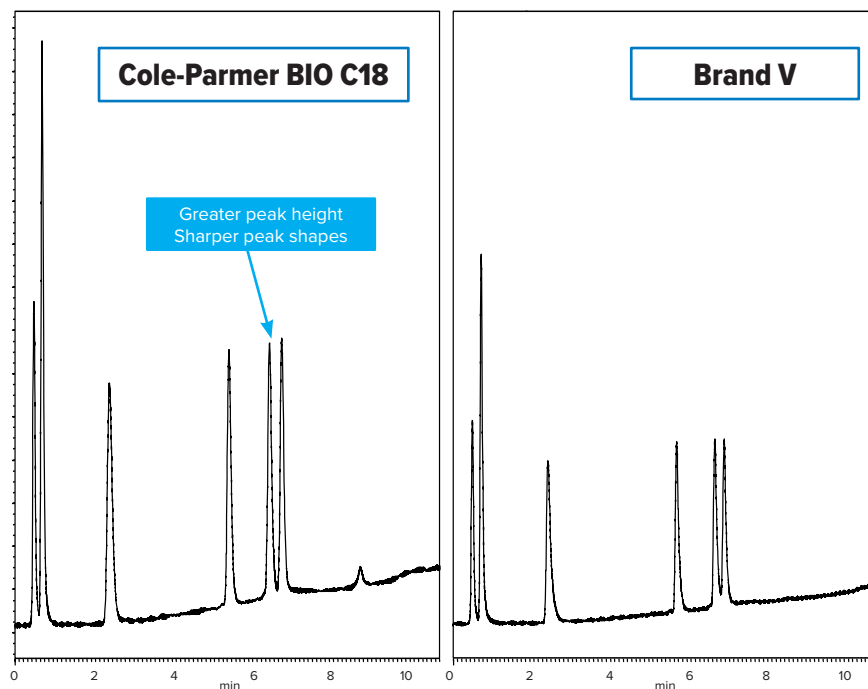
Columns: 50 x 2.1 mm 5 µm

A: 0.1% TFA

B: 0.1% TFA in ACN

10 to 40% B in 10 min

λ - 220nm



Cole-Parmer BIO C18 — Proteins

The excellent surface coverage of the C18 ligand on the Cole-Parmer BIO 300 Å material gives multiple benefits for protein analysis:

– Improved Recovery

Cole-Parmer BIO C18 provides sharp peak shapes due to the surface coverage, for increased recovery of protein samples.

– Improved Reproducibility

By having a controlled surface coverage, reproducibility of the analysis is improved from sample to sample.

1. Ribonuclease A
2. Cytochrome C
3. Halo-Transferrin
4. Apomyoglobin

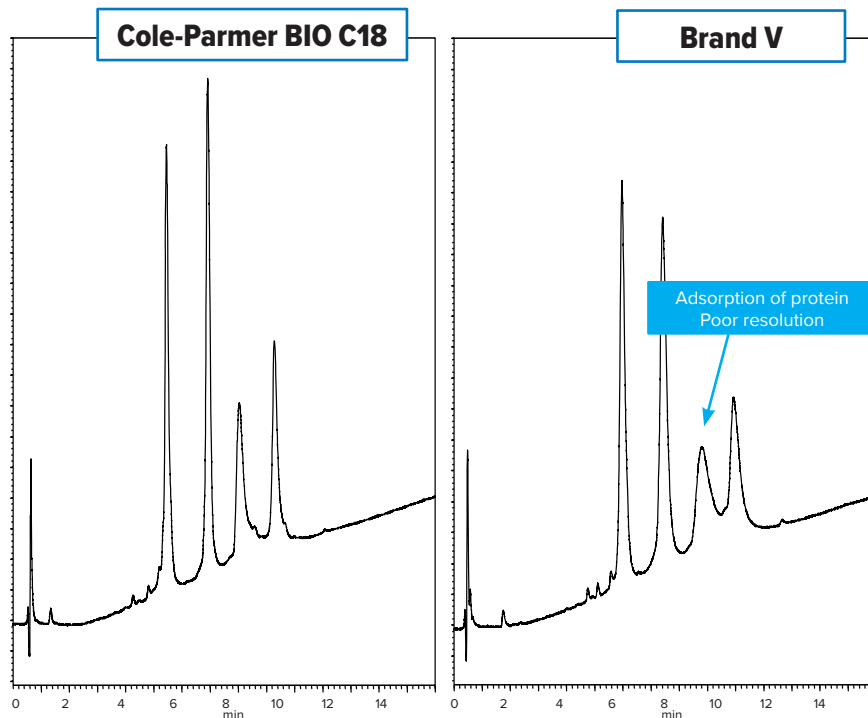
Columns: 50 x 2.1 mm 5 µm

A: 0.1% Formic acid

B: 0.1% Formic acid in ACN

10 to 60% B in 15 min

λ - 220nm



Cole-Parmer BIO C18

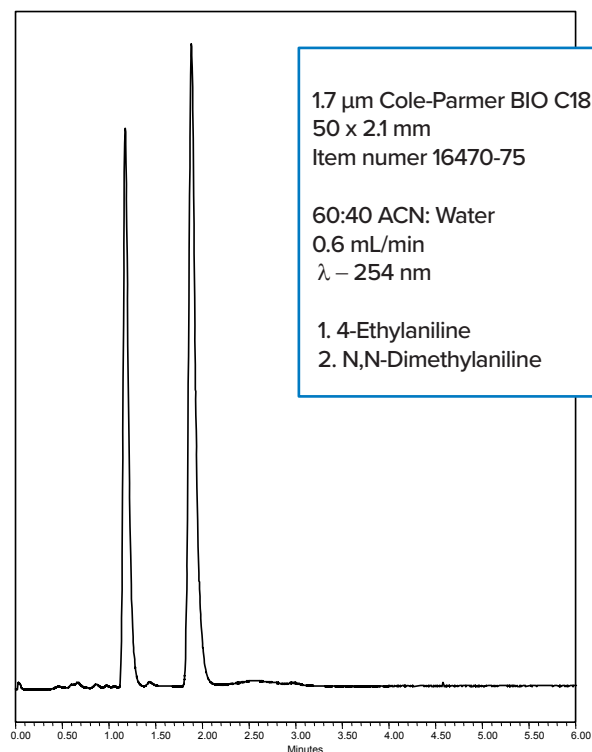
Cole-Parmer BIO C18 — Basic Peak Shapes

Peak shape affects not only the sensitivity but also the resolution of structurally similar compounds. It is important to ensure good peak shape to provide the best performance possible with biomolecules.

Cole-Parmer BIO C18 and C4 are both manufactured to ensure that surface coverage is high, reducing any secondary negative interactions which could compromise peaks shapes.

Small basic probes prove whether there are any secondary silanol interactions which would compromise peak shapes.

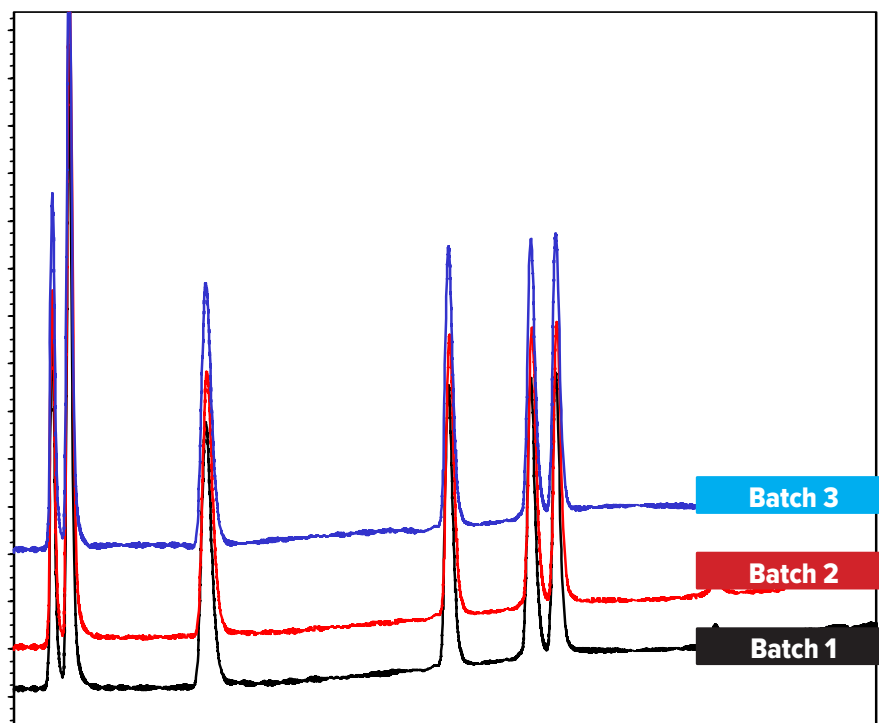
Basic compound	Asymmetry competitor	Asymmetry Cole-Parmer BIO C18
4-Ethylaniline	1.58	1.30
N,N-Dimethylaniline	1.52	1.28



Reproducibility

The excellent surface coverage of the C18 ligand on the Cole-Parmer BIO 300 Å material ensures reproducibility over multiple batches.

1. GLY-TYR (238.2MW)
2. VAL-TYR-VAL (379.5 MW)
3. MET-Enkephalin (573.7)
4. LEU-Enkephalin (555.6 MW)
5. Angiotensin II (1046.2 MW)



Cole-Parmer BIO C4

Cole-Parmer BIO C4 is a 300 Å material specifically optimized for the retention and resolution of large peptides and proteins. Sharp peak shapes, excellent analyte recovery, and high sensitivity can all be achieved in analytical scale and in UHPLC scale. The C4 ligand provides a high density bonding, resulting in a chemically stable, robust, low bleed phase.

Phase Characteristics

Chemistry	BIO C4
Carbon loading	5%
Particle size	1.7, 3, or 5 µm
Specific area	150 m ² /g
Pore size	300 Å
pH range	2 to 9
USP classification	L26

- 300 Å pore size optimized for peptides and proteins
- 1.7 µm UHPLC particle size increases sensitivity options
- Sharp efficient peak shapes
- Fully scaleable 1.7 µm to 5 µm particle sizes for method transfer

Cole-Parmer BIO C4 — C4 vs C18

If proteins are analyzed with a short alkyl chain phase such as a C4, improvements will often be highlighted in the separation achieved. Resolution and indeed selectivity can both be altered by the hydrophobic and steric interaction difference between C4 and long alkyl chain C18.

In this example the spacing between peaks 4 to 6 varies based upon the chain length of the stationary phase. C4 in this case providing increased selectivity (α).

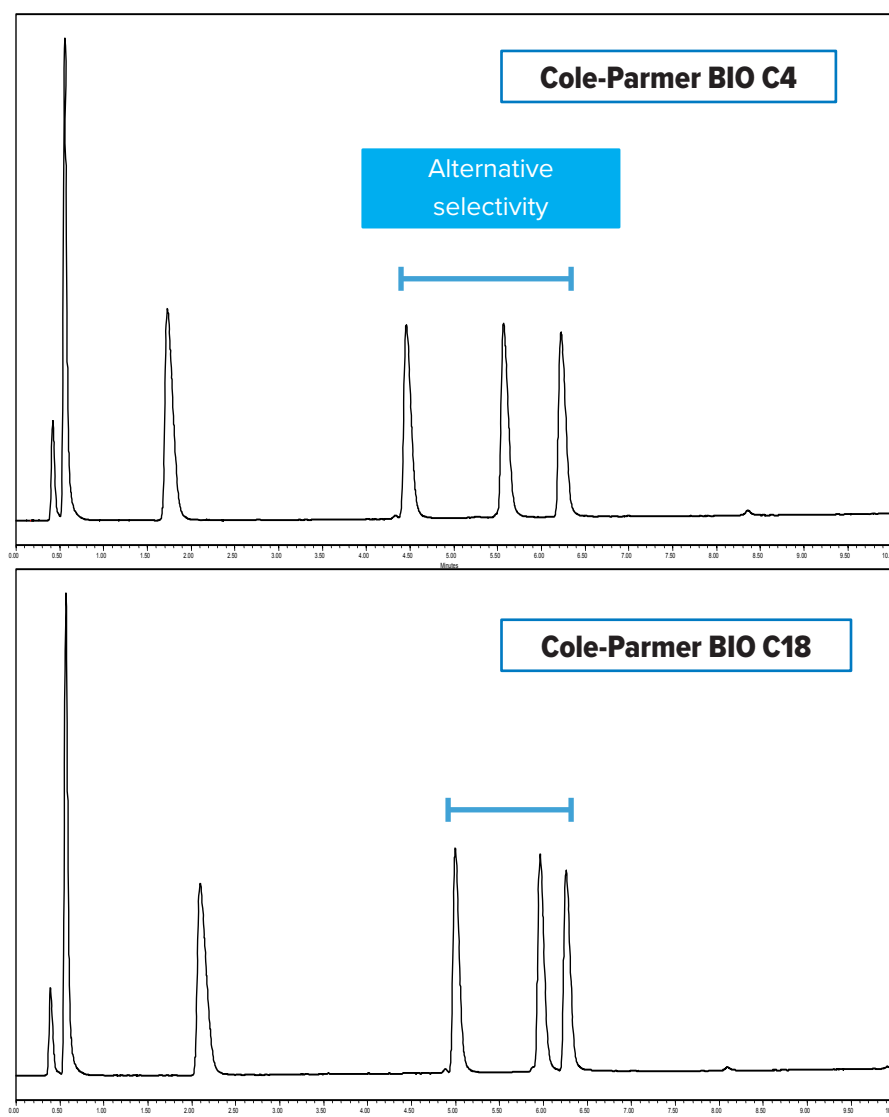
Columns: 50 x 2.1 mm 5 µm

A: 0.1% TFA

B: 0.1% TFA in ACN

10 to 40% B in 10 min

λ - 220 nm

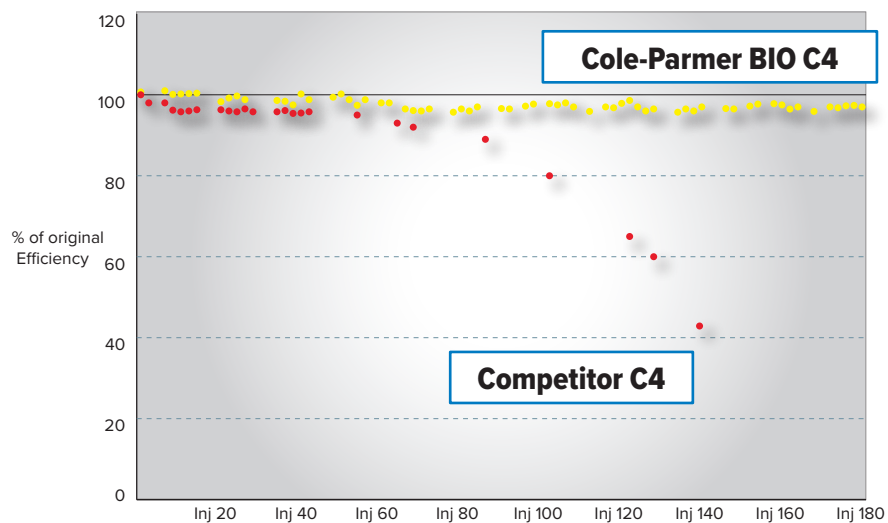


Cole-Parmer BIO C4

Cole-Parmer BIO C4 — Stability in Acidic Conditions

The excellent surface coverage of the C4 ligand on the Cole-Parmer BIO 300 Å material results in sharp peak shapes and increases sensitivity from the resulting peak height gain. It also extends the lifetime of the column.

Stability study is 0.1% TFA : ACN gradients



Ordering Information



UHPLC BIO Columns

Particle size	Length	Column ID	Qty	BIO C18	BIO C4
				Item number	Item number
1.7 μm	50 mm	2.1 mm	1	16470-75	16470-88
		4.6 mm	1	16470-72	16470-85
	100 mm	2.1 mm	1	16470-74	16470-87
	150 mm	2.1 mm	1	16470-73	16470-86



HPLC BIO Columns

Particle size	Length	Column ID	Qty	BIO C18	BIO C4
				Item number	Item number
3 μm	50 mm	2.1 mm	1	16470-71	16470-84
	100 mm	2.1 mm	1	16470-70	16470-83
		4.6 mm	1	16470-68	16470-81
	150 mm	2.1 mm	1	16470-69	16470-82
		4.6 mm	1	16470-67	16470-80
		2.1 mm	1	16470-66	16470-79
5 μm	50 mm	4.6 mm	1	16470-65	16470-78
	100 mm	4.6 mm	1	16470-64	16470-77
	150 mm	4.6 mm	1	16470-63	16470-76
	250 mm	4.6 mm	1		

In-Line Filters

- Maintain chromatographic integrity and increase column lifetime
- Low-volume in-line filters change out in seconds, not minutes
- Place between column and fitting—no backpressure increase
- Fingertight direct connection



Description	Qty	Item number
In-line filters for UHPLC columns, 0.5 μm	2	16470-92
	4	16470-93
In-line filters for HPLC columns, 2 μm	5	16470-90
	10	16470-91

Applications

Compound	Use	Column
Angiotensin I	Peptide	BIO C4
Angiotensin II	Peptide	BIO C18
Apomyoglobin	Protein	BIO C18
Casein	Protein	BIO C18
Casein tryptic digest	Peptide	BIO C18
Cytochrome C	Protein	BIO C18
GLY-TYR	Peptide	BIO C18
Holo-Transferrin	Protein	BIO C18
Human growth hormone	Peptide hormone	BIO C18
Insulin	Peptide	BIO C4
LEU-Enkephalin	Peptide	BIO C18
MET-Enkephalin	Peptide	BIO C18
Ribonuclease A	Protein	BIO C18
VAL-TYR-VAL	Peptide	BIO C18

Operating Conditions

- **Each Cole-Parmer BIO column is shipped with its own test certificate**

Most columns will have a reduced lifetime if operated at extremes of temperature, pH, and pressure. Try and avoid excessive use or increased combinations of temperature and pH.

- Cole-Parmer BIO columns will operate at elevated temperatures to aid the separation up to 90 °C.
- Cole-Parmer BIO columns are stable between pH 2 to 9 and can be used with all common reversed phase mobile phase solvents, acetonitrile, MeOH, water as well as common buffers, formic acid, TFA, acetic acid, and ammonium acetate.
- The 3 µm and 5 µm Cole-Parmer BIO HPLC columns will safely operate up to 600 bar (8940 psi), while the 1.7 µm Cole-Parmer BIO UHPLC columns will operate up to 1000 bar (15,000 psi).

coleparmer.com

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