HALO Protein and Peptide UHPLC columns are specifically designed for fast, high-resolution separation of proteins and peptides. The particles packed in these columns are engineered to have pore sizes, particle sizes and diffusion path lengths that are optimum for the separation of proteins up to 500 kDa (HALO Protein columns) and peptides in the range of 3 to 20 kDa (HALO Peptide columns).

The use of highly stable bonding chemistry ensures that separations are rugged and reliable and the low back pressure of these columns allow them to be used effectively on either UHPLC or conventional HPLC equipment.

The high efficiency of sub-2 µm UHPLC columns combined with the low pressure and high speed of monolith columns.

- Fast
- High peak capacity
- Low back pressure
- Stable at high temperature
- Use with UHPLC or conventional HPLC equipment

Put these new, high-performance chromatographic tools to work in your laboratory.

Fused-Core particle technology makes HALO Protein and HALO Peptide columns possible

HALO UHPLC columns are not your typical UHPLC columns. The particles packed into HALO columns are made using groundbreaking Fused-Core™ particle technology that produces superficially porous particles (also known as core-shell particles) that make possible the manufacture of very high efficiency columns without the very high pressure of other UHPLC columns. HALO Protein and HALO Peptide columns, thanks to Fused-Core technology, minimize the compromises that must be made between efficiency, speed of separation and column back pressure. It is like combining the benefits of low pressure and high speed that one gets from monolith columns with the high efficiency of UHPLC columns packed with sub-2 micron particles.

**FIGURE 1:** Groundbreaking Fused-Core particle technology

Fused-Core particle technology facilitates the production of particles with specifically engineered and carefully controlled pore size, particle size and diffusion path length. These parameters are then selected for optimum separation of proteins and peptides, depending on the molecular size of the analytes. The cartoon on the left illustrates the basic structure of the particle and the SEM on the right shows what a HALO Protein particle actually looks like.

**FIGURE 2:** Fast separation of proteins and peptides.

<table>
<thead>
<tr>
<th>Column: HALO Protein C4, 2.1 x 100 mm</th>
<th>Flow rate: 0.5 mL/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile Phase: A: Water/0.1% TFA, B: 80/20 Acetonitrile/Water + 0.1% TFA</td>
<td>Temp: 60 °C</td>
</tr>
<tr>
<td>Gradient: 0% to 87.5% B in 1 min</td>
<td>Pressure: 109 bar</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample:</th>
<th>Flow Rate: 5.0 mL/min</th>
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</thead>
<tbody>
<tr>
<td>Cytochrome c</td>
<td>Temperature: 60 °C</td>
</tr>
<tr>
<td>Lysozyme</td>
<td>Pressure: 330 bar</td>
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<tr>
<td>α-Chymotrypsin</td>
<td>LC System: Conventional</td>
</tr>
<tr>
<td>Catalase</td>
<td>HPLC, Agilent 1100</td>
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<tr>
<td>Carbonic anhydrase</td>
<td></td>
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<tr>
<td>Enolase</td>
<td></td>
</tr>
<tr>
<td>β-Amylase</td>
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The top chromatogram demonstrates the high speed separation of 7 proteins in less than 8 minutes with a HALO Protein C4 column. The chromatogram on the bottom shows the separation of 9 peptides and 2 proteins in less than 60 seconds with a HALO Peptide E2-C18 column.
HALO Protein and HALO Peptide Specifications

Stationary Phase Support

HALO Protein
- 3.4 μm diameter spherical, ultra-pure, “Type B” silica
- 0.2 μm porous layer fused to a 3.0 μm solid core
- 400 Å pore size

Bonded Phase
C4: Dimethylbutylysilane, exhaustively endcapped and enhanced for high temperature stability

HALO Peptide
- 2.7 μm (HALO) and 4.7 μm (HALO-5) diameter spherical, ultra-pure, “Type B” silica
- HALO: 0.5 μm porous layer fused to a 1.7 μm solid core.
- HALO-5: 0.6 μm porous layer fused to a 3.5 μm solid core.
- 160 Å pore size
- Two bonded phases (C18 and CN) provide alternate selectivity to optimize peptide separations

Bonded Phases
ES-C18: Octadecyldiisobutylsilane, not endcapped
ES-CN: Cyanopropyldiisopropylsilane, exhaustively endcapped

For more information:
info@advanced-materials-tech.com
www.advanced-materials-tech.com

HALO Protein & Peptide UHPLC Columns

<table>
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<th>Dimensions (mm)</th>
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Guard Columns, 3 pk
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Guard Column Holder

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