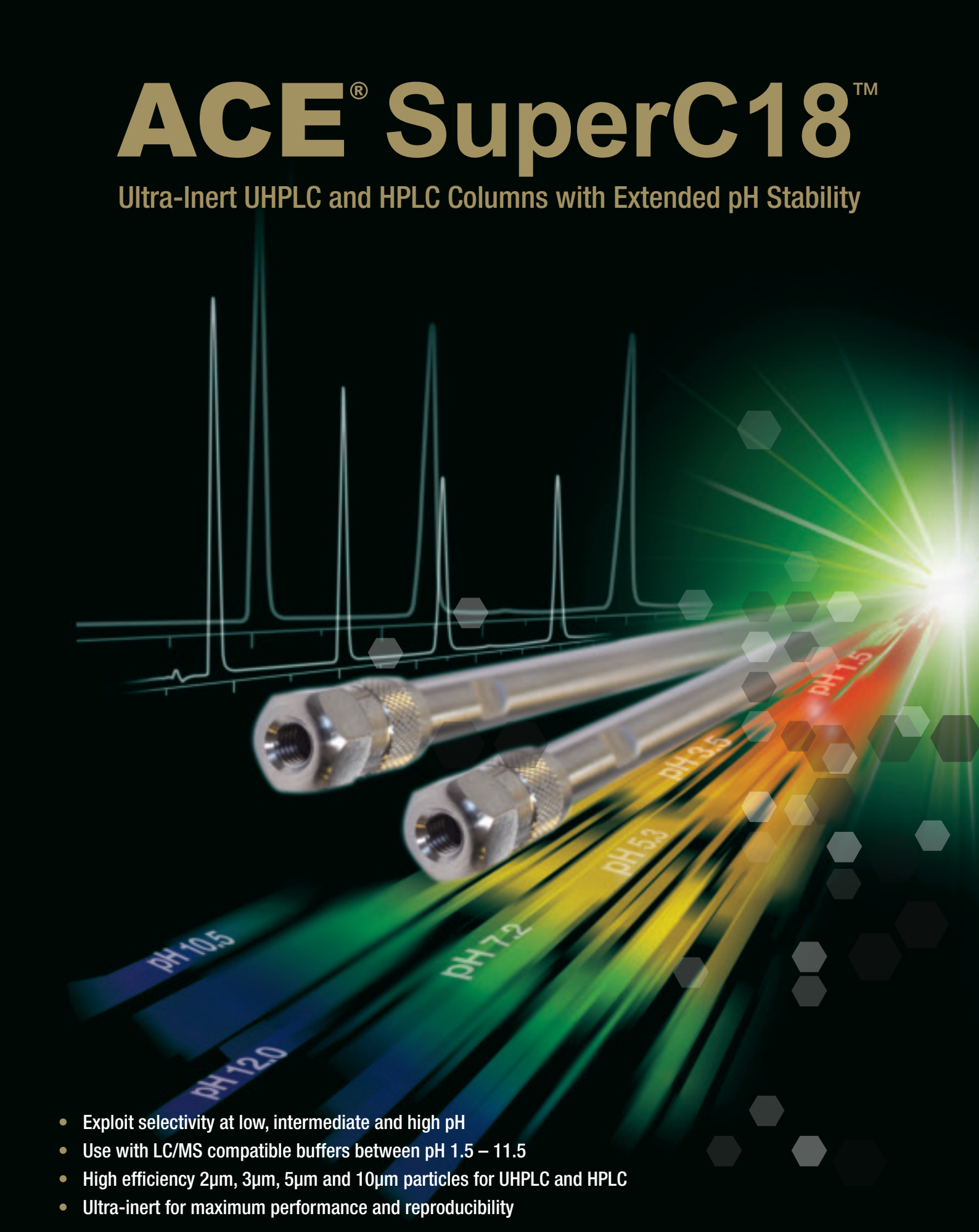
ACE® SuperC18™

Ultra-Inert UHPLC and HPLC Columns with Extended pH Stability



- 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®
UHPLC and HPLC Columns

ACE® 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 for reduced analysis costs

Specially Designed for High and Low pH Mobile Phases

- Designed for use with LC/MS compatible buffers
- Recommended pH range 1.5 – 11.5

Ultra-Low Bleed for Improved LC/MS Compatibility

- Compatible with both MeOH and MeCN
- Rapid column equilibration without memory effects

Preparative Dimensions Available

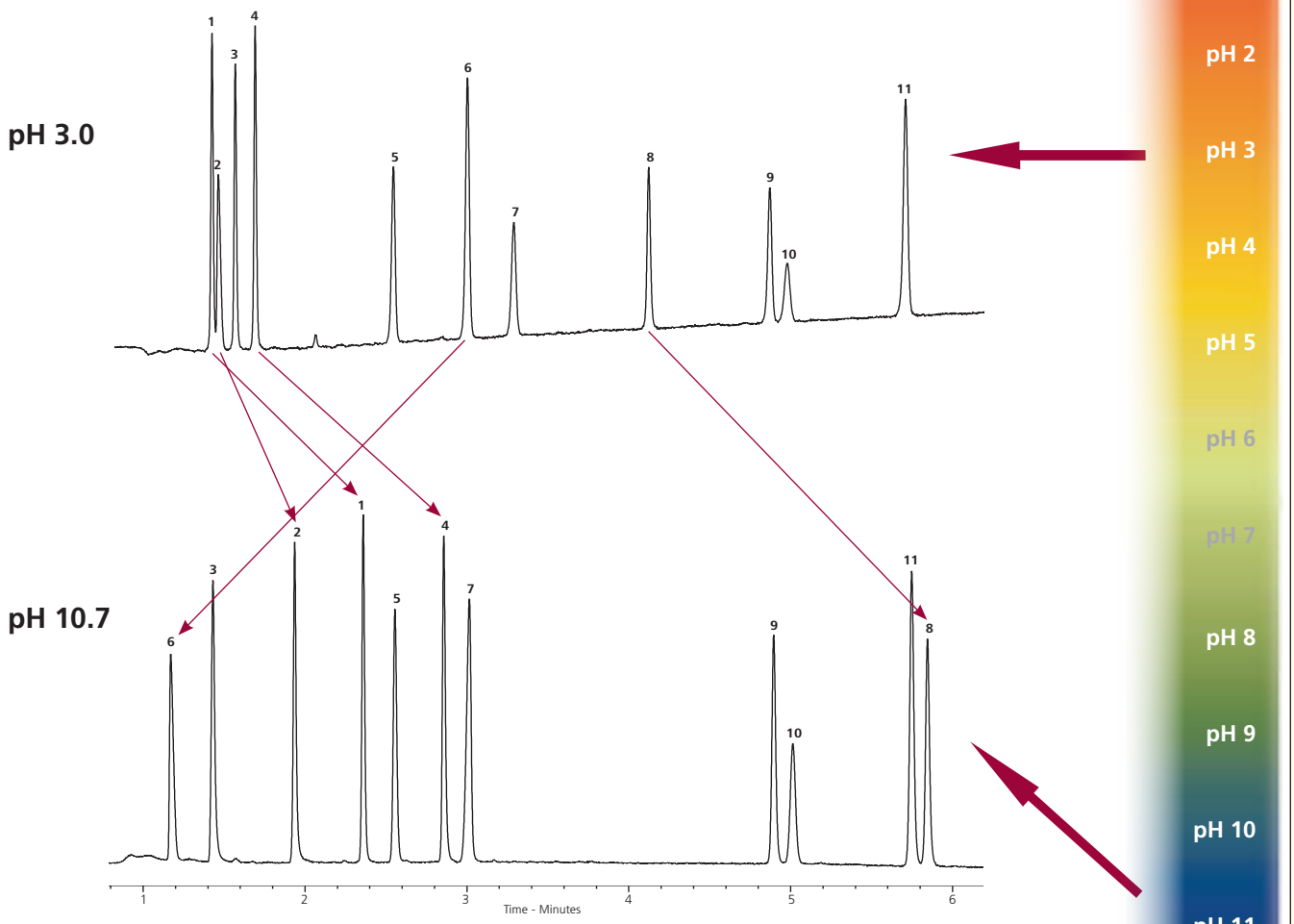
- Reproducible scale up from analytical separations
- Exploit increased loading capability at elevated pH

ACE performance guarantee

If ACE SuperC18 does not outperform the column you are currently using, simply contact us for a full refund and keep the ACE SuperC18 column (2.1mm - 4.6mm id) FREE OF CHARGE.

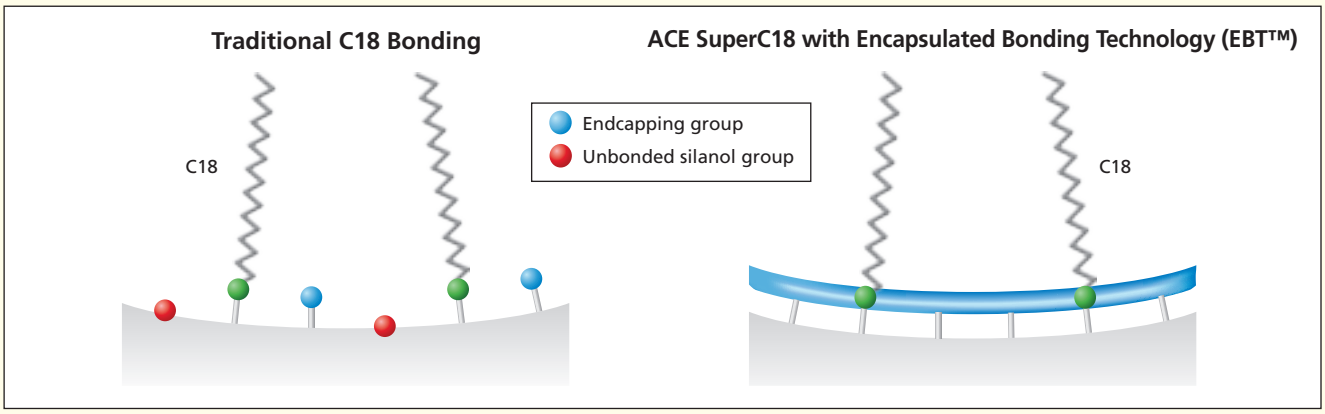
Exploit Selectivity by Adjusting pH

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 H_2O (pH 3.0) B: 10mM ammonium formate (pH 3.0) in 90:10 (v/v) MeCN/H_2O
Basic Mobile Phase: A: 0.1% NH_3 (= 18mM) in H_2O (pH 10.7) B: 0.1% NH_3 (=18mM), pH 10.7 in 90:10 (v/v) MeCN/H_2O

Encapsulated Bonding Technology (EBT™) for Improved Chromatography and Stability



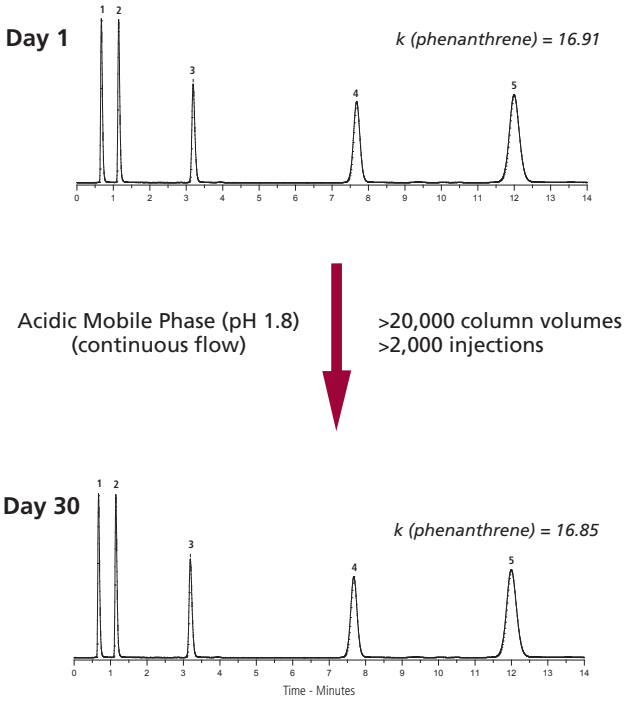
- The unique Encapsulated Bonding Technology (EBT™) developed for ACE SuperC18 columns dramatically increases ligand coverage of the silica surface and effectively eliminates the effect of unbonded silanol groups from separations. This higher ligand coverage results in improved inertness, chromatographic performance and stability.
- Under aggressive acidic conditions (see Figure 1) ACE SuperC18 is highly resistant to ligand cleavage, due to a combination of the Encapsulated Bonding Technology (EBT™) and ultra-inert ACE silica. Many C18 bonded columns will exhibit ligand cleavage under acidic conditions, resulting in retention shifts and/or increased peak tailing.
- Under basic conditions with LC/MS compatible mobile phases (see Figure 2), the Encapsulated Bonding Technology (EBT™) shields the ACE SuperC18 surface from dissolution whilst maintaining excellent chromatographic performance. Traditional C18 bonded silica columns are prone to silica dissolution under such 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 H_2O (pH 1.8)
Temperature: 40°C Flow Rate: 0.20ml/min



Evaluation conditions

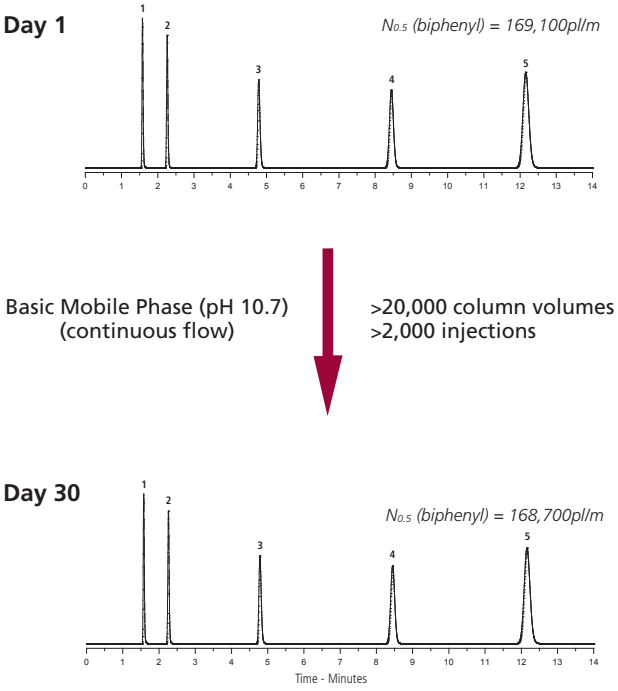
Sample: 1) uracil 2) dimethyl phthalate 3) toluene 4) biphenyl 5) phenanthrene
Mobile Phase: 70:30 MeOH:H_2O
Temperature: 22°C Flow Rate: 0.20ml/min Wavelength: 254nm

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 MeCN/0.1% NH_3 in H_2O (pH 10.7)
Temperature: 40°C Flow Rate: 1.00ml/min



Evaluation conditions

Sample: 1) uracil 2) dimethyl phthalate 3) toluene 4) biphenyl 5) phenanthrene
Mobile Phase: 80:20 MeOH:H_2O
Temperature: 22°C Flow Rate: 1.00ml/min Wavelength: 254nm

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 compared
- Comparison of column efficiency for pyridine, a basic molecule
- Efficiency measured at 5% peak height to account for peak tailing effects

Application # 1513

Peak Efficiency Comparison

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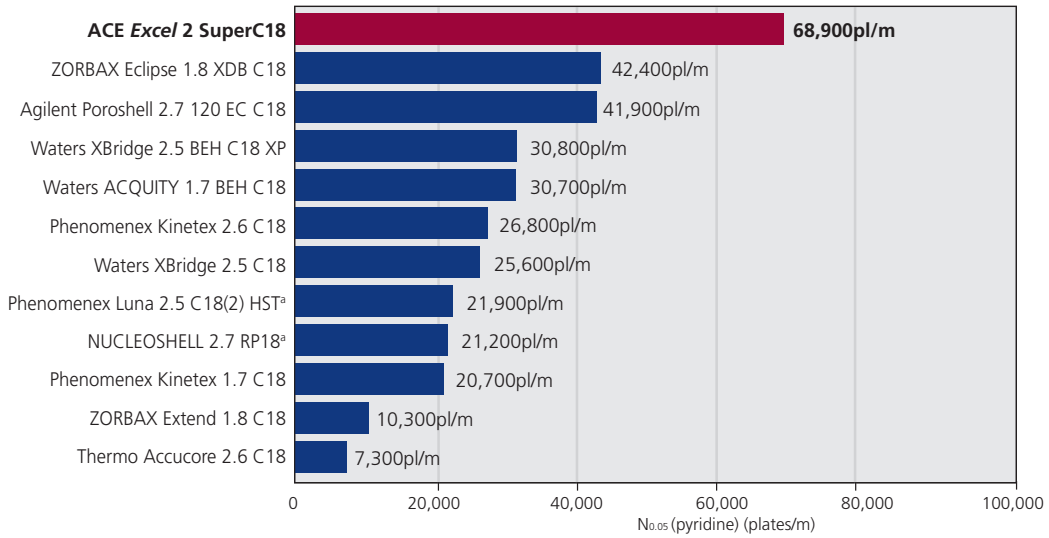
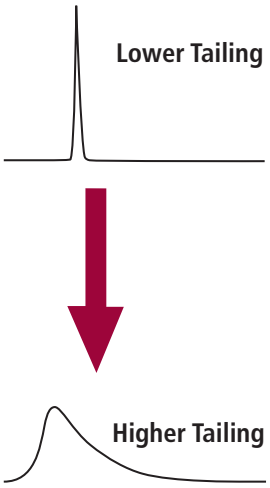
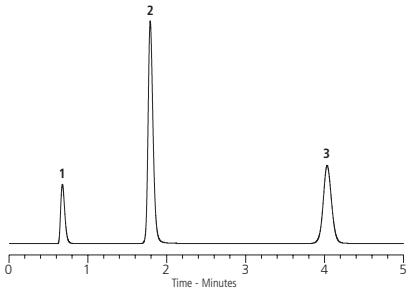
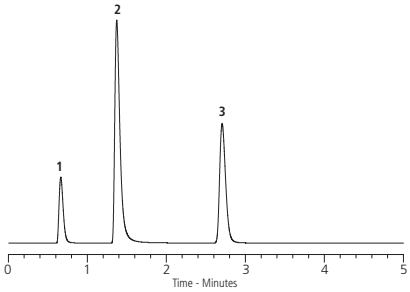




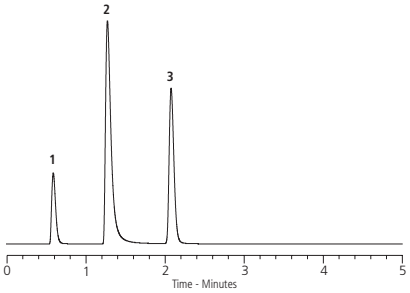
ACE *Excel* 2 SuperC18
(fully porous ultra-inert silica)
$N_{0.05}$ (pyr) = 68,900pl/m



Waters ACQUITY 1.7 BEH C18
(hybrid particle)
$N_{0.05}$ (pyr) = 30,700pl/m



Phenomenex Kinetex 1.7 C18
(core-shell particle)
$N_{0.05}$ (pyr) = 20,700pl/m



Column Dimensions: 50 x 2.1mm ([a]50 x 2.0mm) Sample: 1) uracil 2) pyridine 3) phenol Mobile Phase: 30:70 MeOH/10mM NH_4OAc in H_2O (pH 5.8)
Flow Rate: 0.20ml/min Temperature: 22°C Wavelength: 254nm
Comparative data may not be representative of all applications. Please see page 5 for acknowledgement of trademarks.

Conclusion:

Significant differences in efficiency, peak shape and selectivity are seen when analysing 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 can also result in poor column reproducibility.

ACE C18 columns have gained a well deserved reputation for providing excellent efficiency, peak shape and reproducibility. ACE 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 conditions.

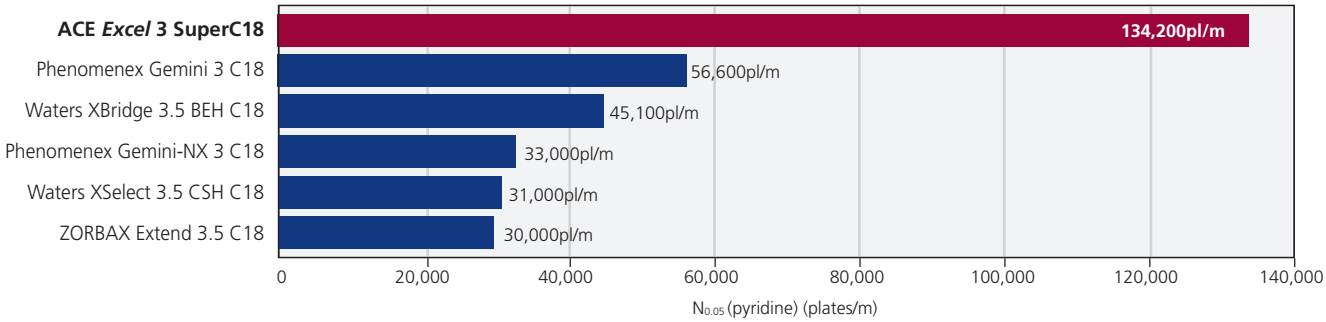
ACE® Stationary Phases Virtually Eliminate the Negative Effects of Silanols on UHPLC & HPLC Separations

Comparison of Column Inertness at High pH

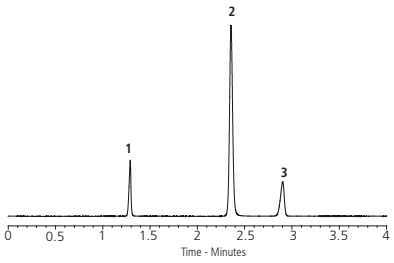
- LC/MS compatible mobile phase at pH 10.7
- Leading column brands in 150 x 4.6mm dimensions
- Comparison of column efficiency for pyridine, a basic molecule
- Efficiency measured at 5% peak height to account for peak tailing effects

Peak Efficiency Comparison **Reproduced with kind permission of The Open University, UK.**

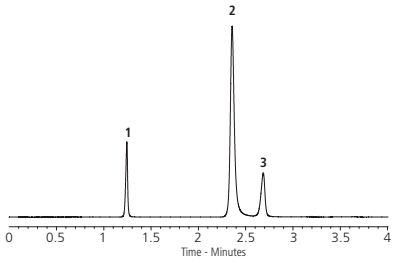
Application # 1514



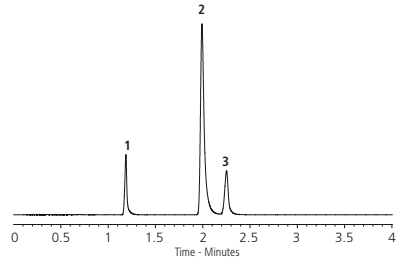
ACE *Excel* 3 SuperC18
$N_{0.05}$ (pyr) = 134,200pl/m



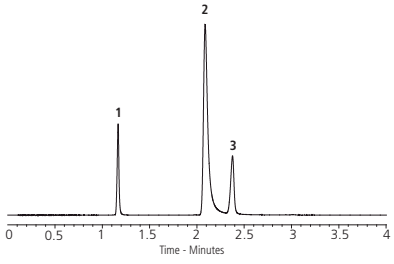
Phenomenex Gemini 3 C18
$N_{0.05}$ (pyr) = 56,600pl/m



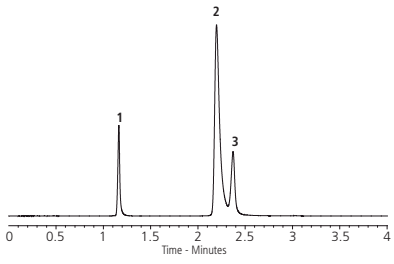
Waters XBridge 3.5 BEH C18
$N_{0.05}$ (pyr) = 45,100pl/m



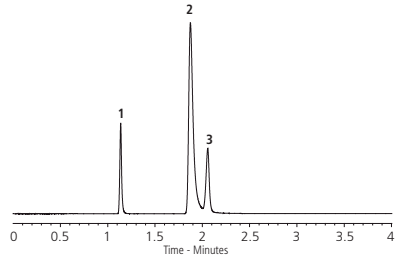
Phenomenex Gemini-NX 3 C18
$N_{0.05}$ (pyr) = 33,000pl/m



Waters XSelect 3.5 CSH C18
$N_{0.05}$ (pyr) = 31,000pl/m



ZORBAX Extend 3.5 C18
$N_{0.05}$ (pyr) = 30,000pl/m



Column Dimensions: 150 x 4.6mm Sample: 1) uracil 2) pyridine 3) phenol Mobile Phase: 0.1% NH_3 (=18mM), pH 10.7 in 60:40 (v/v) MeOH/H_2O
Flow Rate: 1.00ml/min Temperature: 22°C Wavelength: 254nm
Comparative data may not be representative of all applications. Please see page 5 for acknowledgment of trademarks.

Conclusion:

When analysing 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 remain.

Further to the intermediate pH comparison (see page 3), the ACE SuperC18 again provides excellent peak shape and efficiency when analysing a basic molecule (pyridine) at high pH, indicating 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 optimised and sample impurities to be identified. ACE SuperC18 columns are designed to provide excellent peak shape and lifetime under acidic, intermediate and high pH with LC/MS compatible buffers, and may additionally be used with mobile phases containing MeOH or MeCN without suffering efficiency loss and/or extended equilibration times.

ACE® Stationary Phases Virtually Eliminate the Negative Effects of Silanols on UHPLC & HPLC Separations

Product Availability and Specifications

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

[a] ACE 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 your distributor or visit www.ace-hplc.com.
- For HPLC column connections up to 6000psi, PEEK fingertight fittings (p/n ACE-CC10) are recommended – for further details please contact your distributor or visit www.ace-hplc.com.
- For UHPLC column connections up to 25000psi, reuseable fittings (p/n EXL-CC10) are recommended – for further details please contact your distributor or visit www.ace-hplc.com.

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

Column Diameter	Column Length							
	20mm	30mm	35mm	50mm	75mm	100mm	125mm	150mm
2.1mm	EXL-1011-0202U	EXL-1011-0302U	EXL-1011-3502U	EXL-1011-0502U	EXL-1011-7502U	EXL-1011-1002U	EXL-1011-1202U	EXL-1011-1502U
3.0mm	EXL-1011-0203U	EXL-1011-0303U	EXL-1011-3503U	EXL-1011-0503U	EXL-1011-7503U	EXL-1011-1003U	EXL-1011-1203U	EXL-1011-1503U
4.6mm	EXL-1011-0246U	EXL-1011-0346U	EXL-1011-3546U	EXL-1011-0546U	EXL-1011-7546U	EXL-1011-1046U	EXL-1011-1246U	EXL-1011-1546U

ACE *Excel* 3µm SuperC18 UHPLC/HPLC Columns (supplied in dual compatible UHPLC/HPLC *"Excel"* hardware format with 1000bar/15000psi pressure limit)

Column Diameter	Column Length								
	20mm	30mm	35mm	50mm	75mm	100mm	125mm	150mm	250mm
2.1mm	EXL-1111-0202U	EXL-1111-0302U	EXL-1111-3502U	EXL-1111-0502U	EXL-1111-7502U	EXL-1111-1002U	EXL-1111-1202U	EXL-1111-1502U	EXL-1111-2502U
3.0mm	EXL-1111-0203U	EXL-1111-0303U	EXL-1111-3503U	EXL-1111-0503U	EXL-1111-7503U	EXL-1111-1003U	EXL-1111-1203U	EXL-1111-1503U	EXL-1111-2503U
4.6mm	EXL-1111-0246U	EXL-1111-0346U	EXL-1111-3546U	EXL-1111-0546U	EXL-1111-7546U	EXL-1111-1046U	EXL-1111-1246U	EXL-1111-1546U	EXL-1111-2546U

ACE *Excel* 5µm SuperC18 UHPLC/HPLC Columns (supplied in dual compatible UHPLC/HPLC *"Excel"* hardware format with 1000bar/15000psi pressure limit)

Column Diameter	Column Length								
	20mm	30mm	35mm	50mm	75mm	100mm	125mm	150mm	250mm
2.1mm	EXL-1211-0202U	EXL-1211-0302U	EXL-1211-3502U	EXL-1211-0502U	EXL-1211-7502U	EXL-1211-1002U	EXL-1211-1202U	EXL-1211-1502U	EXL-1211-2502U
3.0mm	EXL-1211-0203U	EXL-1211-0303U	EXL-1211-3503U	EXL-1211-0503U	EXL-1211-7503U	EXL-1211-1003U	EXL-1211-1203U	EXL-1211-1503U	EXL-1211-2503U
4.6mm	EXL-1211-0246U	EXL-1211-0346U	EXL-1211-3546U	EXL-1211-0546U	EXL-1211-7546U	EXL-1211-1046U	EXL-1211-1246U	EXL-1211-1546U	EXL-1211-2546U

ACE 5µm SuperC18 Semi-Prep and Preparative HPLC Columns

Column Diameter	Column Length					
	50mm	75mm	100mm	125mm	150mm	250mm
7.75mm	ACE-1211-0508	ACE-1211-7508	ACE-1211-1008	ACE-1211-1208	ACE-1211-1508	ACE-1211-2508
10.0mm	ACE-1211-0510	ACE-1211-7510	ACE-1211-1010	ACE-1211-1210	ACE-1211-1510	ACE-1211-2510
21.2mm	ACE-1211-0520	ACE-1211-7520	ACE-1211-1020	ACE-1211-1220	ACE-1211-1520	ACE-1211-2520

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

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