

# Agilent ZORBAX Rapid Resolution HPLC Columns

## Application Note

### Save Time and Reduce Solvent Waste — For Any Application

Agilent ZORBAX Rapid Resolution 3.5  $\mu\text{m}$  HPLC columns are available for a wide range of applications including high throughput, LC/MS, combinatorial chemistry and rapid analytical applications. Rapid Resolution columns are available in a wide range of column lengths, from 15 mm - 150 mm. This means your application can be transferred to a shorter column for immediate time and solvent savings. Rapid Resolution columns are ideal for any application in which you want high resolution and reduced analysis time. Increased productivity is a direct benefit.

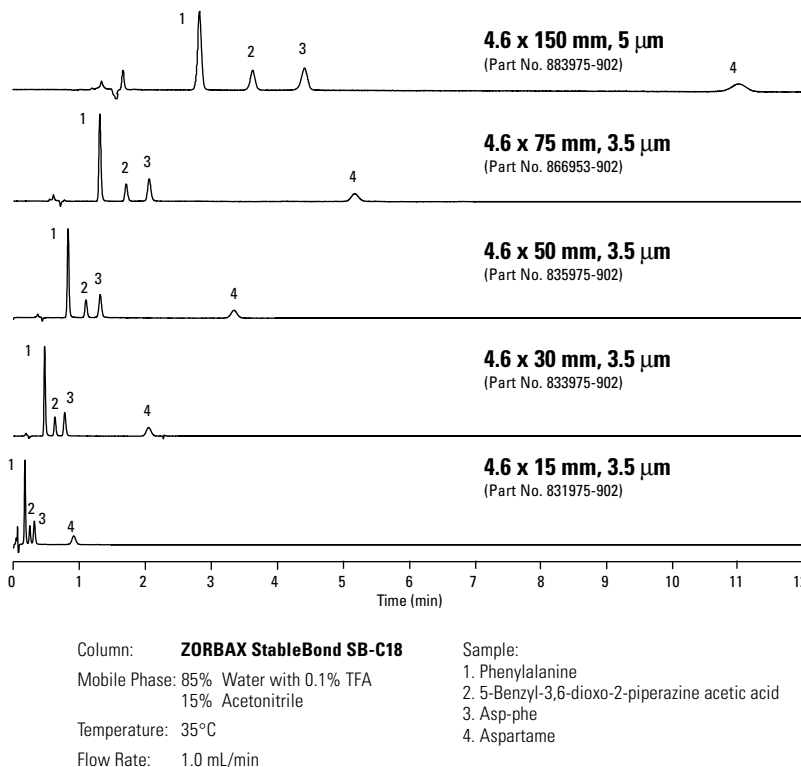
When used for conventional analytical HPLC, Rapid Resolution columns can reduce both analysis time and solvent usage by 40 to 90% over typical HPLC columns. Figure 1 shows the high resolution separation achieved when a conventional analytical column is replaced with progressively shorter Rapid Resolution columns. Note that the resolution achieved with the Rapid Resolution 4.6 x 75 mm, 3.5  $\mu\text{m}$  column matches that achieved on the conventional 4.6 x 150 mm, 5  $\mu\text{m}$  column, but that the analysis time and solvent usage is reduced by 50%. The analysis time and solvent usage can be reduced even further by as much as 80 to 90% when the very short 4.6 x 30 and 4.6 x 15 mm columns are used and all the analytes are still completely resolved.

### Wide Range of Applications

ZORBAX Rapid Resolution columns are available in standard-pore (80Å) and (300Å) StableBond phases as well as the 80Å Eclipse XDB, Bonus-RP and Extend-C18 bonded-phases. Optimum reversed-phase separations of broad classes of small molecules and biomolecules, such as proteins and peptides, are readily achieved with these bonded-phases. One of these columns will be right for your sample.

### Specifically Designed Configurations

Rapid Resolution columns are ideal for saving time during method development as well as for updating and improving methods. Many standard analytical methods use 4.6 x 150 mm or



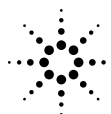
**FIGURE 1**  
**Separation of Aspartame and Its Degradants as a Function of Column Length**

4.6 x 250 mm, 5  $\mu\text{m}$  columns. These methods are easily transferred to Rapid Resolution columns which are engineered with shorter configurations and carefully controlled 3.5  $\mu\text{m}$  packings particles. For standard analytical applications a Rapid Resolution 4.6 x 75 mm (3.5  $\mu\text{m}$ ) column provides the same separation efficiency as a 4.6 x 150 mm (5  $\mu\text{m}$ ) column in half the time and with half the solvent use. Similarly, resolution achieved with a Rapid Resolution 4.6 x 150 mm (3.5  $\mu\text{m}$ ) column is equivalent to that of a 4.6 x 250 mm (5  $\mu\text{m}$ ) column.

### High-Throughput Separations

Shorter Rapid Resolution columns (15-50 mm) are also the ideal choice when a conventional analytical method is being

moved to LC/MS and are available in a wide range of configurations to meet these needs. High-throughput applications for combinatorial chemistry and LC/MS often use 2.1 x 50 mm and 4.6 x 50 mm length columns. Since these applications require limited resolution and very short analysis times Rapid Resolution columns are ideal. Very short Rapid Resolution columns (15 mm and 30 mm lengths) are easy-to-use, finger-tight, cartridge configurations permitting fast column changes with reliable results. These cartridges can be used for isocratic (Figure 2) and gradient separations with possible separation times of 60 seconds or less.



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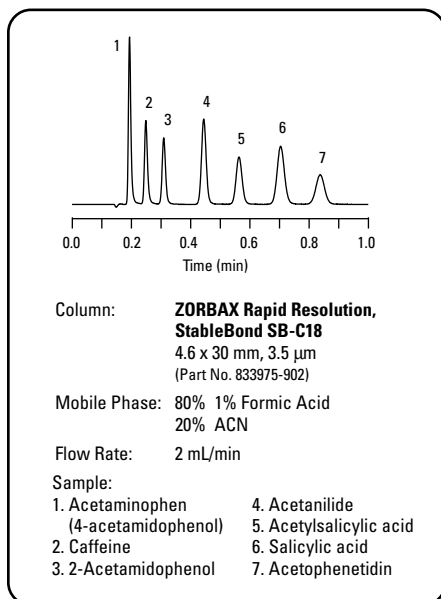
Innovating the HP Way

## High-Throughput Gradient Separations

Gradient elution separations such as for peptide digests or protein samples also benefit when Rapid Resolution columns are used. Both separation time and re-equilibration of the gradient are significantly reduced without loss in resolution. Three consecutive injections

FIGURE 2

### Isocratic High-Throughput HPLC ... in less Than 60 Seconds



of a peptide/protein sample are completed in less than 40 minutes (Figure 3). Gradient and re-equilibration times are only 10 and 4 minutes, respectively.

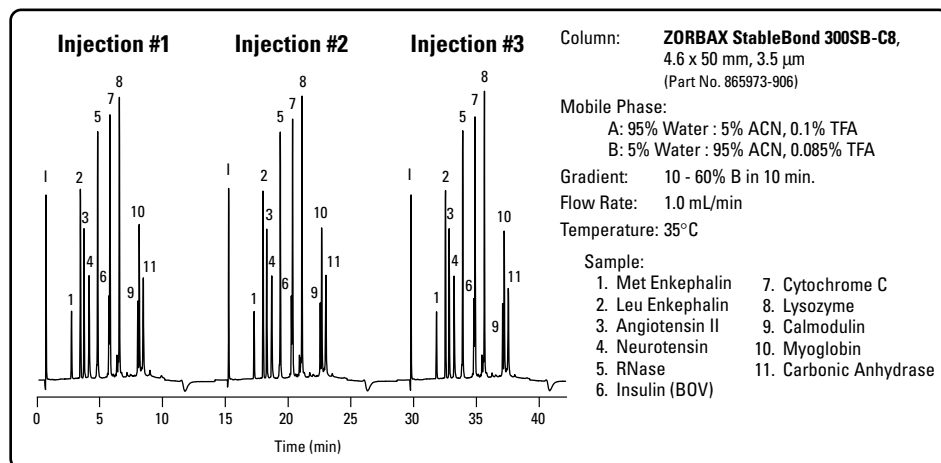
## Precisely Sized Packing Material

The 3.5  $\mu$ m packings used in Rapid Resolution columns are precisely sized with a narrow particle-size distribution to provide an excellent balance between very high resolution and convenient, practical operation. Specifically, 3.5  $\mu$ m particles generate more plates/meter and maintain this efficiency at higher flow rates

compared to conventional columns with 5  $\mu$ m packings. These columns use 2 mm frits just like the ZORBAX 5  $\mu$ m columns so there is no greater tendency for plugging. Additionally, the 3.5  $\mu$ m packings are designed to operate at pressures compatible with standard HPLC systems. Rapid Resolution columns produced from these 3.5  $\mu$ m packings deliver day-to-day rugged, reliable performance. They are equivalent in durable operation to ZORBAX 5  $\mu$ m columns.

FIGURE 3

### Rapid Analysis of a Protein Sample with Fast Re-Equilibration: ZORBAX 300SB-C8



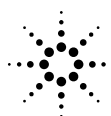
## ZORBAX Rapid Resolution 3.5 $\mu$ m HPLC Columns

| 80 Å pore size  |                           |                          |                           |                            |                      |                     |                          |                 |            |
|---|---------------------------|--------------------------|---------------------------|----------------------------|----------------------|---------------------|--------------------------|-----------------|------------|
| Size (mm)   | StableBond SB-C18 (L1)    | StableBond SB-C8 (L7)    | StableBond SB-CN (L10)    | StableBond SB-Phenyl (L11) | Eclipse XDB-C18 (L1) | Eclipse XDB-C8 (L7) | Eclipse XDB-Phenyl (L11) | Extend-C18 (L1) | Bonus-RP   |
| 4.6 x 150   | 863953-902                | 863953-906               | 863953-905                | 863953-912                 | 963967-902           | 963967-906          | 963967-912               | 763953-902      | 863668-901 |
| 4.6 x 75  | 866953-902                | 866953-906               | 866953-905                | 866953-912                 | 966967-902           | 966967-906          | 966967-912               | 766953-902      | 866668-901 |
| 4.6 x 75 *  | 7995218-344*              | 7995208-344*             |                           |                            | 7995118-344*         | 7995108-344*        |                          |                 |            |
| 4.6 x 50  | 835975-902                | 835975-906               | 835975-905                | 835975-912                 | 935967-902           | 935967-906          | 935967-912               | 735953-902      |            |
| 2.1 x 150   | 830990-902                | 830990-906               |                           |                            | 930990-902           | 930990-906          |                          |                 |            |
| 2.1 x 50  | 871700-902                | 871700-906               |                           |                            | 971700-902           | 971700-906          |                          | 735700-902      | 861700-901 |
| *This cartridge column requires hardware kit 5021-1845        |                           |                          |                           |                            |                      |                     |                          |                 |            |
| Rapid Resolution Cartridges (Require Hardware Kit 820222-901) |                           |                          |                           |                            |                      |                     |                          |                 |            |
| 4.6 x 30  | 833975-902                | 833975-906               |                           |                            | 933975-902           | 933975-906          |                          |                 |            |
| 4.6 x 30 (3 pk)   | 833975-932                | 833975-936               |                           |                            | 933975-932           | 933975-936          |                          |                 |            |
| 4.6 x 15  | 831975-902                | 831975-906               |                           |                            | 931975-902           | 931975-906          |                          |                 |            |
| 4.6 x 15 (3 pk)   | 831975-932                | 831975-936               |                           |                            | 931975-932           | 931975-936          |                          |                 |            |
| 2.1 x 30  | 873700-902                | 873700-906               |                           |                            | 973700-902           | 973700-906          |                          |                 |            |
| 2.1 x 30 (3 pk)   | 873700-932                | 873700-936               |                           |                            | 973700-932           | 973700-936          |                          |                 |            |
| 2.1 x 15  | 875700-902                | 875700-906               |                           |                            | 975700-902           | 975700-906          |                          |                 |            |
| 2.1 x 15 (3 pk)   | 875700-932                | 875700-936               |                           |                            | 975700-932           | 975700-936          |                          |                 |            |
| 300 Å pore size   |                           |                          |                           |                            |                      |                     |                          |                 |            |
| Size (mm)   | StableBond 300SB-C18 (L1) | StableBond 300SB-C8 (L7) | StableBond 300SB-CN (L10) | StableBond 300SB-C3        |                      |                     |                          |                 |            |
| 4.6 x 150   | 863973-902                | 863973-906               | 863973-905                | 863973-909                 |                      |                     |                          |                 |            |
| 4.6 x 50  | 865973-902                | 865973-906               | 865973-905                | 865973-909                 |                      |                     |                          |                 |            |

Configurations not shown are available by Special Product Quote.

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