

**DIKMA**®

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# Diamondsil® Plus



**Dikma Technologies Inc.**

[www.dikmatech.com](http://www.dikmatech.com)

# Diamonsil<sup>®</sup> Plus

## Diamonsil<sup>®</sup> PLUS! Welcome the newest member of our Diamonsil<sup>®</sup> Family!

Diamonsil<sup>®</sup> columns are the signature products of Dikma Technologies Inc. Since the introduction of Diamonsil<sup>®</sup> (1) in 1998, the series has gained recognition from professionals for its outstanding performance and comprehensive service.

In 2008, Dikma successfully launched Diamonsil<sup>®</sup> (2). Utilizing Dikma's very own silica gel bonding technology, Diamonsil<sup>®</sup> (2) is popular among users for its high carbon loading and outstanding separation performance. To date, over 7,000 studies published in domestic and foreign journals have used a Diamonsil<sup>®</sup> column.

At the beginning of 2015, the Diamonsil<sup>®</sup> family welcomes a new member - Diamonsil<sup>®</sup> Plus. Not only does this new column possess the strengths of the first two generations, Diamonsil<sup>®</sup> Plus also has longer column lifetime, higher efficiency, and faster separations with outstanding resolution, and it is compatible with the full range of mobile phase compositions from 100% aqueous to 100% organic.

### Features of Diamonsil<sup>®</sup> Plus Columns

- Reversed-phase and polar-modified columns
- High efficiency
- Long column lifetime
- Faster separations with outstanding resolution
- Compatible with full range of mobile phase compositions from 100% aqueous to 100% organic
- Suitable for analysis of some proteins, peptides and biomolecules
- Excellent reproducibility
- Extended range pH stability

### Diamonsil<sup>®</sup> Plus Material Characteristics

Bonded phase	Particle size (μm)	Pore size (Å)	Surface area (m <sup>2</sup> /g)	Carbon loading (%)	Phase density (μmol/m <sup>3</sup> )	pH range	Endcapping
C18	3, 5, 10	100	200	14	3.7-4.2	1.5 – 10.0	Yes
C8	3, 5, 10	100	200	9		1.5 – 10.0	Yes
C18-A*	3, 5, 10	100	200	15		1.5 – 10.0	Yes
C18-B*	3, 5, 10	100	200	16		1.5 – 10.0	Yes

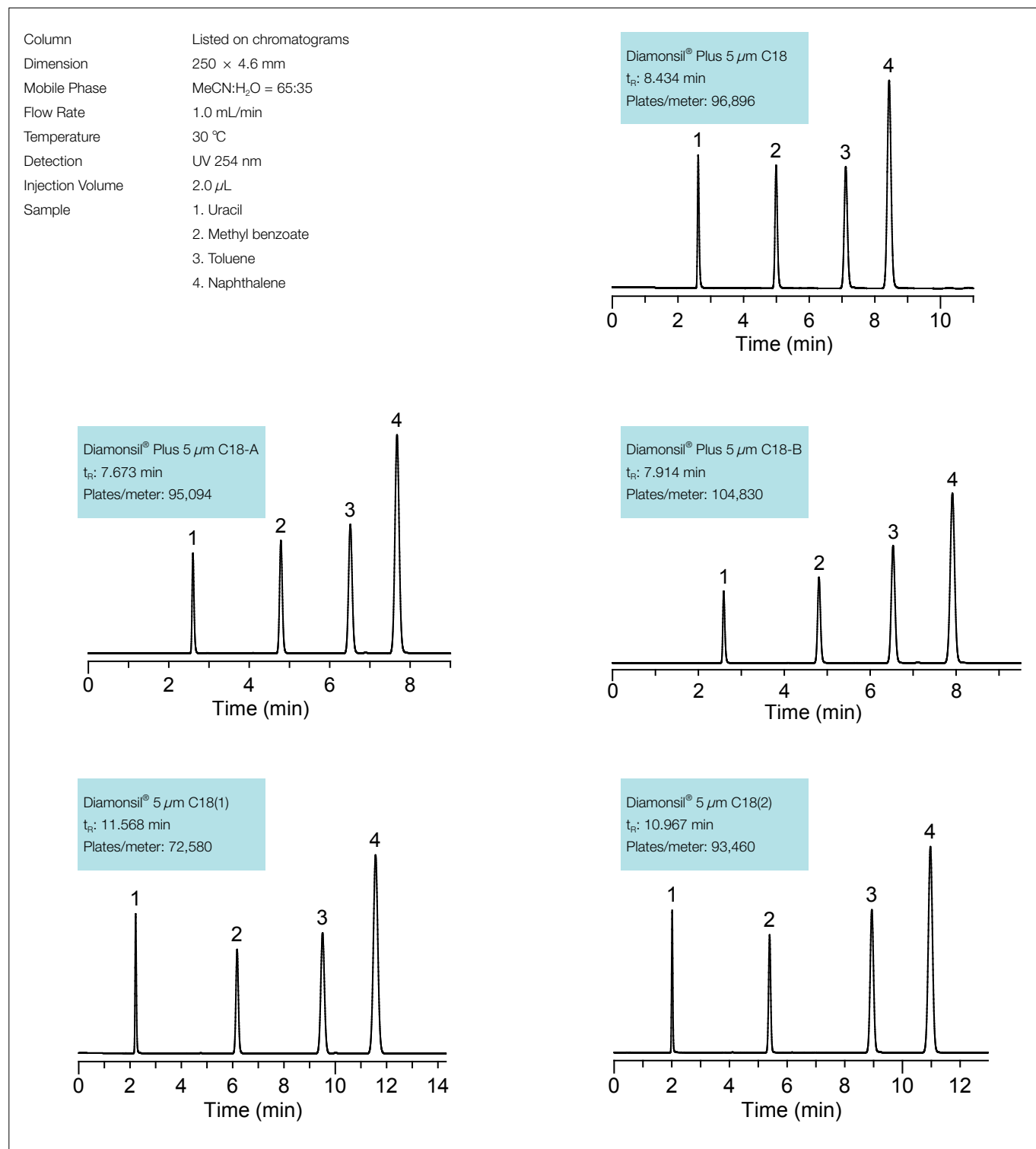
\*C18-A and C18-B are stationary phases of polar modified columns, where C18-B's polarity is slightly greater than C18-A.



## High Efficiency

In addition to being highly efficient like Diamonsil® (2), Diamonsil® Plus is also capable of faster separations for different compounds. The results of column efficiency testing below shows that each of three Diamonsil® Plus HPLC columns has over 95,000 theoretical plates per meter, and the speed of analysis is higher than Diamonsil® (1) and Diamonsil® (2).

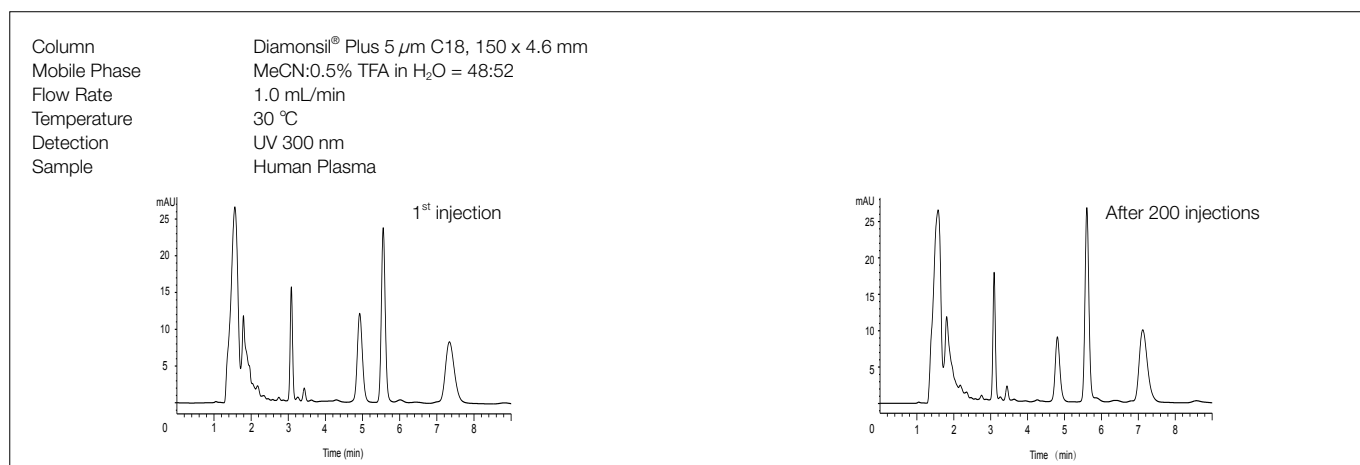
### Column Efficiency Test



## Long Column Lifetime

Longer column lifetimes remove the need for frequent column replacement and related tasks of method validation and conditions exploration, thereby significantly reducing cost. In this experiment, human plasma was directly injected into Diamonsil® Plus C18 after methanol precipitation. After 200 injections, column efficiency of Diamonsil® Plus C18 was unchanged. This shows that Diamonsil® Plus C18 returns consistent analysis results even after multiple injections of complex mixed samples.

### Lifetime Test I\*



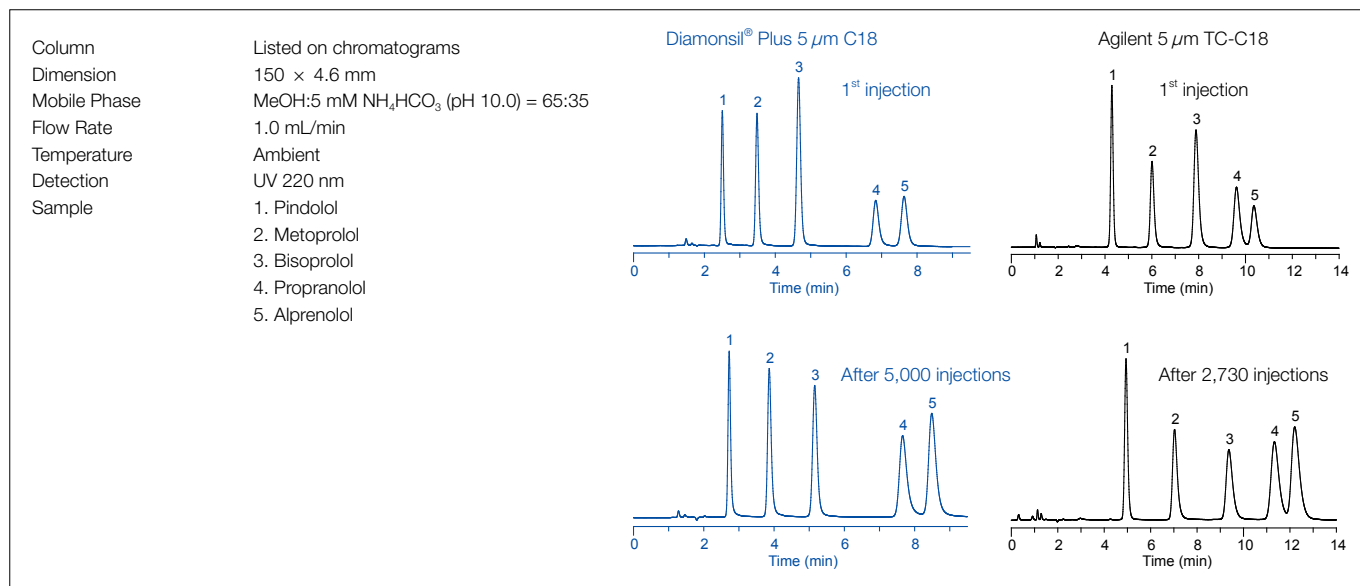
\*Customer data from Xijing Hospital. Courtesy of the Fourth Military Medical University

To further examine the column lifetime, column efficiency tests were conducted after the injection of  $\beta$ -blockers. After 5,000 consecutive injections, the column efficiency and peak shapes of Diamonsil® Plus 5 µm C18 did not show any significant changes whereas Agilent 5 µm TC-C18 column exhibited the reduced efficiency and tailing peaks.

Diamonsil® Plus 5 µm C18: After first injection,  $N_{(\text{Naphthalene})} = 13,389$ ,  $A_{s(\text{Naphthalene})} = 1.149$ ; after 5,000 injections,  $N_{(\text{Naphthalene})} = 13,667$ ,  $A_{s(\text{Naphthalene})} = 1.075$ .

Agilent 5 µm TC-C18: After first injection,  $N_{(\text{Naphthalene})} = 13,878$ ,  $A_{s(\text{Naphthalene})} = 1.042$ ; after 2,730 injections,  $N_{(\text{Naphthalene})} = 7,624$ ,  $A_{s(\text{Naphthalene})} = 1.616$ .

### Lifetime Test II\*

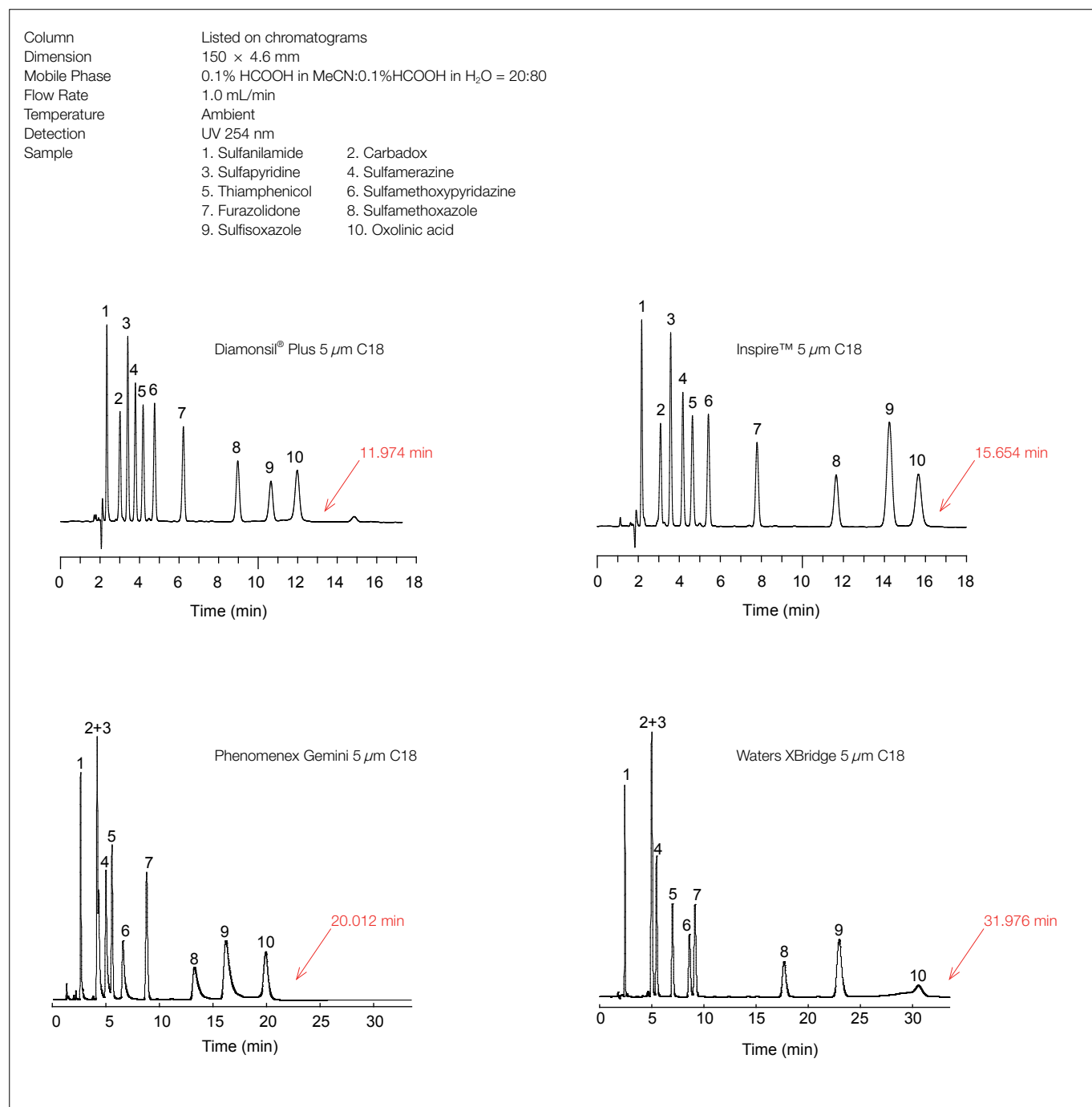


\*TC-C18 is a registered trademark of Agilent Corporation. Dikma Technologies Inc. is not affiliated with the above company.

## Faster Separations with Outstanding Resolution

Sulfonamides are broad-spectrum antibacterials clinically used to prevent and treat infectious diseases. The following graphs show the results of analysis on 10 sulfonamides using reversed-phase C18 column. The results prove that: Diamonsil<sup>®</sup> Plus C18 has better selectivity and separation capability compared to products of other brands; also, the column has a shorter retention time for more rapid analysis.

### Antibacterials\*



\*Gemini is a registered trademark of Phenomenex. Dikma Technologies Inc. is not affiliated with the above company.

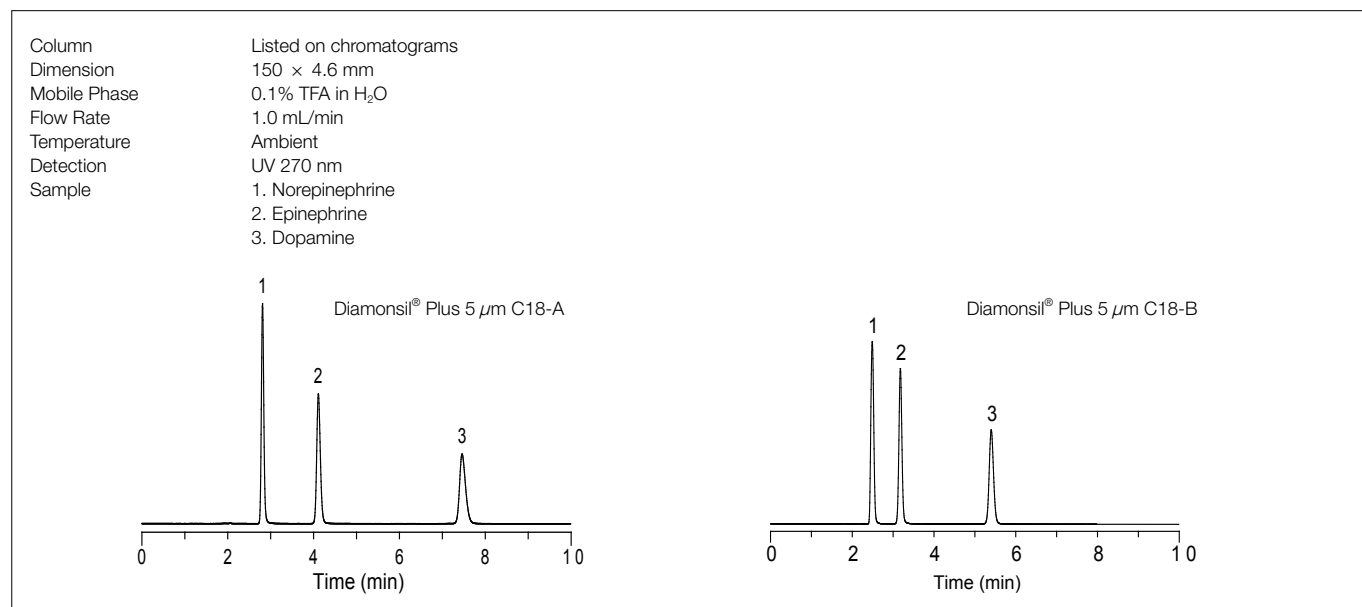
\*XBridge is a trademark of Waters Corporation. Dikma Technologies Inc. is not affiliated with the above company.

# Diamonsil® Plus

## Compatible with Full Range of Mobile Phase Compositions from 100% Aqueous to 100% Organic

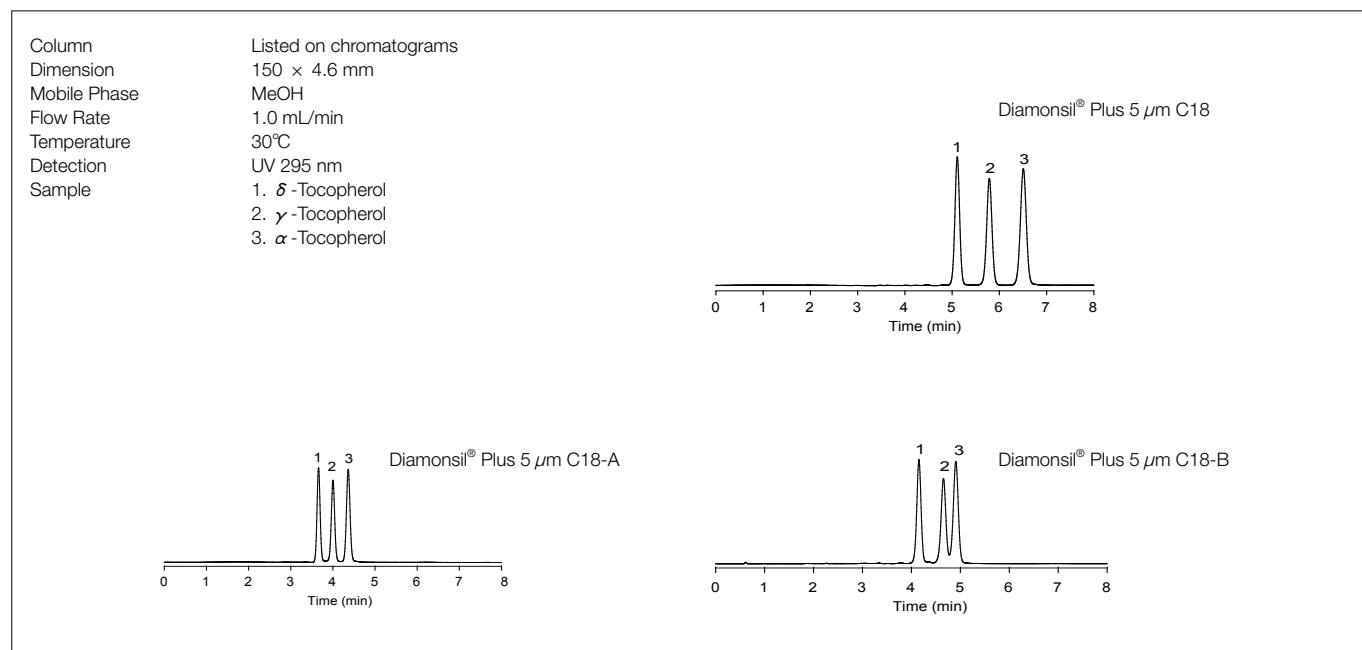
Catecholamine is a kind of compound with high polarity and basicity; it is difficult to retain on regular C18 columns, and requires highly aqueous conditions. This poses a great challenge to the water resistance of columns. Diamonsil® Plus C18-A and Diamonsil® Plus C18-B are both polar-modified columns, and display extraordinary selectivity and resolution in 100% aqueous conditions.

### Catecholamine



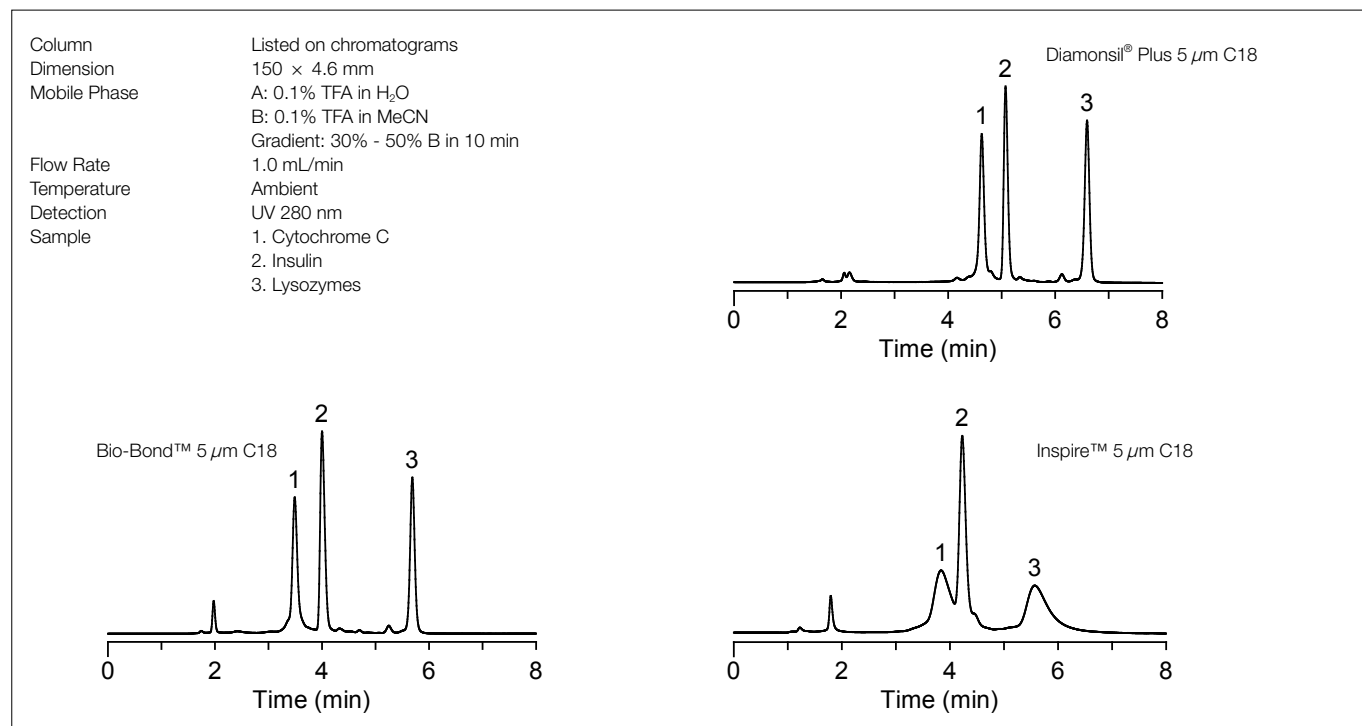
A highly organic mobile phase can speed up the process of desolvation, effectively enhancing the sensitivity of LC-MS detection. Diamonsil® Plus C18 and Diamonsil® Plus C8 can operate in 100% organic mobile phase compositions.

### Tocopherols



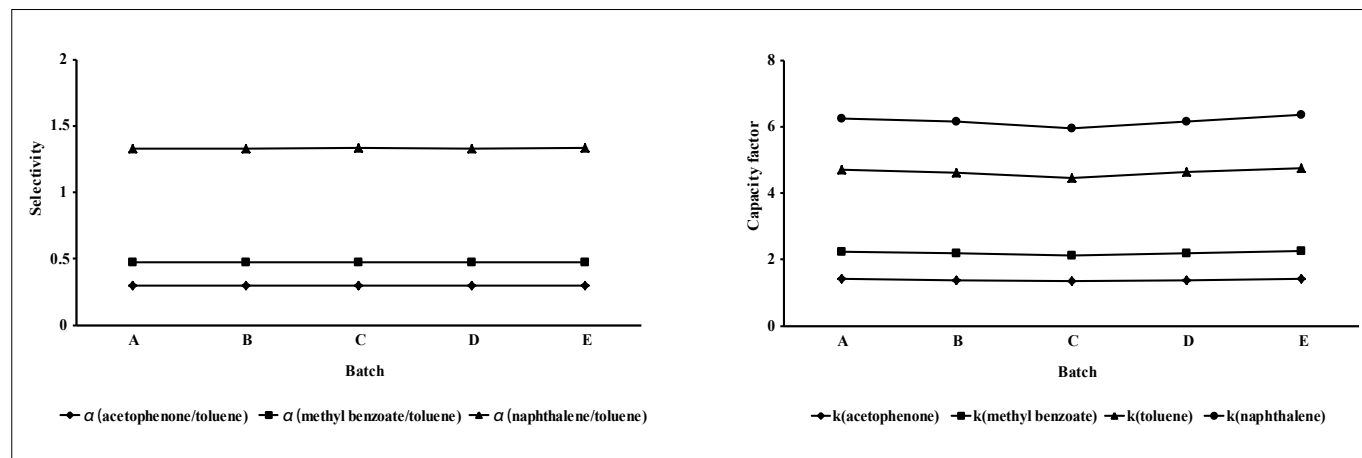
## Suitable for Analysis of some Proteins, Peptides and Biomolecules

Not only are Diamonsil® Plus columns suitable for the analysis of small molecule compounds, they can also be used for analysis of some proteins, peptides, and biomolecules. As shown in the graphs below: Diamonsil® Plus can achieve separation results similar to a 300 Å silica-based Bio-Bond™ column specifically for separating proteins and peptides.



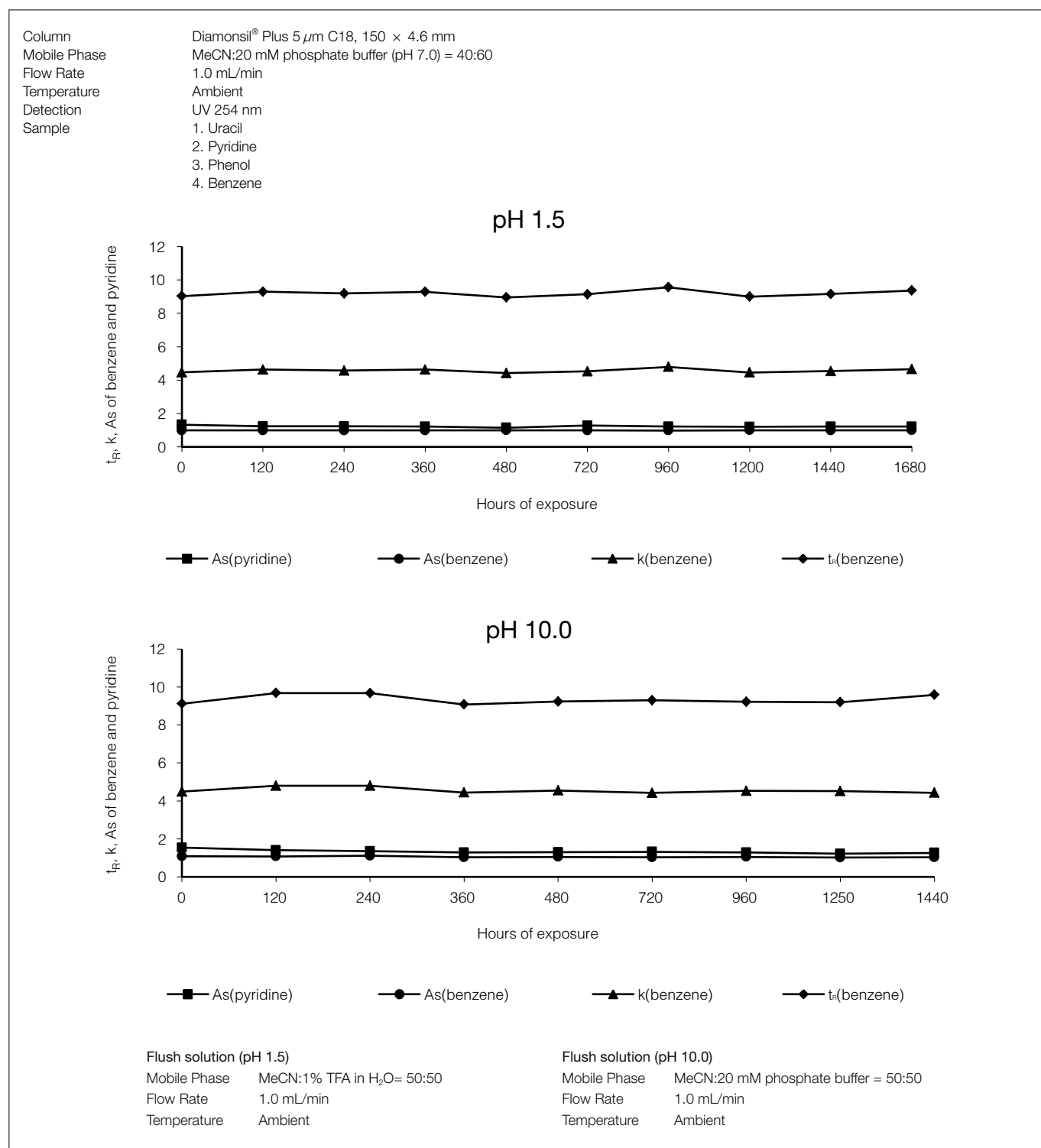
## Excellent Reproducibility

For development of new drugs, discovery and synthesis of new compounds, and quality control, reproducibility of columns is highly regarded by professional analysts. All Diamonsil® Plus columns and packings undergo a series of tests, repeatedly comparing horizontally and vertically the test results in order to ensure outstanding batch-to-batch and column-to-column reproducibilities.



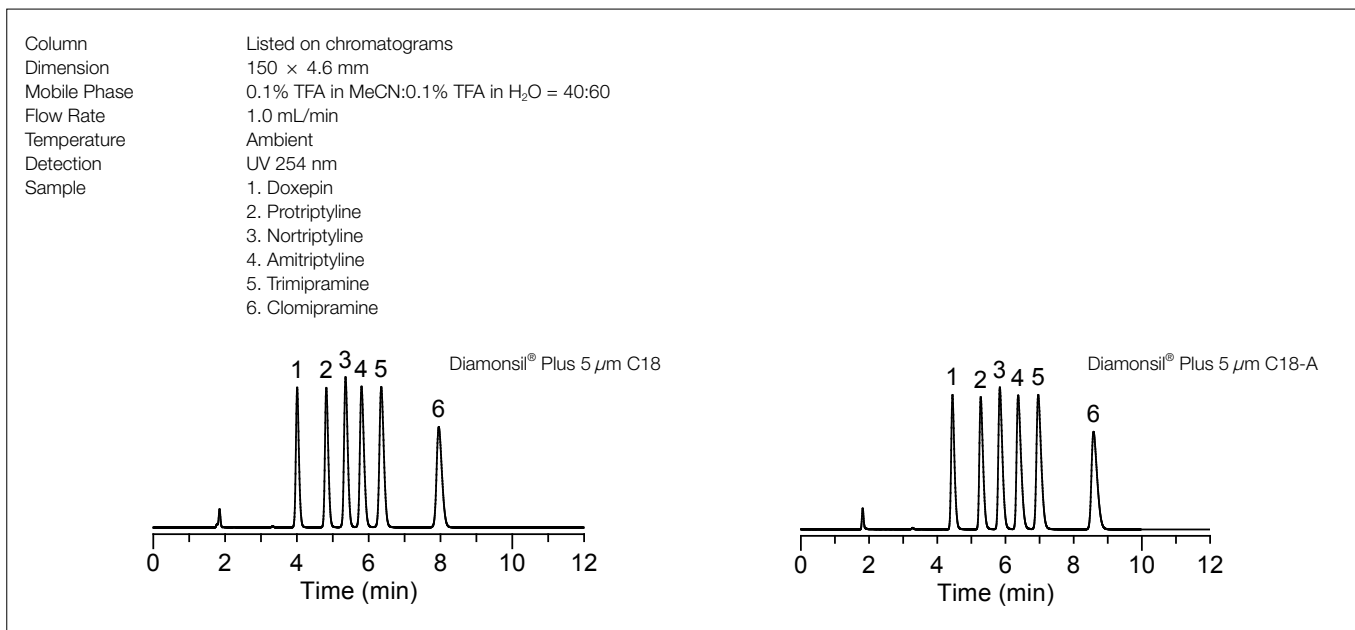
## Extended Range pH Stability

Dikma Technologies Inc. utilizes unique chemical bonding technologies to give Diamonsil® Plus an extended pH range from 1.5 to 10.0. It is not uncommon for a column to have a broader pH range, but the most important issues are the column's durability and stability under high and low pH conditions. Dikma's Diamonsil® Plus can endure continuous flushing for over 1,440 hours at pH 1.5 and 10.0, and then continuously detect the changes in retention time, asymmetry factor, and capacity factor. Empirical results show that Diamonsil® Plus can operate under both extreme conditions, and is highly durable and stable.

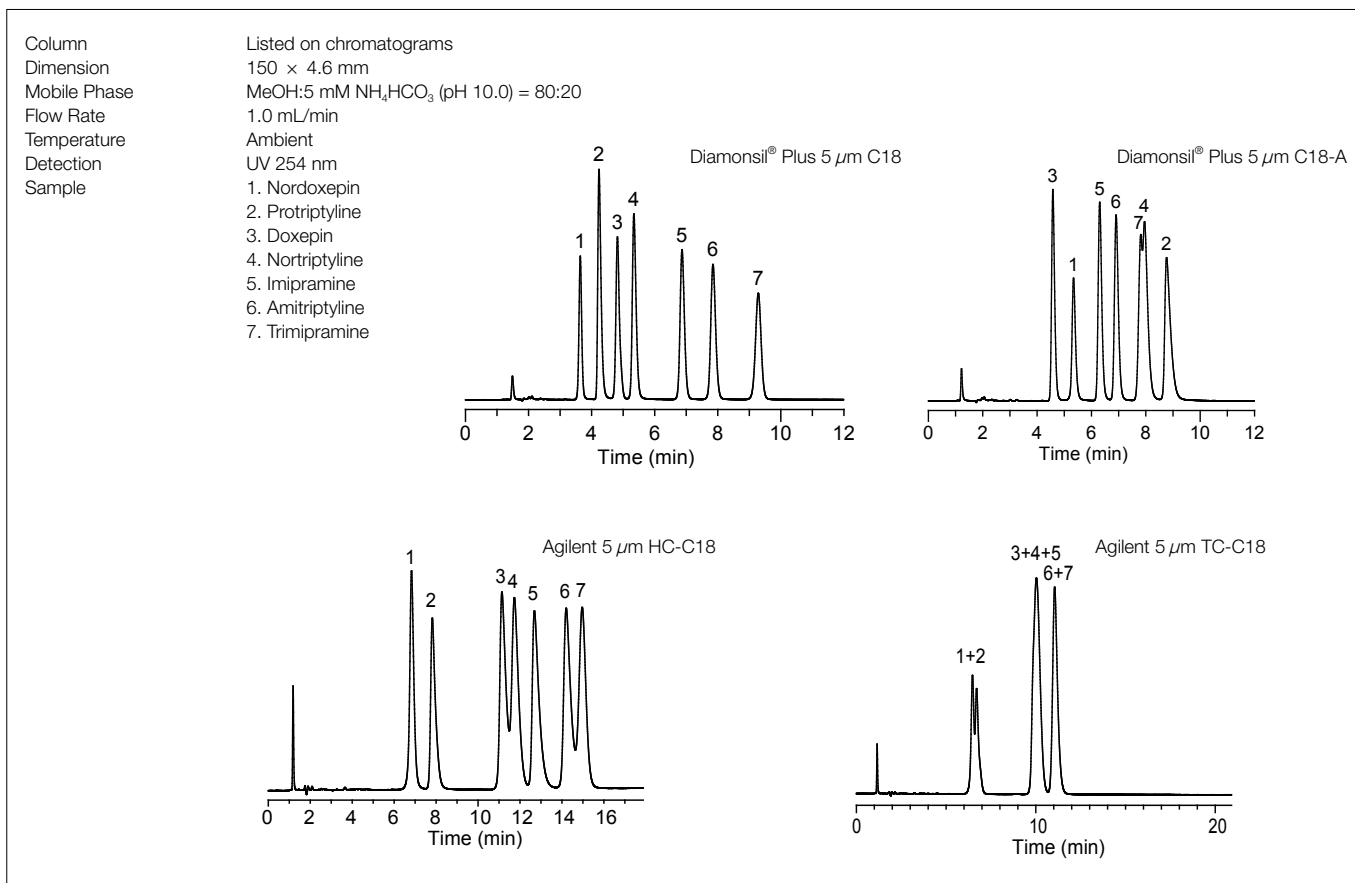




## TCAs at Low pH



## TCAs at High pH\*

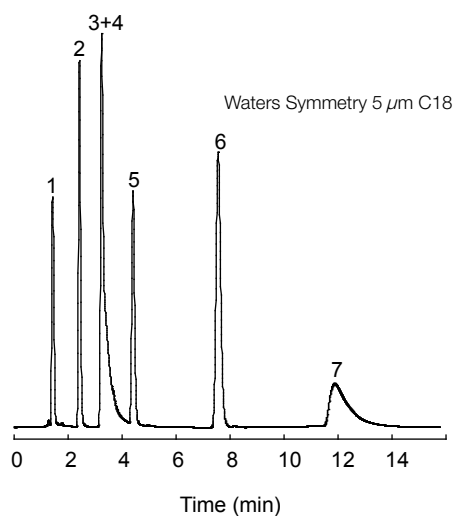
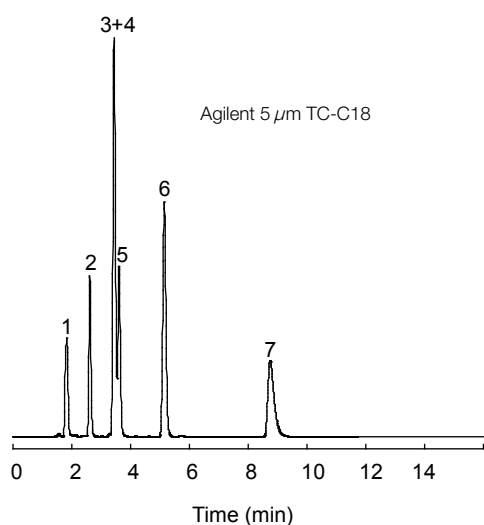
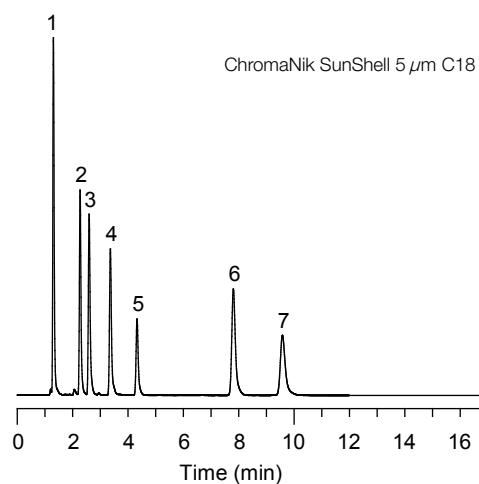
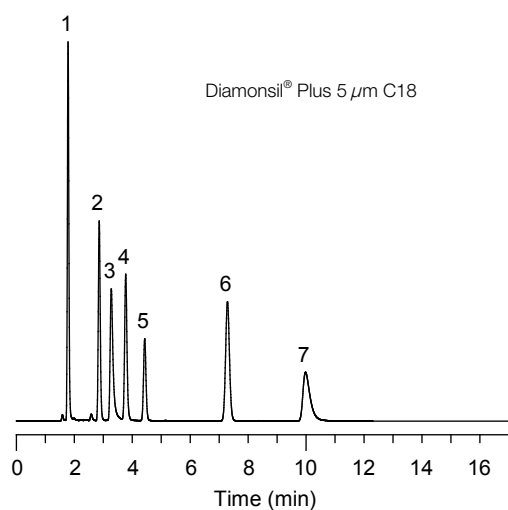


\*HC-C18 is a registered trademark of Agilent Corporation. Dikma Technologies Inc. is not affiliated with the above company.

\*TC-C18 is a registered trademark of Agilent Corporation. Dikma Technologies Inc. is not affiliated with the above company.

## Neue Test\*

Column	Listed on chromatograms
Dimension	150 × 4.6 mm
Mobile Phase	MeOH:20 mM phosphate buffer (pH 7.0) = 75:25
Flow Rate	1.0 mL/min
Temperature	Ambient
Detection	UV 254 nm
Sample	1. Uracil 2. Butylparaben 3. Propranolol 4. Dipropyl phthalate 5. Naphthalene 6. Acenaphthene 7. Amitriptyline



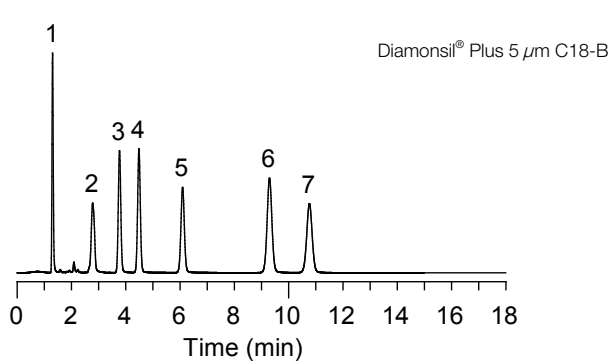
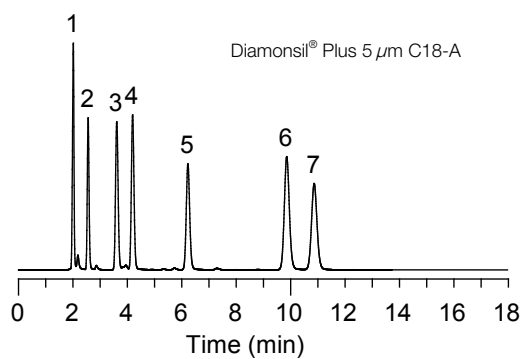
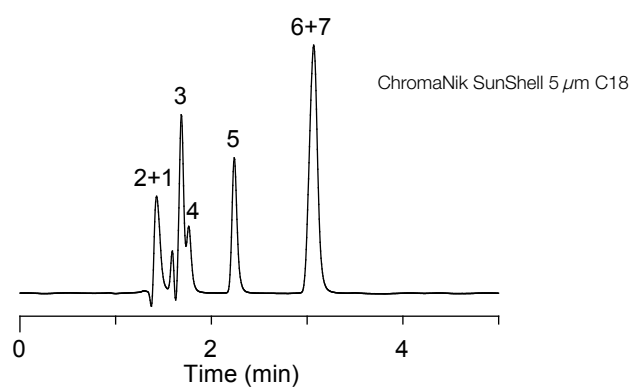
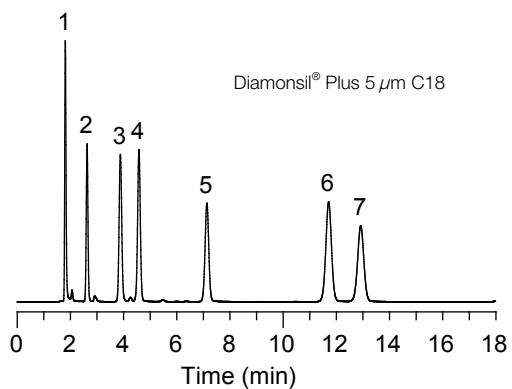
\*Symmetry is a registered trademark of Waters Corporation. Dikma Technologies Inc. is not affiliated with the above company.

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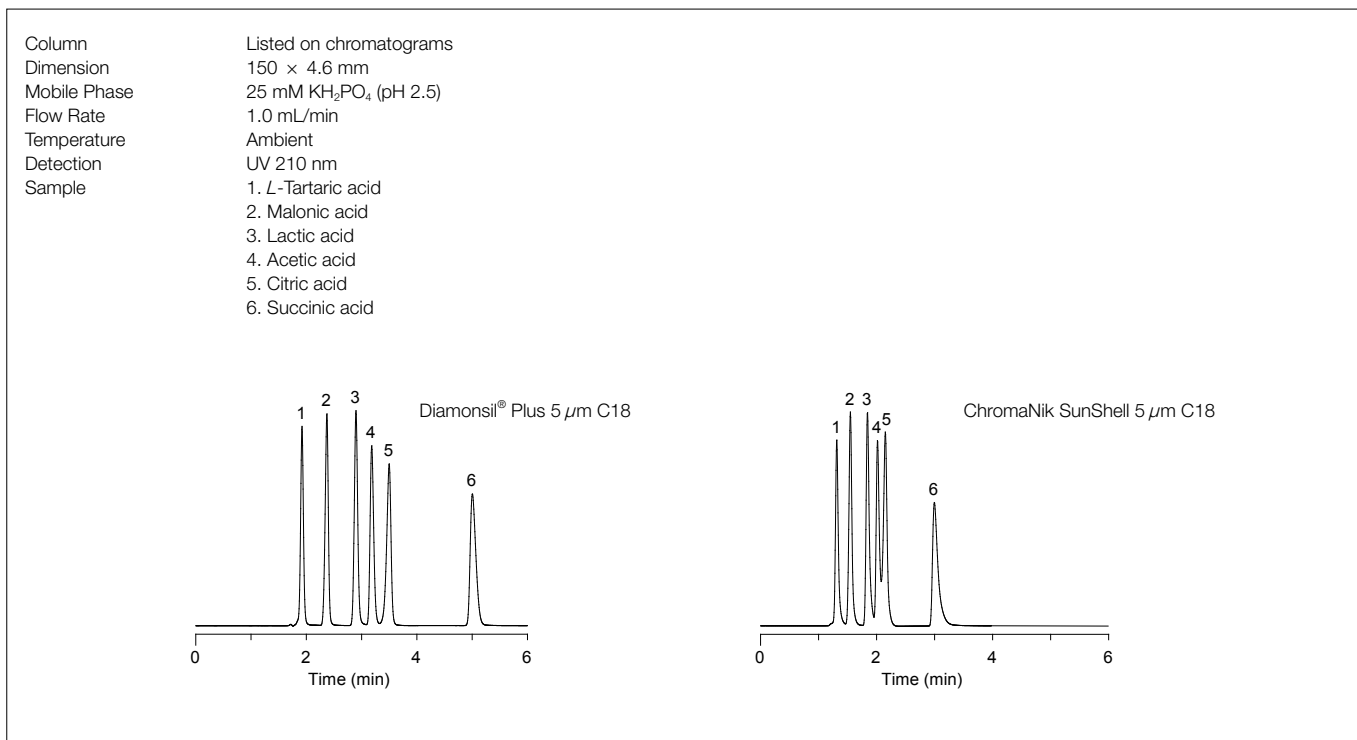
## Caffeine Metabolites\*

Column	Listed on chromatograms
Dimension	150 × 4.6 mm
Mobile Phase	MeOH:0.1% HCOOH in H <sub>2</sub> O = 10:90
Flow Rate	1.0 mL/min
Temperature	Ambient
Detection	UV 254 nm
Sample	1. 1-Methyluric acid 2. Xanthine 3. 7-Methylxanthine 4. 3-Methylxanthine 5. Theobromine 6. 1,7-Dimethylxanthine 7. Theophylline



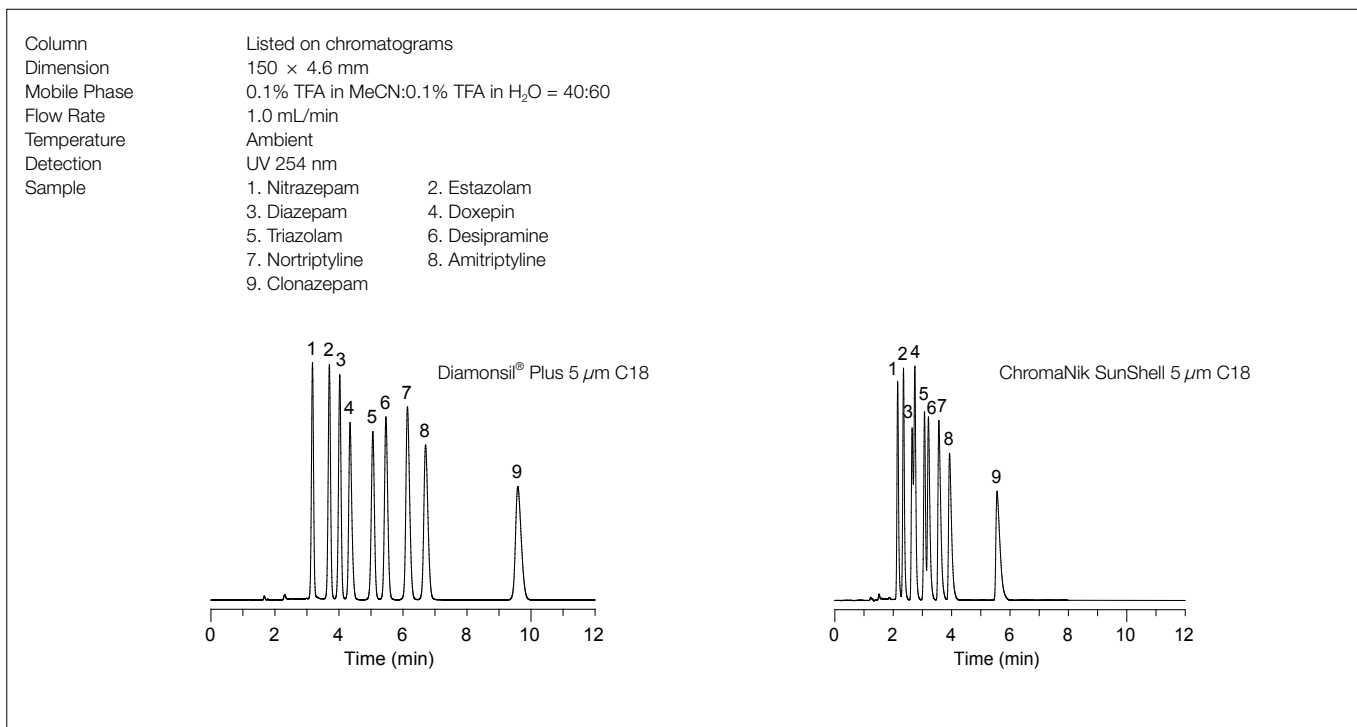
\*SunShell is a registered trademark of ChromaNik Technologies Inc. Dikma Technologies Inc. is not affiliated with the above company.

## Organic Acids\*



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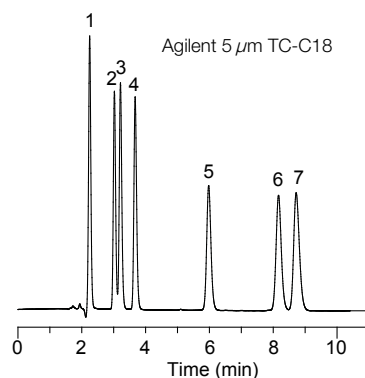
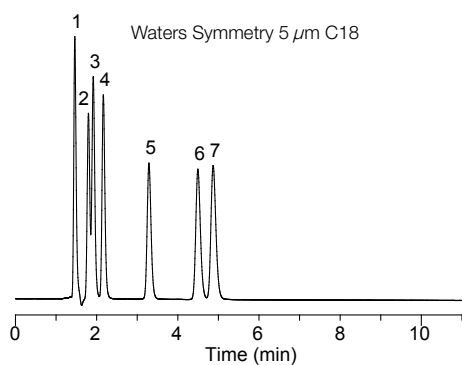
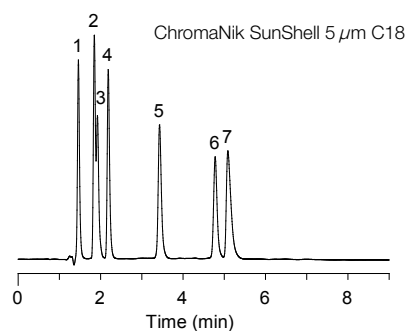
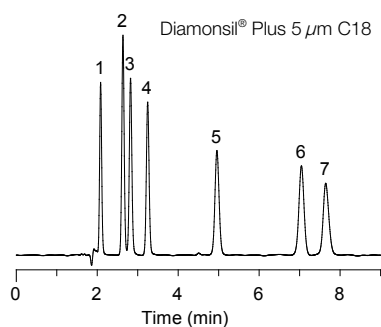
## TCA and Benzos\*



\*SunShell is a registered trademark of ChromaNik Technologies Inc. Dikma Technologies Inc. is not affiliated with the above company.

## β-Blockers\*

Column	Listed on chromatograms
Dimension	150 × 4.6 mm
Mobile Phase	0.1% TFA in MeCN:0.1% TFA in H <sub>2</sub> O = 30:70
Flow Rate	1.0 mL/min
Temperature	Ambient
Detection	UV 220 nm
Sample	1. Nadolol 2. Pindolol 3. Acebutolol 4. Metoprolol 5. Labetolol 6. Propranolol 7. Alprenolol

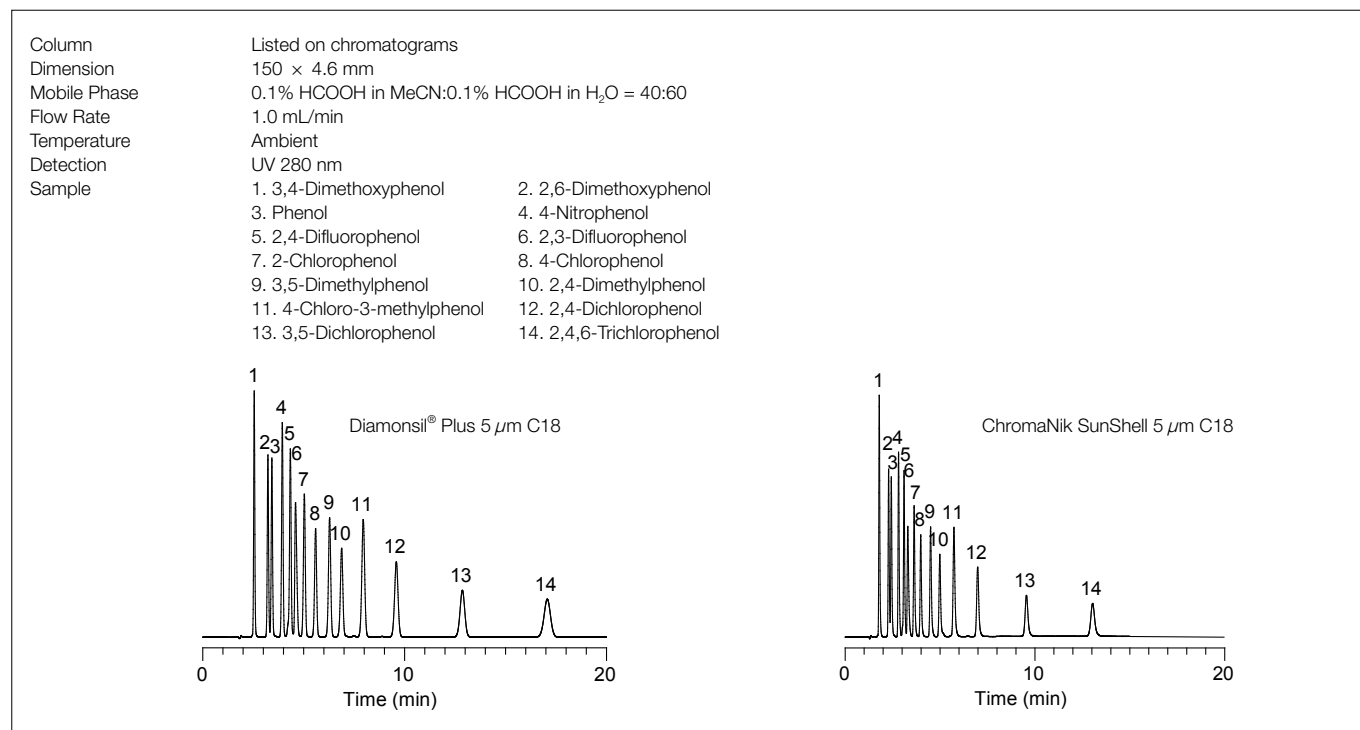


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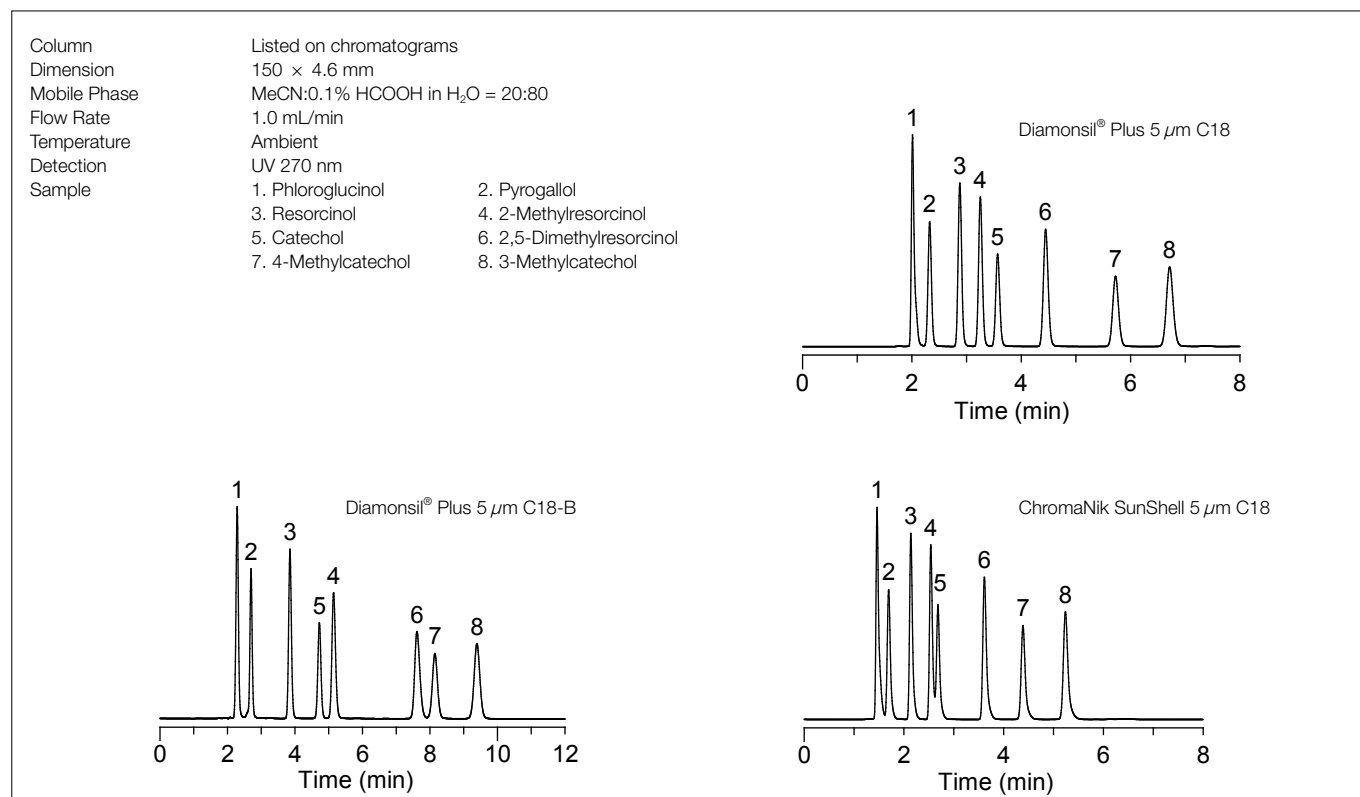
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## Phenols\*



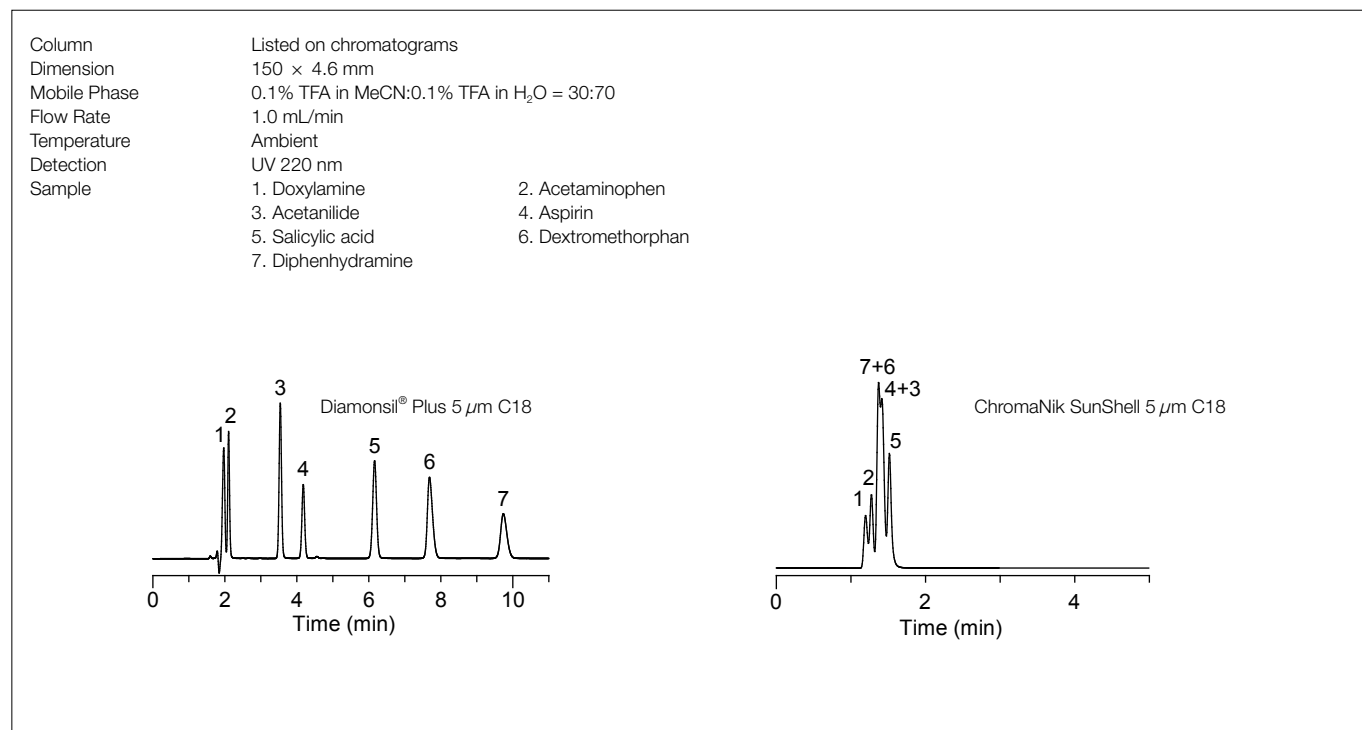
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## Hydroquinones and Phloroglucinols\*



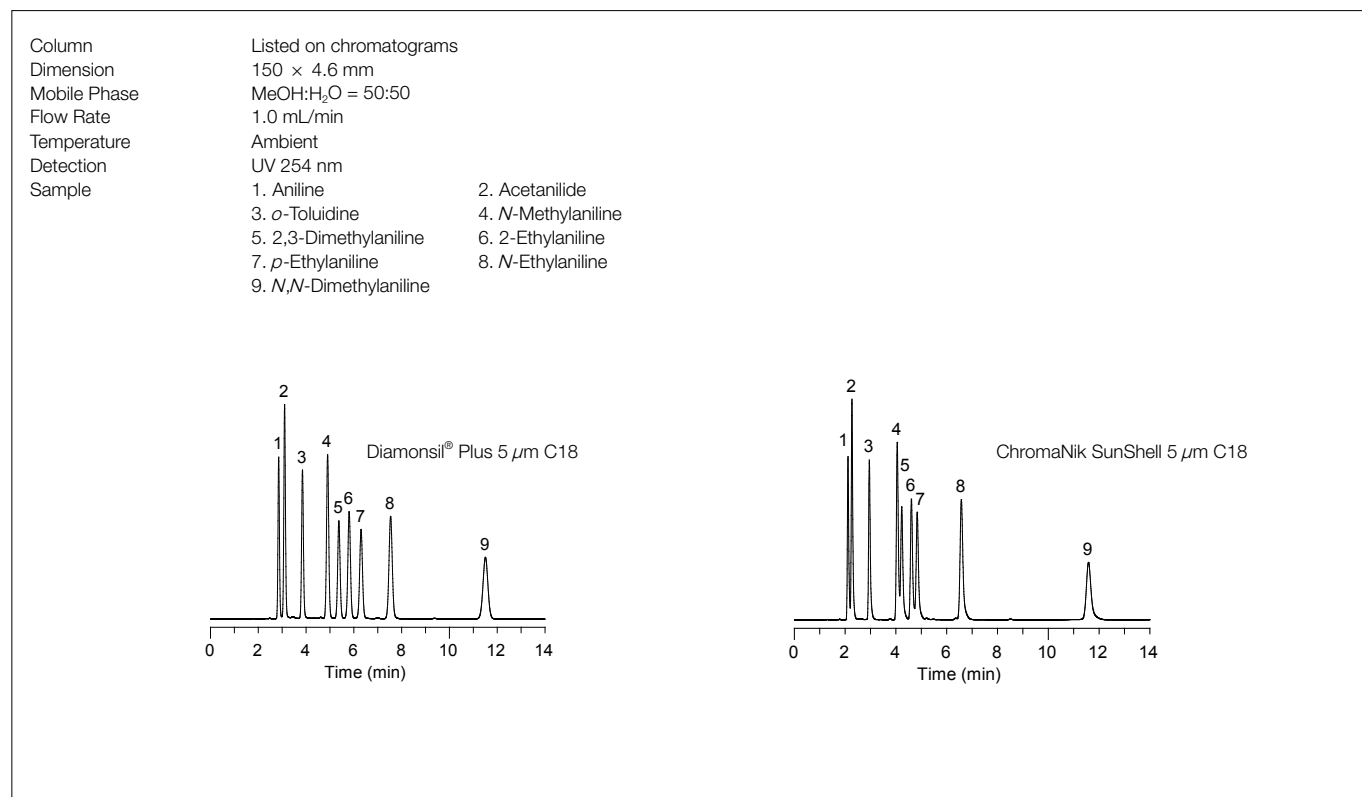
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## Cold Medicine\*



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## Anilines\*



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## Diamonsil® Plus Ordering Information

5 µm Analytical Columns

Guard Cartridge

Description	150 x 4.6 mm	250 x 4.6 mm	10 x 4.0 mm
Diamonsil® Plus 5 µm C18	99401	99403	6201
Diamonsil® Plus 5 µm C8	99410	99412	6202
Diamonsil® Plus 5 µm C18-A	99404	99406	6803 + 6220
Diamonsil® Plus 5 µm C18-B	99407	99409	



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Literature No. 3049

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