

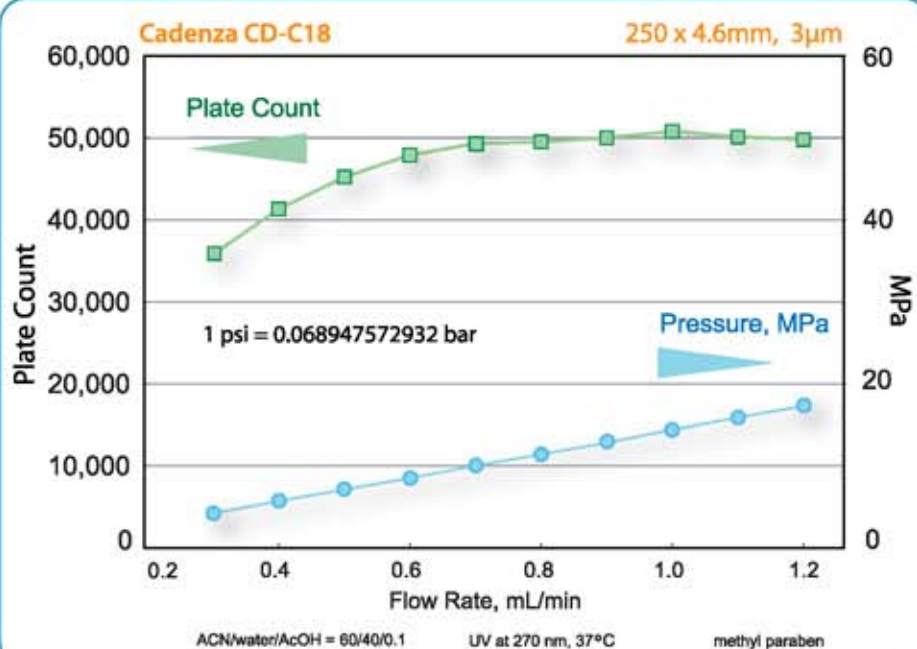
Cadenza CD-C18

Higher Resolution and Lower Back Pressure for HPLC

Lower Back Pressure

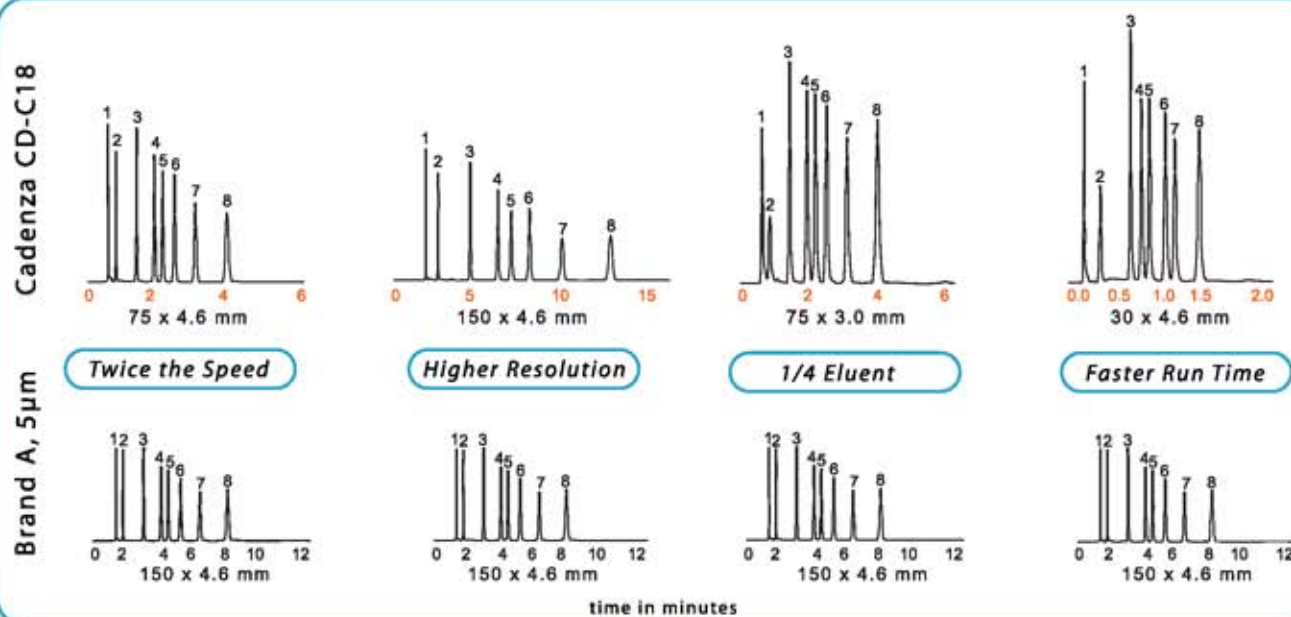
Cadenza CD-C18 columns offer:

- Higher Column Efficiency
- Lower Back Pressure
- ◆ Better Separation of Hydrophobic Compounds
- Higher Steric Selectivity
- ▲ High Plate Count at a Low Flow Rate



Cadenza CD-C18 offers lower back pressure for a 3µm packing material. In the above graph, a 250 x 4.6mm 3µm Cadenza CD-C18 has pressure of only 50 MPa (500 bar, 7250 psi) with a flow rate of 1.2 mL/min. The graph also shows lower analysis pressure, LC-ESI usage even with a 4.6mm column and decreased solvent consumption.

Higher Resolution or Faster Separation



1. 1-Hydroxy-7-azabenzotriazole
2. Acetoaminophen

3. Prednisolone
4. 6-Methylprednisolone

5. Methyl-3-amino-2-thiophenecarboxylate
6. Corticosterone

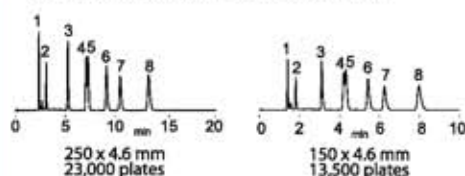
7. 4-Aminobenzophenon
8. Propyl paraben

1

manufactured by Imtakt

A Revolution in Column Efficiency

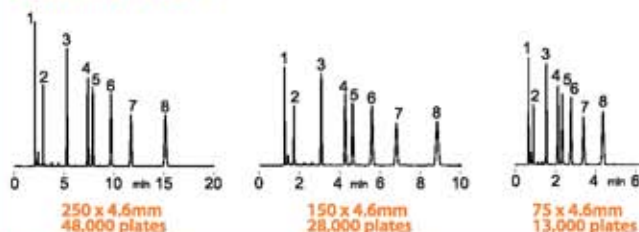
Conventional 5µm ODS Columns



10mM CH₃COONH₄ / ACN = 81/39
1.0 mL/min, 37 °C
UV at 254nm

1. 1-Hydroxy-7-azabenzotriazole
2. Acetaminophen
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Cadenza CD-C18



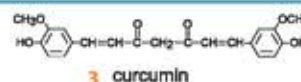
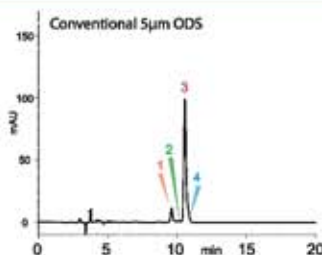
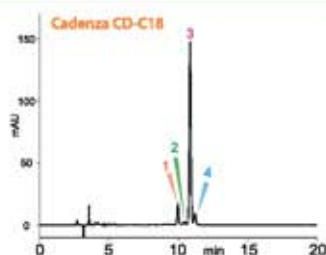
Higher Throughput

Cadenza CD-C18 is an authority on high throughput. Cadenza yields results equal or better quality than our competitors, but with a shorter column length. This results in three major benefits: shorter analysis time, less solvent use, and more efficient methods development process.

Higher Resolution

As shown in the examples at left, Cadenza CD-C18 provides twice the efficiency of equivalently sized columns. Cadenza CD-C18 demonstrates impressive plate numbers and exceptionally high recognition of molecules in the stationary phase. Cadenza CD-C18 users can expect unprecedented performance. The 250 x 4.6mm columns offer 50,000 plates per column.

250mm 3µm Column Offers Outstanding Resolution



250 x 4.6 mm
acetonitrile / water / formic acid
= 55 / 45 / 0.05
0.8 mL/min, 37°C, UV at 220 nm

This comparison data proves the high efficiency of Cadenza CD-C18's separation. Curcumin is the main ingredient found in turmeric. When analyzing the market reagent curcumin, a number of impurities are detected, as shown above. Cadenza CD-C18 clearly uncovered three impurities.

Under the exact same conditions, a conventional ODS column did not even detect the impurity shown in peak #2 of Cadenza's chromatogram. Moreover, peak #4 overlapped with the curcumin peak. This level of separation is unsatisfactory.

A high resolution column is essential to check for impurities in natural products and compounds. Cadenza CD-C18's 250 x 4.6mm column proudly offers our users the revolutionary power of 50,000 plates per column, twice the number found in standard columns.

For Maximum Resolution, Use a 500mm Length Column with 3µm Packing Materials

Cadenza CD-C18 alkylparabens

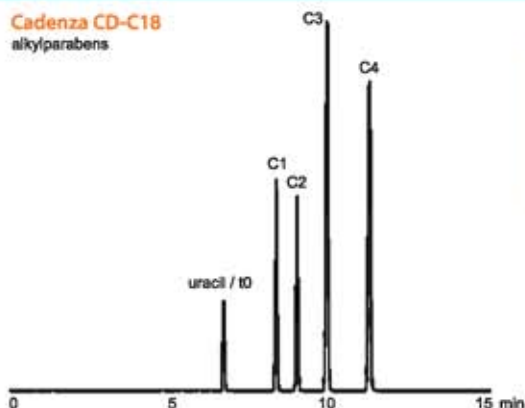


plate count

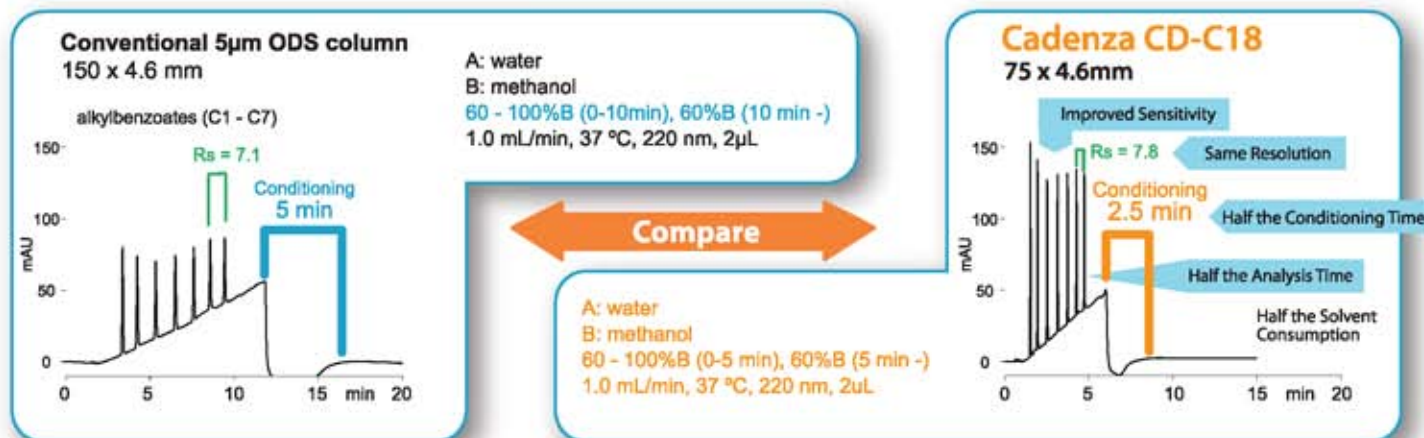
t0	109,300
C1	110,200
C2	108,300
C3	105,400
C4	102,500

Cadenza CD-C18
500 x 4.6 mm
water / acetonitrile = 20 / 80
0.7 mL/min
room temperature
270 nm
13.6 MPa

The chromatogram at left shows the performance on a new Cadenza CD-C18 column that is 500mm in length. In the separation of parabens, the 500mm column provides over 100,000 plates for each peak. This includes uracil's peak, which is used as a void marker. The Cadenza packing method is optimized, so that our 250 x 4.6mm column provides 50,000 plates as well.

Our technology combines low pressure and high theoretical plates to provide 500mm columns. The 500mm length column offers superior resolution compared to two 250 x 4.6mm columns connected in series.

Achieve Higher Efficiencies with Shorter Cadenza CD-C18 Columns



The shorter Cadenza CD-C18 75 x 4.6mm can replace your conventional 150 x 4.6mm and offer you:

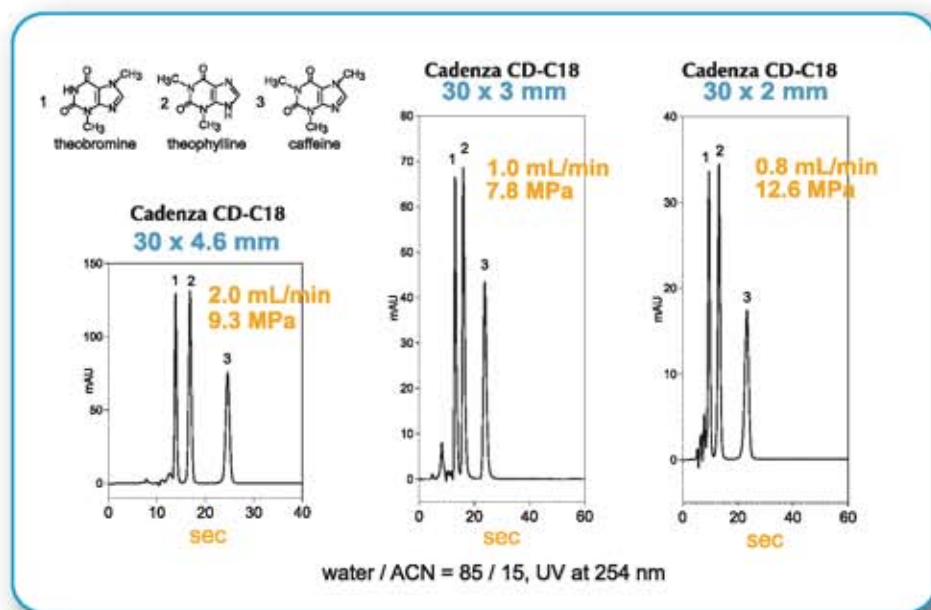
- Similar or improved resolution
- Half the analysis time
- Improved concentration and sensitivity
- Half the conditioning time
- Half the solvent use

A shorter Cadenza column offers the same degree of separation, while cutting analysis time and conditioning time in half.

It is even simple to switch conditions for gradient analysis. Gradient time is reduced by 50%, while the gradient's initial and final concentration remains the same. In the case of isocratic analysis, the same conditions apply. Cadenza offers improved sensitivity with the same resolution by fully realizing the power of a 3µm particle column design.

Compare Cadenza with other 3µm columns. Cadenza offers an advantage of 13,000 plates in a 75mm column, a number double that of a same dimension 5µm ODS column. Achieve the same separation quality as a conventional column with a shorter Cadenza column.

High Speed Analysis with High Flow Rates and Short Columns

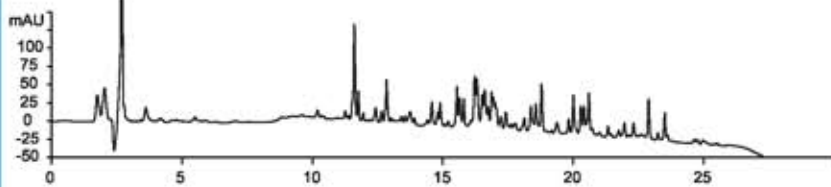


For the highest throughput, use the shortest column that gives you sufficient separation and resolution. Cadenza CD-C18 comes in unusually short sizes of 10mm, 20mm, and 30mm, which allow customers to minimize their run times. Because our columns have high efficiency, separation remains satisfactory for most customers when they use our shorter columns to cut run times.

Examples of Peptide Separations

Cadenza CD-C18 150 X 2mm

056

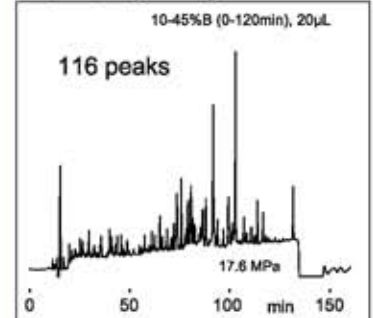


150 X 2 mm
A: water / TFA = 100 / 0.08
B: acetonitrile / TFA = 100 / 0.05
5%B (0-2min), 5-40%B, 40-90%B (20-25min), 90%B (25-30min), 90-5%B (30-33min)
0.2mL/min
UV at 214 nm
40 °C
BSA tryptic Digest, 18.5uL (ca. 6.5ug)

Cadenza CD-C18 3um

153

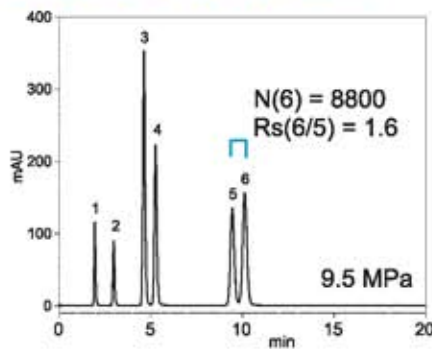
500 X 4.6 mm
Peptides, Tryptic Digest of α -Casein



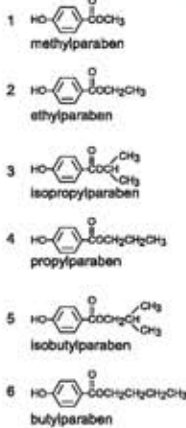
10-45%B (0-120min), 20uL
116 peaks
A: water / TFA, B: acetonitrile / TFA
0.5 mL/min, room temperature, 220 nm

Examples of Isomer Separation

Cadenza CD-C18 75 X 2mm



MeOH / water = 55 / 45
0.2 mL/min
30 deg.C
UV at 270 nm



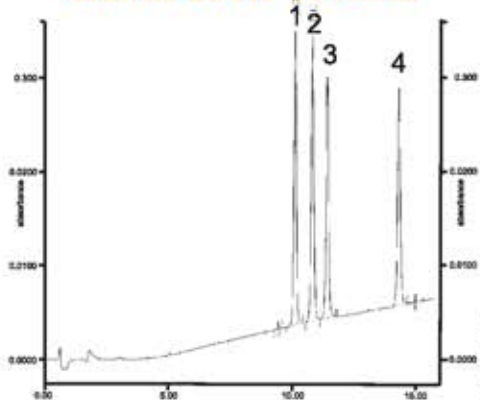
Cadenza CD-C18 excels at separating structural isomers.

As shown in this separation example, when one compares the separation of paraben isomer structures, such as propylparabens and butyl parabens, Cadenza provides more plates and better resolution in half the column length.

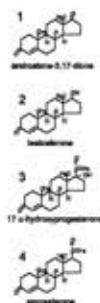
With only 1/2 the length, Cadenza provides greater efficiency than do conventional columns. Moreover, this high-throughput column offers quicker results and greater sensitivity under the same separation conditions used for a conventional column.

Examples of Steroid Separations

Cadenza CD-C18 75 X 2mm

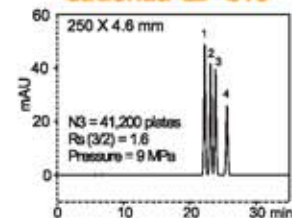


A: 10% methanol,
B: methanol 30 - 50
%B (0 - 0.5 min),
50 - 80 %B (0.5 - 12.5 min),
100 %B (12.5 min -)
0.3 mL/min
UV at 280 nm
20 uL (500 ppb)



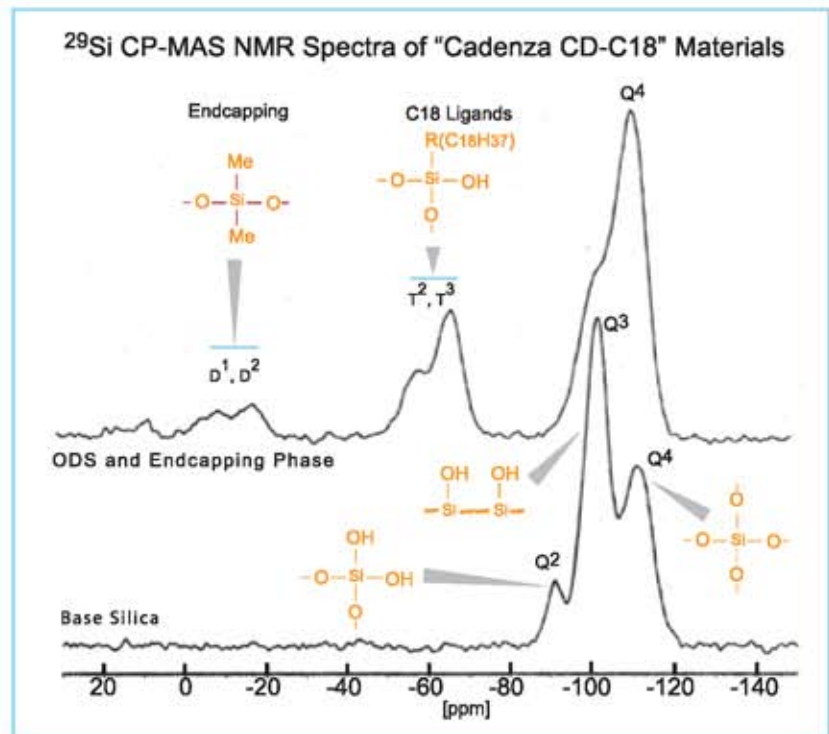
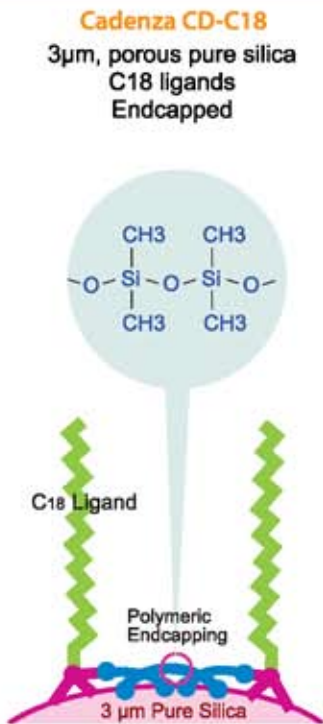
Cadenza CD-C18

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water / acetonitrile / acetic acid = 70 / 30 / 0.1
0.5 mL/min, 37 ° C, 280 nm

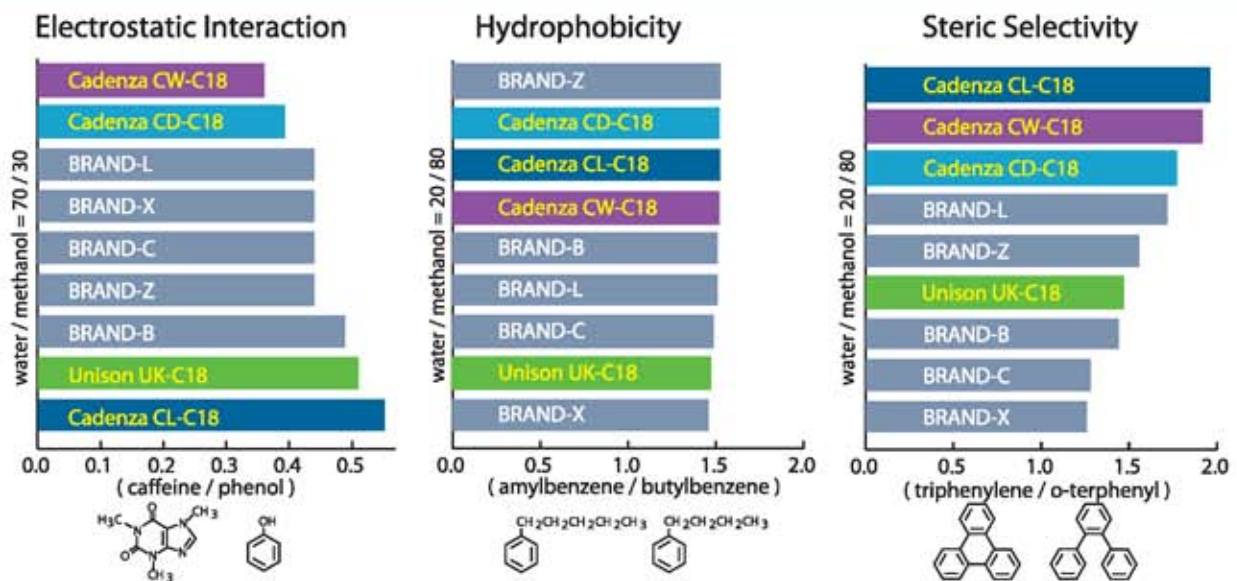
Cadenza CD-C18 Phase Structure



Courtesy of Prof. Dr. Klaus Albert, Univ. of Tübingen

The stationary phase structure model of Cadenza CD-C18 has a novel end-capping technology called "Polymeric Endcapping". This unique phase structure is proven by Si CP-MAS Spectra.

Chromatographic Characteristics

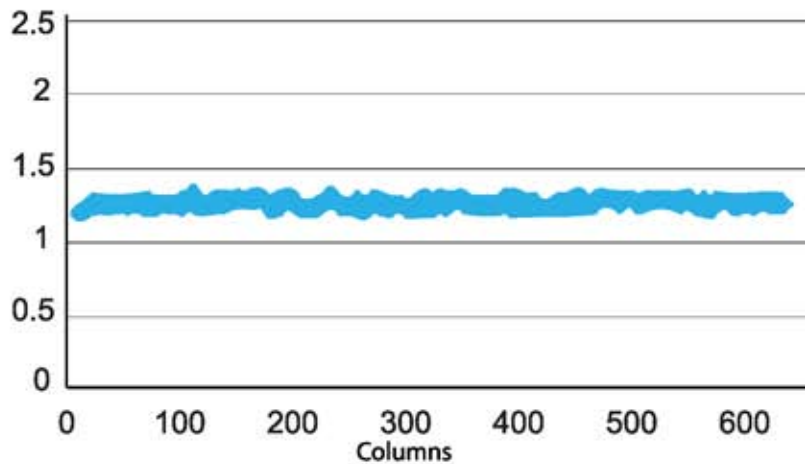


Cadenza CD-C18 is designed to provide hydrophobicity similar to that of other conventional ODS phases. However, Cadenza CD-C18 also offers lower hydrogen bonding capacity and has higher steric selectivity than other columns. These characteristics provide excellent performance for molecular recognition.

World Class Batch-to-Batch Reproducibility

Cadenza CD-C18

75 x 4.6mm



Water / ACN / AcOH = 40 / 60 / 0.1, 1.0 mL/min, 37 °C, 270 nm
1. uracil, 2. propylbenzoate

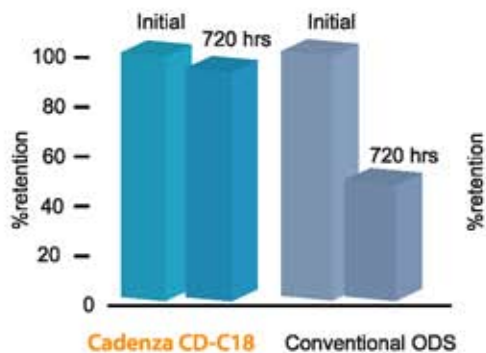
N = 500
R = 1.27 +/- 0.02

1.6%RSD

The figure to the left demonstrates the world-class consistency of our columns. In this graph, we analyzed the variance in results between 500 columns. As you can see, the column-to-column and batch-to-batch reproducibility is unmatched.

Excellent Durability Over a Wide pH Range

pH 1.5
ambient
(0.5% TFA)



This data shows Cadenza CD-C18's pH stability.

In the water eluent of acids and alkalis (not including organic solvents), we measured the rate of change in column durability after a constant period of exposure to solvent.

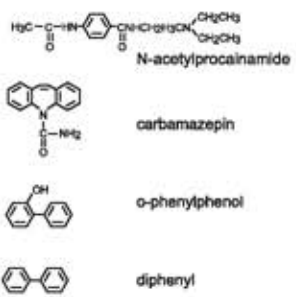
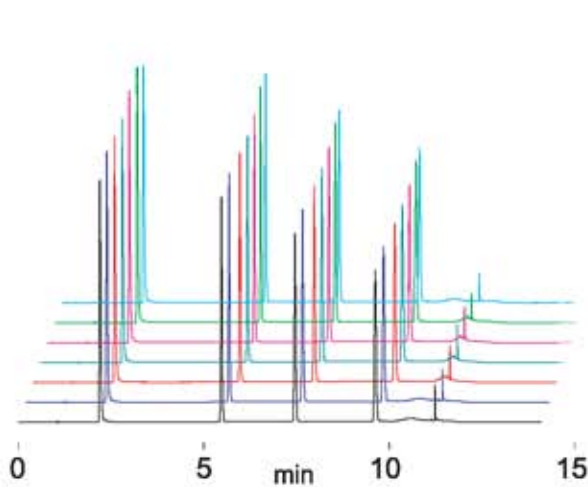
Conventional ODS columns showed a huge change in column life with acidic and alkali eluents. The cause of this is hydrolysis degradation of both the stationary phase ODS and the endcapping functional group.

Cadenza CD-C18 excels in severe conditions. There is little change in retention despite extreme pH conditions. This proves Cadenza CD-C18's polymeric endcapping. By using Cadenza CD-C18, you will no longer face the traditional problems associated with moving from low pH to high pH in the mobile phase.

Column Consistency in Gradient Analysis

Cadenza CD-C18

75 x 4.6mm



Run No.	Rs(2/1)	N(4)	Pressure MPa
1	35.3	176000	8.2
500	35.9	175000	8.5
1000	35.7	175000	8.7
1500	35.9	174000	8.8
2000	33.0	173000	9.0
2500	35.8	176000	8.9
3000	35.8	176000	9.1

A: 5mM NaH₂PO₄, B: acetonitrile
 10 - 90%B (0-10min), 10%B (10-15min)
 1.0 mL/min, 37°C, 260 nm

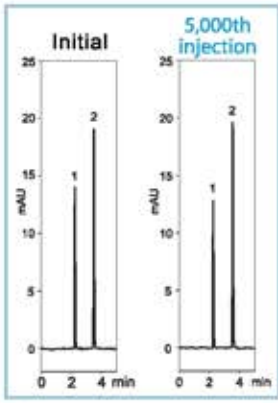
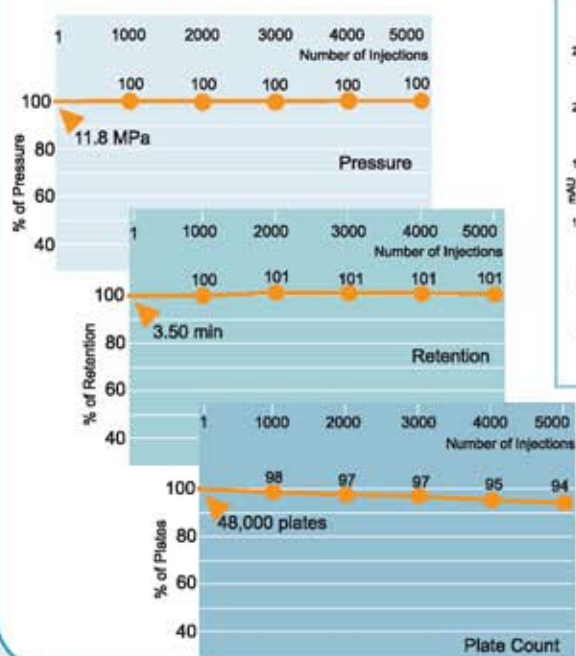
This data shows Cadenza CD-C18's durability through gradient analysis. Gradient analysis is a stressful elution mode for columns. Researchers are concerned about column degradation, particularly through the degradation of packing material that can result after the use of a wide range of organic solvent concentrations.

We examined the column's durability through repeated analysis using gradient elution. There was no column deterioration after 3000 injections under optimized conditions. The basic compound's separation (Peak 1, 2) was also excellent. Under such conditions, it is possible to achieve stable analysis during non-stop 24 hour experimentation.

Column Durability through Repeat Injections

Cadenza CD-C18

250 x 4.6mm



water / ACN / AcOH = 40 / 60 / 0.1
 1.0 mL/min, 37°C, 270 nm
 1. uracil, 2. butylparaben, 2µL

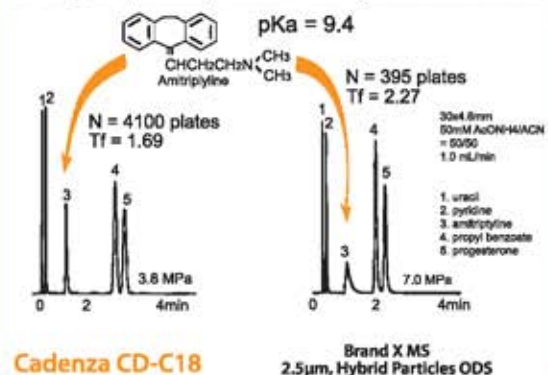
This data shows the column life of Cadenza CD-18 under inspection conditions.

We conducted a repeat injection experiment with an optimized Cadenza. The resulting packing situation yielded over 90% of the normal plate numbers, even after 5000 injections. There was little effect on column life and column pressure as well.

The column life changes dramatically with temperature, pH, and mobile phase composition. While this experiment's results may not apply to all situations, the Cadenza CD-C18 column offers the industry's highest efficiency in processing the most samples possible.

Cadenza CD-C18 Separates Basic Compounds

Brand X gave a peak tailing because of inhomogeneous residual silanols



Our columns offer you the highest efficiency. As shown in the analysis to the left, in head-to-head comparisons, we usually beat the competition by offering higher resolution, lower back pressure, and more consistent reproducibility. We offer customers the choice of better HPLC columns and better science.

In this data, peak 3 (amitriptyline) had significant tailing using Brand-X. This is because Brand-X has inhomogeneous residual silanols, which Cadenza CD-C18 does not have. The third peak is extremely sharp when using a Cadenza CD-C18.

Product Codes

CADENZA CD-C18 3 µm Particle Size Stationary Phase	Length mm	Analytical Columns				Semi-Prep Columns	
		Internal Diameter					
		1	2	3	4.6	6	10
	10		CD020	CD030	CD000		
	20		CD029	CD039	CD009		
	30	CD011	CD021	CD031	CD001	CD061	CD0P1
	50	CD012	CD022	CD032	CD002	CD062	CD0P2
	75	CD013	CD023	CD033	CD003	CD063	CD0P3
	100	CD014	CD024	CD034	CD004	CD064	CD0P4
	150	CD015	CD025	CD035	CD005	CD065	CD0P5
	250	CD016	CD026	CD036	CD006	CD066	CD0P6
	500				CD007		

Guard Cartridges		
Size	Code	Pieces
1mm	GCCD0C	3
2-6mm	GCCD0S	3
10mm	GCUD0M	2

Guard Holders		
Column Coupler Included		
1-6mm	GCH01S	
10mm	GCH02M	

Cadenza 5CD-C18 5 µm Particle Size Stationary Phase	Length mm	Analytical Columns				Semi-Prep Columns		Prep Columns
		Internal Diameter						
		1	2	3	4.6	6	10	20
	30	5CD011	5CD021	5CD031	5CD001	5CD061	5CD0P1	
	50	5CD012	5CD022	5CD032	5CD002	5CD062	5CD0P2	5CD0Q2
	75	5CD013	5CD023	5CD033	5CD003	5CD063	5CD0P3	
	100	5CD014	5CD024	5CD034	5CD004	5CD064	5CD0P4	5CD0Q4
	150	5CD015	5CD025	5CD035	5CD005	5CD065	5CD0P5	5CD0Q5
	250	5CD016	5CD026	5CD036	5CD006	5CD066	5CD0P6	5CD0Q6

Guard Cartridges		
Size	Code	Pieces
1mm	G5CD0C	3
2-6mm	G5CD0S	3
10mm	G5CD0M	2

Guard Holders		
Column Coupler Included		
1-6mm	GCH01S	
10mm	GCH02M	