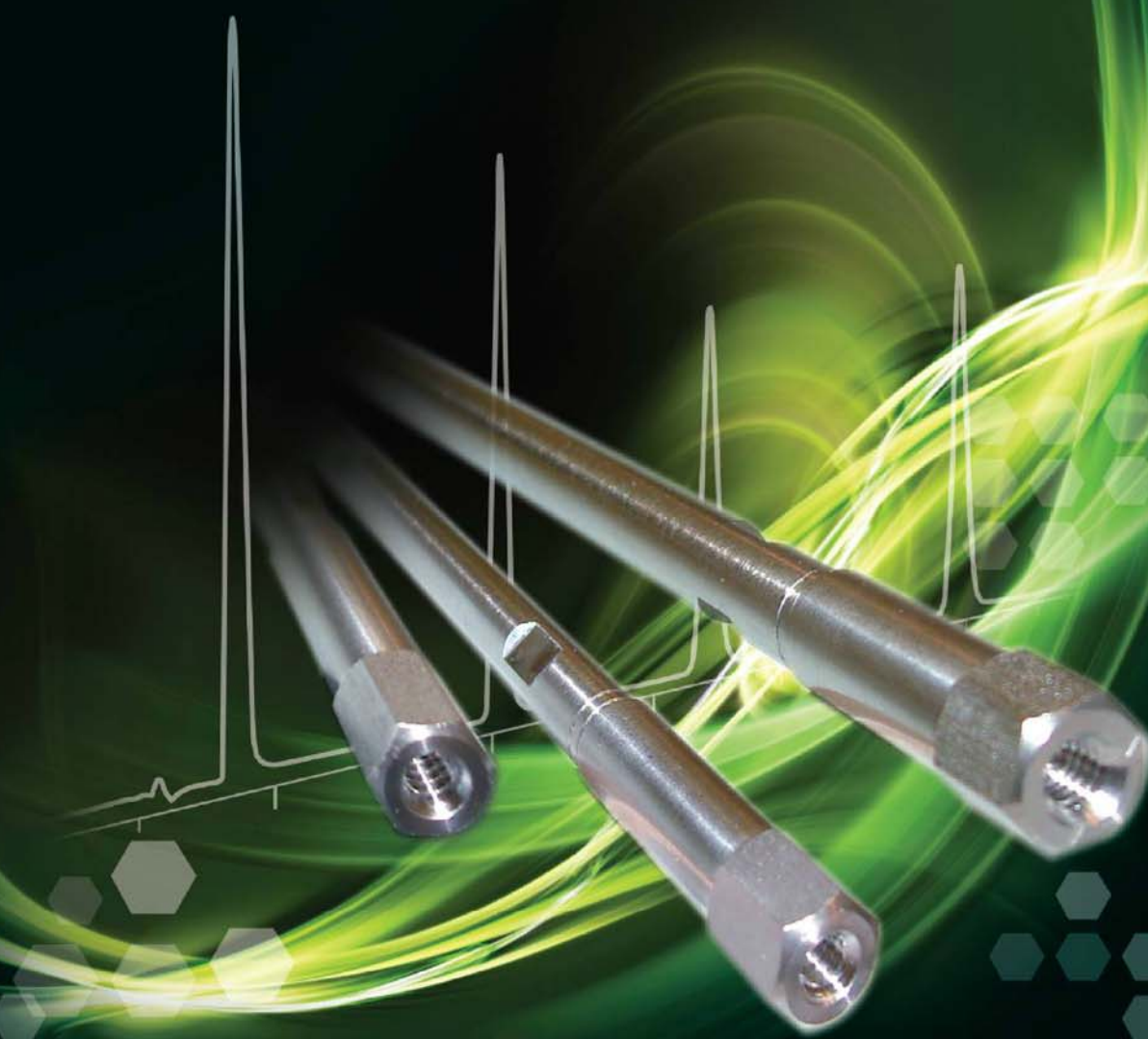


# ACE<sup>®</sup>

HPLC and UHPLC Columns

## Independent Column Comparisons

- 
- UHPLC and HPLC columns
  - Porous and solid-core particles
  - Asymmetry and efficiency comparisons
  - Independently tested for impartial results

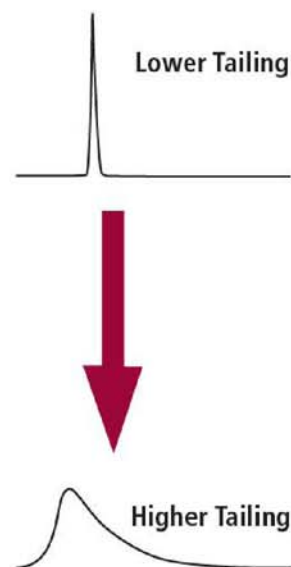
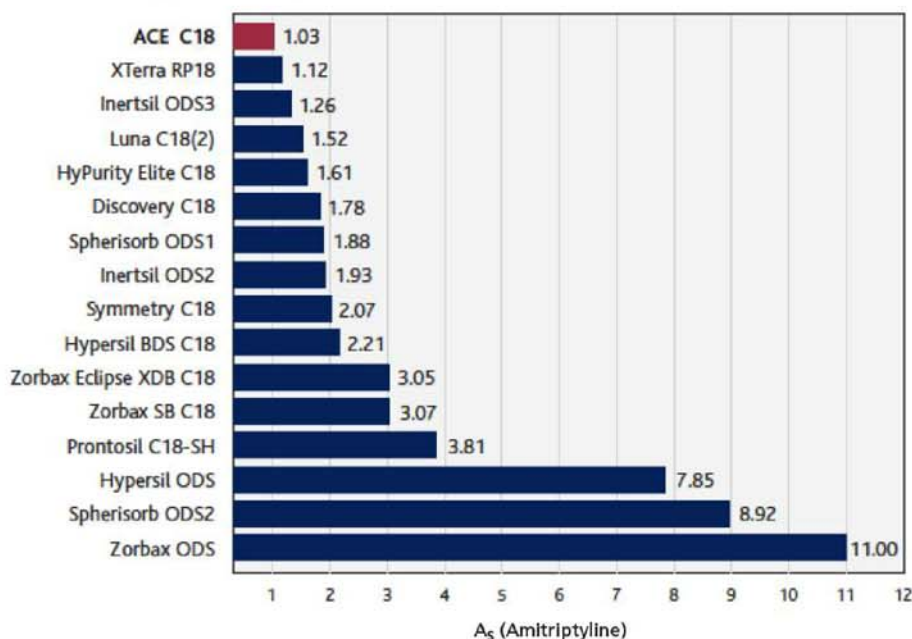
## Comparison of Leading 5µm C18 Columns

- Data obtained from the National Institute of Standards and Technology (NIST), USA

- Leading 5µm C18 column brands
- Basic molecule testing
- Peak asymmetry investigation

"Elution of organic bases (eg amitriptyline) with severe peak tailing is often associated with high silanol activity; however, the elution of such compounds with symmetrical peak shape is considered indicative of column deactivation."

### Peak Asymmetry Comparison



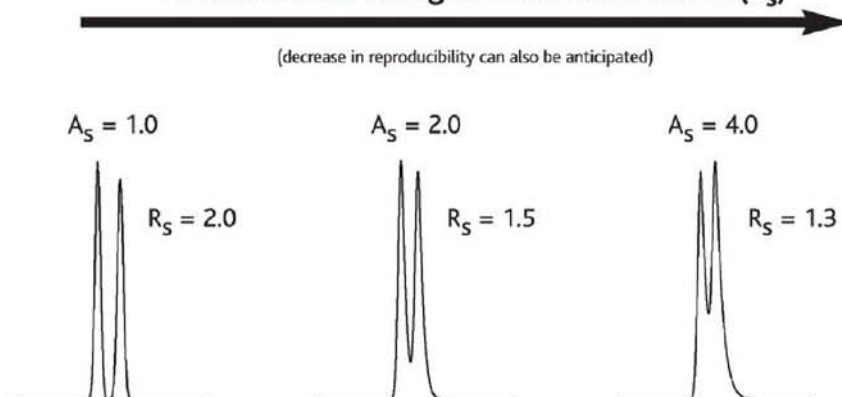
Column Dimensions: 150 x 4.6mm, 5µm Mobile Phase: 80:20 MeOH/5mM potassium phosphate buffer (pH 7.0) Flow Rate: 2.0ml/min Temperature: 24°C

The above data was obtained from the National Institute of Standards and Technology (NIST), Certificate of Analysis for Standard Reference Material 870 - "Column Performance Test Mixture for Liquid Chromatography" at the NIST internet site <http://ois.nist.gov/srmcatalog/certificates/870.pdf> in September 2002.

The NIST test mixture, which is designed to characterize general aspects of HPLC was revised in December 2002. Comparative data may not be representative of all applications.

### Importance of Peak Asymmetry ( $A_s$ )

- Increased Peak Tailing Decreases Resolution ( $R_s$ )



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

**"Independent Testing Shows ACE HPLC Columns Deliver Outstanding Peak Shape"**

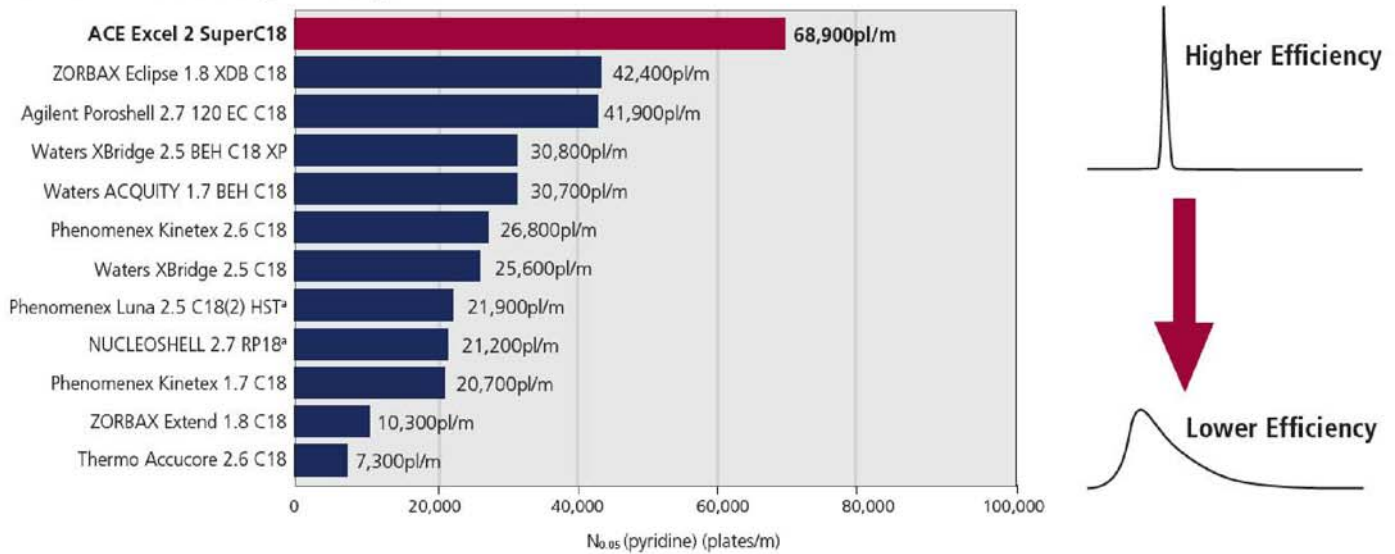
## Comparison of Column Inertness at Intermediate pH

- Reproduced with kind permission of The Open University, UK

- 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

### Peak Efficiency Comparison

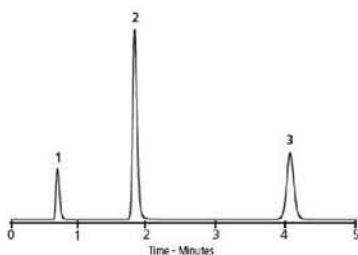
Application # 1513



Column Dimensions: 50 x 2.1mm (#50 x 2.0mm) Sample: 1) uracil 2) pyridine 3) phenol Mobile Phase: 30:70 MeOH/10mM NH<sub>4</sub>OAc in H<sub>2</sub>O (pH 5.8)  
Flow Rate: 0.20ml/min Temperature: 22°C Wavelength: 254nm Comparative data may not be representative of all applications.

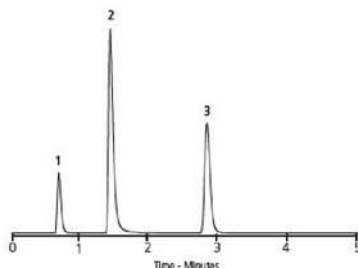
#### ACE Excel 2 SuperC18

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



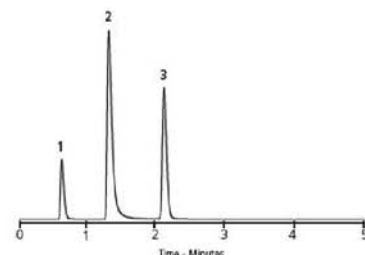
#### Waters ACQUITY 1.7 BEH C18

(hybrid particle)  
 $N_{0.05}$  (pyr) = 30,700pl/m



#### Phenomenex Kinetex 1.7 C18

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



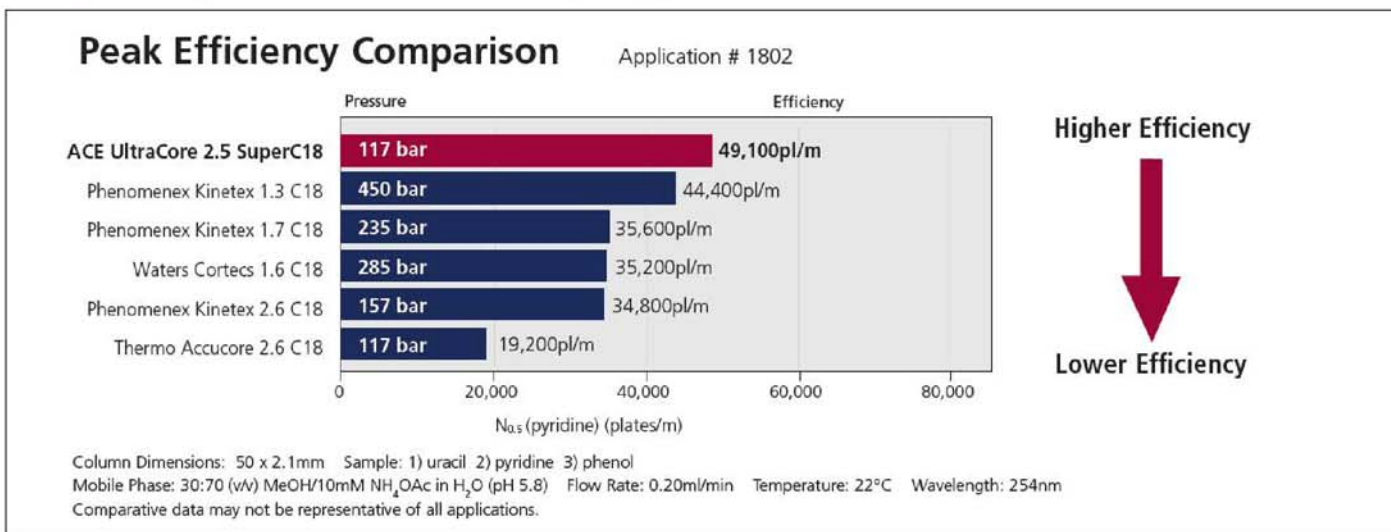
**“Independent Testing Shows ACE UHPLC Columns  
Deliver Outstanding Efficiency”**

# Independent Testing Comparison #3: Solid-Core Particles

## ACE UltraCore SuperC18 Provides Exceptional Efficiency

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- Leading column brands from major manufacturers investigated
- Comparison of column efficiency for pyridine – a basic molecule

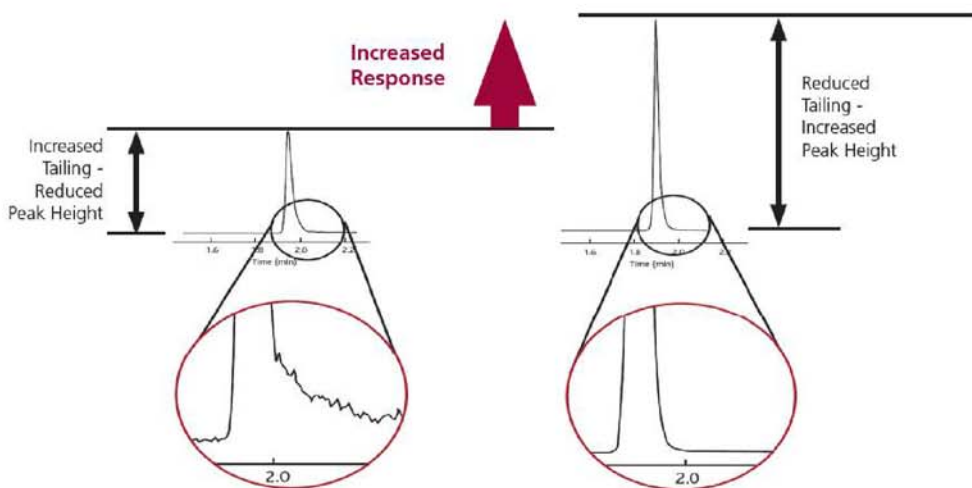


“Independent Testing Shows ACE Solid-Core Columns Deliver Outstanding Performance”

Reduce Peak Tailing Improve MS Signal Response

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 e-mail: info@mz-at.de, www.mz-at.de

- Improved efficiency and peak shape has a direct effect upon signal response



Improve your MS signal response by selecting high efficiency, low tailing ACE UHPLC and HPLC Columns

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