• Exploit selectivity at low, intermediate and high pH
• Use with LC/MS-compatible buffers between pH 1.5 – 11.5
• High efficiency 2µm, 3µm, 5µm and 10µm particles for UHPLC and HPLC
• Ultra-inert for maximum performance and reproducibility
ACE® Excel™ SuperC18™

Ultra-Inert UHPLC and HPLC Columns with Extended pH Stability

Ideal Column Choice for Method Development
- Exploit selectivity changes at low, intermediate and high pH
- Excellent column lifetime reduces the cost per analysis

Specially Designed for High and Low pH Mobile Phases
- Designed for use with LC/MS-compatible buffers
- Recommended pH range 1.5 – 11.5
- No hysteresis problems when switching pHs

Ultra-Low Bleed for Improved LC/MS Compatibility
- Compatible with both MeOH and ACN
- Rapid column equilibration without memory effects

Preparative Dimensions Available
- Reproducible scale up from analytical separations up to 5 and 10µm particle sizes
- Exploit increased loading capacity of basic analytes at elevated pH

Exploit Selectivity by Adjusting pH
Application # 1510

Column: ACE Excel 3µm SuperC18, 50 x 2.1mm
Sample: 1) nizatidine  2) salbutamol  3) amiloride  4) N-acetylprocainamide  5) quinoxaline  6) methyl paraben  7) p-cresol  8) reserpine  9) piperine  10) toluene  11) felodipine
Temperature: 40°C   Flow Rate: 0.42ml/min   Wavelength: 254nm   Gradient: 3 – 100% B in 7 minutes
Acidic Mobile Phase: A: 10mM ammonium formate in H2O (pH 3.0)  B: 10mM ammonium formate (pH 3.0) in 90:10 (v/v) MeCN/H2O
Basic Mobile Phase: A: 0.1% NH₃ (= 18mM) in H2O (pH 10.7)  B: 0.1% NH₃ (=18mM), pH 10.7 in 90:10 (v/v) MeCN/H2O

If ACE Excel SuperC18 does not outperform the column you are currently using, simply contact us for a full refund and keep the ACE Excel SuperC18 column (2.1mm - 4.6mm id) FREE OF CHARGE.
Encapsulated Bonding Technology (EBT™) for Improved Chromatography and Stability

The unique Encapsulated Bonding Technology (EBT™) developed for ACE Excel SuperC18 columns dramatically increases ligand coverage of the silica surface and effectively eliminates the negative effect of unbonded silanol groups from separations. This higher ligand coverage results in improved inertness, chromatographic performance and stability.

Many C18 bonded columns will exhibit ligand cleavage under acidic conditions, resulting in retention shifts and/or increased peak tailing. Under aggressive acidic conditions (see Figure 1) ACE Excel SuperC18 is highly resistant to ligand cleavage, due to a combination of the Encapsulated Bonding Technology (EBT™) and ultra-inert ACE silica.

Under basic conditions with LC/MS-compatible mobile phases (see Figure 2), the Encapsulated Bonding Technology (EBT™) shields the ACE Excel SuperC18 surface from dissolution while maintaining excellent chromatographic performance. Traditional C18 bonded silica columns are prone to silica dissolution under these aggressive conditions, which can result in premature column deterioration.

**Figure 1 - Excellent Acidic Stability at pH 1.8**
Application # 1511

Acidic flow conditions
Column: ACE Excel 2µm SuperC18, 50 x 2.1mm
Mobile Phase: 50:50 MeOH/0.1% TFA in H₂O (pH 1.8)
Temperature: 40°C Flow Rate: 0.20ml/min

Day 1

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12.

$k$ (phenanthrene) = 16.91

Acidic Mobile Phase (pH 1.8) (continuous flow)

>20,000 column volumes
>2,000 injections

Day 30

$k$ (phenanthrene) = 16.85

Evaluation conditions
Sample: 1) uracil 2) dimethyl phthalate 3) toluene 4) biphenyl 5) phenanthrene
Mobile Phase: 70:30 MeOH:H₂O
Temperature: 22°C Flow Rate: 0.20ml/min Wavelength: 254nm

**Figure 2 - Excellent Basic Stability at pH 10.7**
Application # 1512

Basic flow conditions
Column: ACE Excel 3µm SuperC18, 150 x 4.6mm
Mobile Phase: 50:50 ACN/0.1% NH₃ in H₂O (pH 10.7)
Temperature: 40°C Flow Rate: 1.00ml/min

Day 1

$N_0.5$ (biphenyl) = 169,100pl/m

Day 30

$N_0.5$ (biphenyl) = 168,700pl/m

Evaluation conditions
Sample: 1) uracil 2) dimethyl phthalate 3) toluene 4) biphenyl 5) phenanthrene
Mobile Phase: 80:20 MeOH:H₂O
Temperature: 22°C Flow Rate: 1.00ml/min Wavelength: 254nm

2

Acidic Mobile Phase (pH 1.8)

>20,000 column volumes
>2,000 injections

Basic Mobile Phase (pH 10.7)

>20,000 column volumes
>2,000 injections
Comparison of Column Inertness at Intermediate pH

- Leading column brands in 50 x 2.1mm LC/MS-compatible dimensions at pH 5.8
- Silica, Hybrid and Superficially Porous particle technologies were compared
- Comparison of column efficiency for pyridine, a basic molecule
- Efficiency measured at 5% peak height to account for peak tailing effects

Significant differences in efficiency, peak shape and selectivity are seen when analyzing pyridine – a basic molecule. Increased tailing and retention, combined with reduced efficiency, are indicative of undesirable secondary interactions between pyridine and silanol groups on the stationary phase surface. These interactions result in poor column reproducibility.

ACE C18 columns have gained a well deserved reputation for providing excellent efficiency, peak shape and reproducibility. ACE Excel SuperC18 columns further build upon this proven reputation to provide the analyst with even better chromatographic performance across an extended range of pH conditions under LC/MS-compatible mobile phase conditions.
Comparison of Column Inertness at High pH

- LC/MS-compatible mobile phase at pH 10.7
- Leading column brands in 150 x 4.6mm dimensions
- Comparison of column efficiency for pyridine, a basic molecule
- Efficiency measured at 5% peak height to account for peak tailing effects

Comparison of Column Efficiency for Pyridine, a Basic Molecule

When analyzing a basic molecule (pyridine) at high pH, differences in efficiency, peak tailing and retention are seen. This suggests undesirable secondary interactions between the basic molecule and silanol groups on the stationary phase surface still remain.

Further to the intermediate pH comparison (see page 3), the ACE Excel SuperC18 again provides excellent peak shape and efficiency when analyzing a basic molecule (pyridine) at high pH, which indicates undesirable secondary interactions have been virtually eliminated. These undesirable interactions can also result in poor column reproducibility.

Changing pH is a powerful tool to enable the selectivity to be optimized and sample impurities to be identified. ACE Excel SuperC18 columns are designed to provide excellent peak shape and lifetime under acidic, intermediate and high pH conditions with LC/MS-compatible buffers, and may additionally be used with mobile phases containing MeOH or ACN without suffering efficiency loss and/or extended equilibration times.

Conclusion:
When analyzing a basic molecule (pyridine) at high pH, differences in efficiency, peak tailing and retention are seen. This suggests undesirable secondary interactions between the basic molecule and silanol groups on the stationary phase surface still remain.

Further to the intermediate pH comparison (see page 3), the ACE Excel SuperC18 again provides excellent peak shape and efficiency when analyzing a basic molecule (pyridine) at high pH, which indicates undesirable secondary interactions have been virtually eliminated. These undesirable interactions can also result in poor column reproducibility.

Changing pH is a powerful tool to enable the selectivity to be optimized and sample impurities to be identified. ACE Excel SuperC18 columns are designed to provide excellent peak shape and lifetime under acidic, intermediate and high pH conditions with LC/MS-compatible buffers, and may additionally be used with mobile phases containing MeOH or ACN without suffering efficiency loss and/or extended equilibration times.
Product Availability and Specifications

ACE Excel® SuperC18 Ultra-Inert UHPLC and HPLC Columns with Extended pH Stability

<table>
<thead>
<tr>
<th>Phase</th>
<th>Functional Group</th>
<th>Endcapped</th>
<th>Particle Size (µm)</th>
<th>Pore Size (Å)</th>
<th>Surface Area (m²/g)</th>
<th>Carbon Load (%)</th>
<th>Maximum pH Range</th>
<th>USP Listing</th>
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<tbody>
<tr>
<td>ACE Excel SuperC18</td>
<td>Octadecyl encapsulated</td>
<td>Yes</td>
<td>2, 3, 5, 10</td>
<td>90</td>
<td>400</td>
<td>14.8</td>
<td>1.5-11.5*</td>
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</table>

*ACE Excel SuperC18 is designed for use with LC/MS-compatible buffers. Further information is contained within “ACE SuperC18 – A Guide to Buffer Selection” – please contact your distributor to request your FREE copy or visit www.ace-hplc.com.

**To further extend UHPLC and HPLC column lifetimes, ACE pre-column filters are recommended – for further details please contact MAC-MOD Analytical or visit www.mac-mod.com.**

- For HPLC column connections up to 6000psi, PEEK fingertight fittings (p/n ACE-CC10) are recommended – for further details please contact MAC-MOD Analytical or visit www.mac-mod.com.
- For UHPLC column connections up to 25000psi, reusable fittings (p/n EXL-CC10) are recommended – for further details please contact MAC-MOD Analytical or visit www.mac-mod.com.

**ACE Excel 2µm SuperC18 UHPLC/HPLC Columns** (supplied in dual compatible UHPLC/HPLC “Excel” hardware format with 1000bar/15000psi pressure limit)

<table>
<thead>
<tr>
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<tr>
<td>$515</td>
<td>$545</td>
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**ACE Excel 3µm SuperC18 UHPLC/HPLC Columns** (supplied in dual compatible UHPLC/HPLC “Excel” hardware format with 1000bar/15000psi pressure limit)

<table>
<thead>
<tr>
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</tr>
<tr>
<td>$450</td>
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**ACE Excel 5µm SuperC18 UHPLC/HPLC Columns** (supplied in dual compatible UHPLC/HPLC “Excel” hardware format with 1000bar/15000psi pressure limit)

<table>
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<tr>
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**ACE 5µm SuperC18 Semi-Prep and Preparative HPLC Columns**

<table>
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<tr>
<th>Column Diameter</th>
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<tr>
<td>ACE-1211-2508</td>
<td>ACE-1211-2510</td>
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</tbody>
</table>

**Prices Available upon request.**

**ACE 10µm SuperC18 Analytical, Semi-Prep and Preparative HPLC Columns** (please enquire)

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ACE Excel SuperC18 is designed for use with LC/MS-compatible buffers. Further information is contained within “ACE SuperC18 – A Guide to Buffer Selection” – please contact your distributor to request your FREE copy or visit www.ace-hplc.com.

**Specifications**

- **Phase:**
  - ACE Excel SuperC18
- **Functional Group:**
  - Octadecyl encapsulated
- **Endcapped:**
  - Yes
- **Particle Size (µm):**
  - 2, 3, 5, 10
- **Pore Size (Å):**
  - 90
- **Surface Area (m²/g):**
  - 400
- **Carbon Load (%):**
  - 14.8
- **Maximum pH Range:**
  - 1.5-11.5*
- **USP Listing:**
  - L1

**Column Diameter**

- 2.1mm
- 3.0mm
- 4.6mm

**Column Length**

- 20mm
- 30mm
- 35mm
- 50mm
- 75mm
- 100mm
- 125mm
- 150mm
- 250mm

**Price**

- 20mm: $515
- 30mm: $545
- 35mm: $555
- 50mm: $590
- 75mm: $665
- 100mm: $695
- 125mm: $740
- 150mm: $780

**ACE Excel 2µm SuperC18 UHPLC/HPLC Columns**

**ACE Excel 3µm SuperC18 UHPLC/HPLC Columns**

**ACE Excel 5µm SuperC18 UHPLC/HPLC Columns**

**ACE 5µm SuperC18 Semi-Prep and Preparative HPLC Columns**

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