Fortis™
Technologies Ltd.

Strength in Technology

Product Guide 2010/2011

Fortis Philosophy

Here at Fortis Technologies we take pride in understanding the needs of our customers, levels of technical service are of the highest standard and all of our products are developed in close consultation with customers to ensure that their needs are met.
We believe in making method development as simple as possible, so our innovative phase chemistries offer the ability for resolution, efficiency, speed and sensitivity; all of the variables that are needed in today's high speed evolving world.
If you have any questions please feel free to contact us at : info@fortis-technologies.com

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New Products

UHPLC Columns

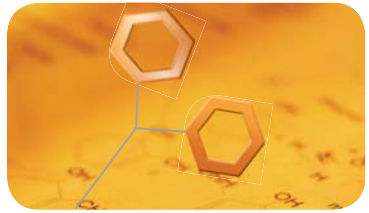
- Optimised for Ultra High Pressure LC (UHPLC)
- Available C18, Diphenyl, HILIC, Cyano
- Operate at 18,000psi
- Fully Scaleable analytical to prep

1.7µm Fortis™ C18

- Superior Peak Shape
- Low, Mid and High pH 1-12
- Based upon Ultra Pure Silica
- Fully Scaleable

1.7µm Fortis™ Diphenyl

- Unique diphenyl selectivity
- Separate Positional Isomers
- Metabolite separations
- Enhanced Polar Retention



1.7µm UHPLC Columns

- **380m2/g Surface Area Provides Increased Peak Capacity**
- **High Efficiency small particles**
- **Robust Reproducible UHPLC columns**
- **Operate to 18,000psi**
- **Fully Scalable to Analytical and Prep Size**

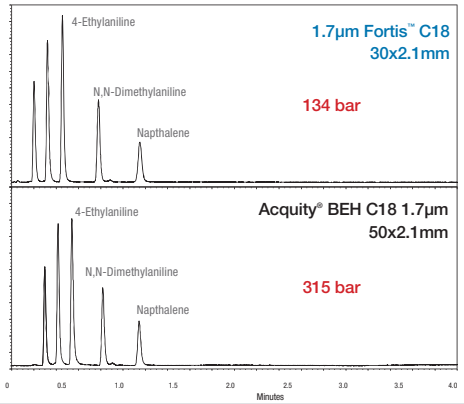
1.7µm Fortis particles are designed to provide characteristics, which will aid in increased productivity within ultra high pressure chromatography (UHPLC). Designed to be robust, reproducible and fully scalable with 3µm, 5µm and 10µm particles. 1.7µm Fortis particles will operate upto 1200bar providing high linear velocities, increased efficiency, and allowing speed and sensitivity to be achieved on all the latest UHPLC systems. By choosing a high surface area (S.A.) UHPLC phase the analyst can increase peak capacity using their existing column dimension, or maintain existing capacity whilst lowering backpressure on a shorter column.

Increased Efficiency

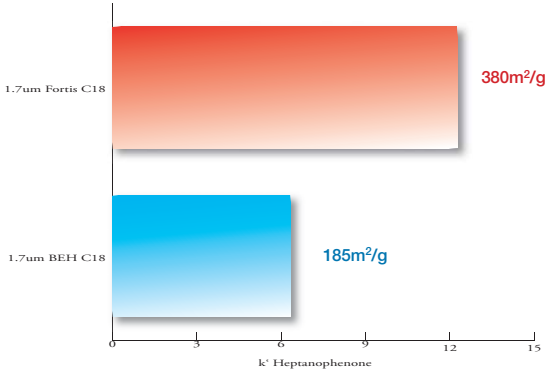
1.7µm Fortis C18 provides increased efficiency over 3µm and 5µm particles. This gives the opportunity to increase resolution or speed of analysis.

A wider linear flow range means that more resolution and peak capacity can be achieved for a given separation.
By having a consistent particle size, 1.7µm Fortis C18 ensures pressure is reduced whilst no loss in efficiency is seen.

- **Higher Efficiency**
- **Greater Resolution**
- **Increased Sensitivity**
- **Fully Scalable 380m^2/g S.A.**



Comparison of Hydrophobicity and Peak Shape



1.7µm Fortis™ C18 50x2.1mm	
Surface Area	380m^2/g
Efficiency	191,670
Peak Shape (N,N-Dimethylaniline)	1.03
Psi - 0.3ml/min (60:40 ACN:Water)	170bar
Psi - 0.4ml/min (60:40 ACN:Water)	225bar

Acquity® BEH 1.7µm C18 50x2.1mm	
Surface Area	185m^2/g
Efficiency	167,400
Peak Shape (N,N-Dimethylaniline)	1.28
Psi - 0.3ml/min (60:40 ACN:Water)	221bar
Psi - 0.4ml/min (60:40 ACN:Water)	292bar

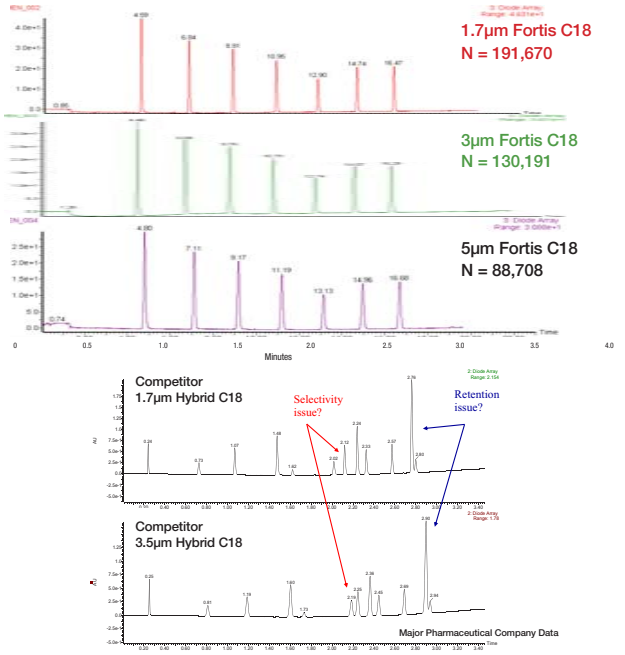
Fully Scaleable

Critically important to the analyst is the ability to have a fully scalable separation. Fortis C18 can be scaled from 1.7µm all the way through analytical 3 and 5µm particles to prep size without any change in retention profile.

By combining the same surface area, pore size characteristics with the identical bonding the analyst can be ensured of having the ability to either scale up methods to 'traditional' LC systems, or to be confident that a method can be transferred to another laboratory with the same selectivity being achieved.

If a small particle used in UHPLC is not the same as its larger 3um and 5um particle then changes in resolution and retention can occur, both of which can cause problems in method validity.

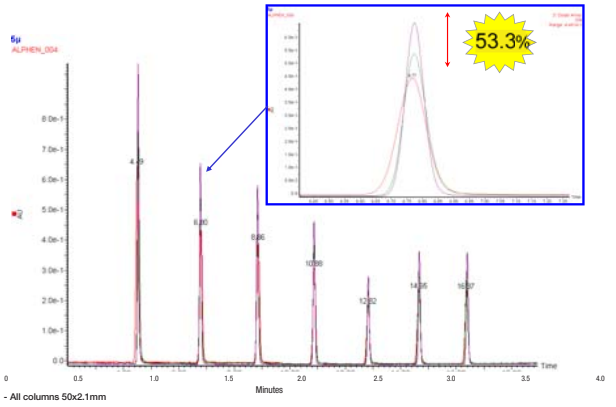
1.7µm Fortis C18 will alleviate all these potential issues, leaving the analyst confident in method transfer.



Sensitivity Gains

Critically peak height increases in UHPLC mode due to the rise in efficiency (N) from the smaller particle, but also it is also inversely proportional to peak width, so symmetrical peaks will lead to increased sensitivity.

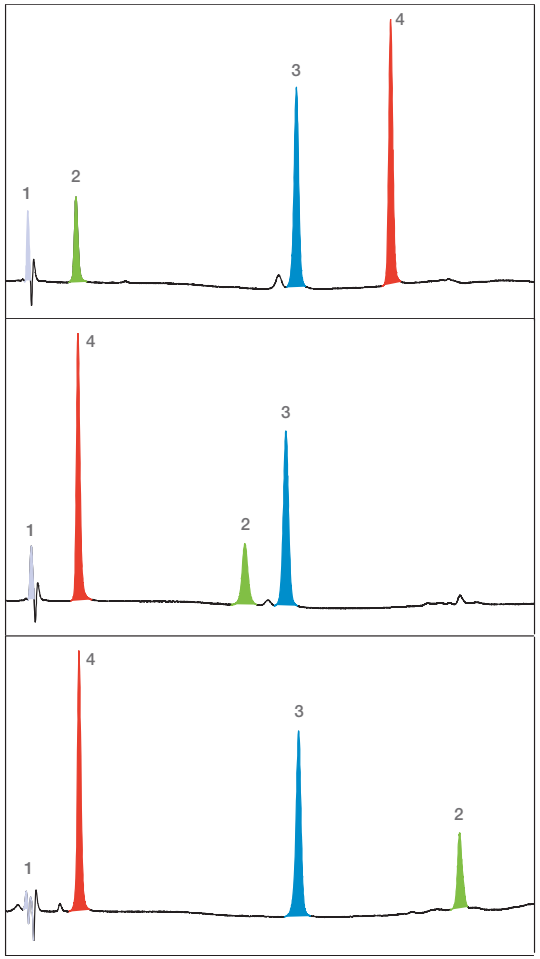
By moving from a 3µm Fortis C18 particle size to 1.7µm Fortis C18 sensitivity can be increased. In this example peak height goes up by over 27%. The increase from 5um particles is even greater.



1.7µm Fortis C18 pH options

- **pH selectivity for method development**
- **pH stable 1-12**
- **Gives high speed of equilibration**

1.7µm Fortis C18 will operate across the pH spectrum giving the analyst the ability to optimise the correct pH region for their separation. Quickly equilibrating from formic acid to ammonium acetate through to ammonia allows pH, as a method variable, to be rapidly evaluated. Resolution of compounds can be changed radically by altering pH to optimise separation between compound classes.



Column:	1.7µm Fortis C18 30x2.1mm
p/n:	F18-020201
Gradient:	10 - 50% in 5min
Flow:	0.4ml/min
Temp:	20°C
Wavelength:	254nm

1. Uracil
2. Procaine
3. Fenuron
4. 3-Nitrobenzoic acid

pH 2.2

pH 7.2

pH 11.2

Fortis C18 page 14

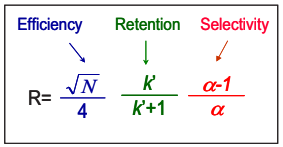
Phase Chemistry Selectivity

Resolution vs Efficiency vs Selectivity

1.7µm Fortis C18 will provide Hydrophobic selectivity which is suitable for many compounds. However as we can see from the resolution equation having multiple phase chemistries available is a definite advantage. Selectivity can then be used in conjunction with efficiency of the small particle.

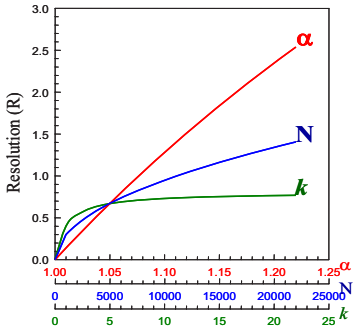
1.7µm Fortis UHPLC columns are also available as:

- **1.7µm Fortis Diphenyl**
- **1.7µm Fortis Cyano**
- **1.7µm Fortis HILIC**



$$\alpha = \frac{k_2}{k_1}$$

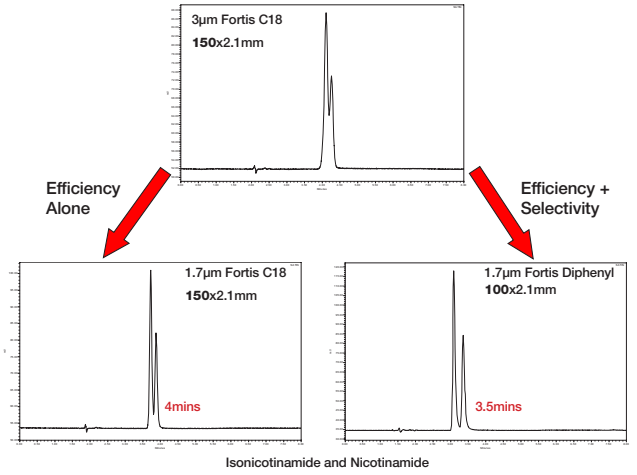
- **Selectivity (α) has the greatest impact on improving resolution.**



Improve Selectivity

If we are scaling a method and hoping that an increase in efficiency alone will provide the necessary resolution we can be disappointed. Scaling from 3µm to 1.7µm C18 has not provided baseline resolution between the compounds. Adding selectivity by phase chemistry into the equation has allowed us to go faster on a shorter column and now achieve full separation.

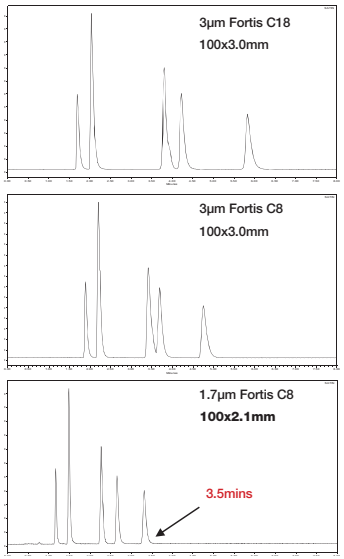
In this instance 1.7µm Fortis Diphenyl provides more resolution than C18. This then leads to the ability to increase speed by use of shorter columns, higher temperature, change in organic or a combination of the above.



Method Development

Transfer from HPLC to UHPLC

Optimising resolution is one of the main reasons that we wish to move from HPLC to UHPLC, along with increased speed.
If we can change the hydrophobicity of the phase chemistry then we have the potential to reduce the retention time.
If we can then move to a smaller particle and increase resolution between our critical pairs we can improve the speed of analysis still further.



Column: Fortis C18 100x3.0mm 3µ
Mobile Phase: 60/40 ACN/20mM Phosphate pH 7.0
Flow: 0.4ml/min
Temp: 25°C
Wavelength: 254nm

Selectivity = Less Retention

1. Doxepin
2. Imipramine
4. Nortriptyline
5. Amitriptyline

Efficiency = More Resolution

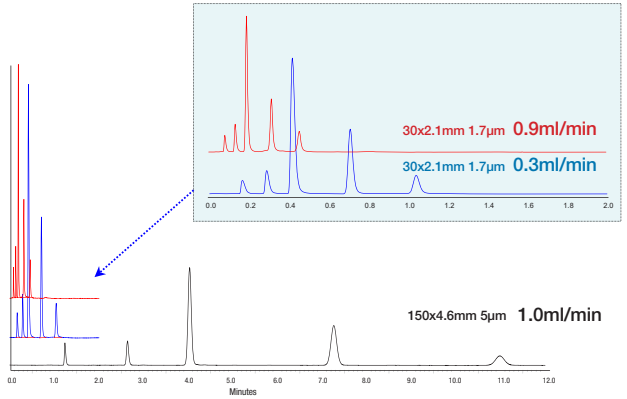
Column: 1.7µm Fortis C8 100x2.1mm
Mobile Phase: 60/40 ACN/20mM Phosphate pH 7.0
Flow: 0.4ml/min
Temp: 40°C
Wavelength: 254nm

Transfer from HPLC to UHPLC

Greater speed can be achieved by moving to smaller particles, whilst still obtaining full baseline resolution.

1.7µm Fortis C18 will operate at higher linear flow rates whilst providing lower backpressure than other sub 2µm particles.

To move to smaller particles and smaller columns, without affecting selectivity, use some simple scaling equations to optimise your UHPLC parameters: e-mail us for the spreadsheet:
technicalsupport@fortis-technologies.com



UHPLC Sample Filter

- **Filter for all UHPLC columns**
- **No backpressure increase**
- **Increase lifetime of UHPLC columns**
- **Low volume in-line filter**
- **Change over time is seconds not minutes**

Fortis UHPLC in-line filters are direct connect design, fitting in between the UHPLC column and the conventional fitting to filter out particulate matter. They contain low dead volume and pressure. In-line filters are ideal for 1.7µm Fortis columns where extra packed bed from a guard would be detrimental. UHPLC in-line filters are manufactured to withstand 20,000psi.

1.7µm UHPLC part numbers

1.7um Fortis C18	
F18-020701	1.7µm Fortis C18 150x2.1mm
F18-020501	1.7µm Fortis C18 100x2.1mm
F18-020301	1.7µm Fortis C18 50x2.1mm
F18-020201	1.7µm Fortis C18 30x2.1mm
F18-020101	1.7µm Fortis C18 20x2.1mm
F18-030501	1.7µm Fortis C18 100x3.0mm
F18-030301	1.7µm Fortis C18 50x3.0mm
F18-030201	1.7µm Fortis C18 30x3.0mm
F18-050301	1.7µm Fortis C18 50x4.6mm

1.7um Fortis Diphenyl	
FPH-020701	1.7µm Fortis Diphenyl 150x2.1mm
FPH-020501	1.7µm Fortis Diphenyl 100x2.1mm
FPH-020301	1.7µm Fortis Diphenyl 50x2.1mm
FPH-020201	1.7µm Fortis Diphenyl 30x2.1mm
FPH-020101	1.7µm Fortis Diphenyl 20x2.1mm
FPH-030501	1.7µm Fortis Diphenyl 100x3.0mm
FPH-030301	1.7µm Fortis Diphenyl 50x3.0mm
FPH-030201	1.7µm Fortis Diphenyl 30x3.0mm
FPH-050301	1.7µm Fortis Diphenyl 50x4.6mm

1.7um Fortis Cyano	
FCN-020701	1.7µm Fortis Cyano 150x2.1mm
FCN-020501	1.7µm Fortis Cyano 100x2.1mm
FCN-020301	1.7µm Fortis Cyano 50x2.1mm
FCN-020201	1.7µm Fortis Cyano 30x2.1mm
FCN-020101	1.7µm Fortis Cyano 20x2.1mm
FCN-030501	1.7µm Fortis Cyano 100x3.0mm
FCN-030301	1.7µm Fortis Cyano 50x3.0mm
FCN-030201	1.7µm Fortis Cyano 30x3.0mm
FCN-050301	1.7µm Fortis Cyano 50x4.6mm

1.7um Fortis HILIC	
FHI-020701	1.7µm Fortis HILIC 150x2.1mm
FHI-020501	1.7µm Fortis HILIC 100x2.1mm
FHI-020301	1.7µm Fortis HILIC 50x2.1mm
FHI-020201	1.7µm Fortis HILIC 30x2.1mm
FHI-020101	1.7µm Fortis HILIC 20x2.1mm
FHI-030501	1.7µm Fortis HILIC 100x3.0mm
FHI-030301	1.7µm Fortis HILIC 50x3.0mm
FHI-030201	1.7µm Fortis HILIC 30x3.0mm
FHI-050301	1.7µm Fortis HILIC 50x4.6mm

High Performance 2.5µm particles

- **Over 20% more efficiency than 3µm**
- **Lower backpressure than UHPLC columns**
- **Operate in 400bar or 1000bar systems**
- **Fully Scalable to analytical and prep size**

Fortis 2.5µm particles are designed to be the next step in improving both resolution and speed. Allowing the analyst to move towards ultra high pressure chromatography (UHPLC) whilst still operating on traditional 400bar LC systems. Can be combined with the companies innovative column designs 2.5µm particles offer speed and efficiency without compromising loadability and scaleability. The optimised C18 bonding maintains the phases ability to be stable from pH 1-12.

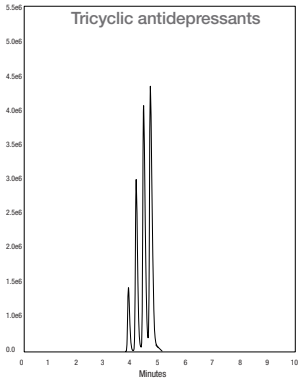
Optimised Resolution

Resolution of closely related species can be achieved by the use of 2.5µm particles and the optimised peak shapes afforded by Fortis C18 stationary phase.
Basic, Acidic and Neutral analyte performance is first class across the pH spectrum.

- **Higher Efficiencies**
- **Greater Reproducibility**
- **Resolution enhanced**

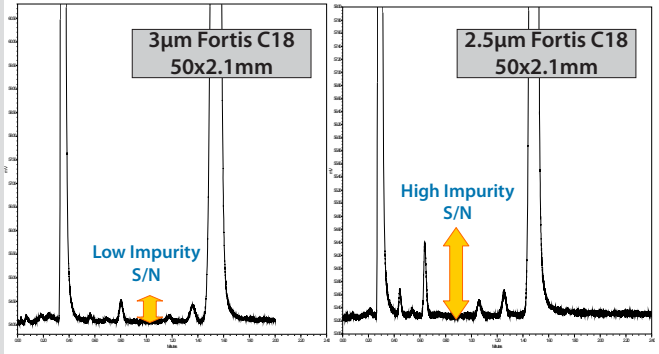
Column: Fortis C18 100x4.6mm 2.5µ
p/n: F18-050502
Mobile Phase: A - H_2O + 0.1% Formic acid
B - ACN + 0.1% Formic acid
Gradient: 25 - 40% in 10min
Flow: 1ml/min
Temp: 20°C
Wavelength: 254nm

1. Protriptyline
2. Nortriptyline
3. Amitriptyline
4. Trimipramine



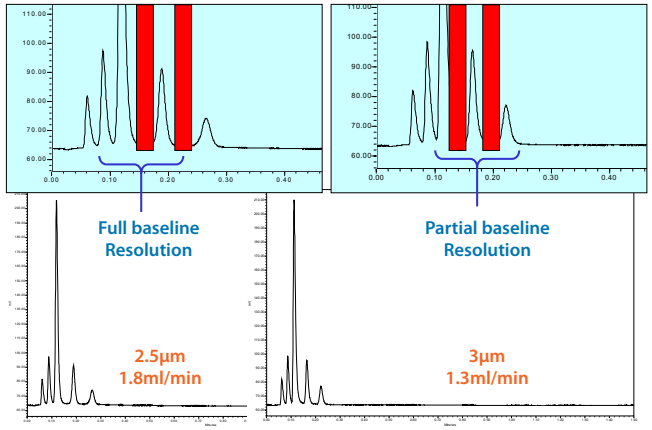
Sensitivity Gain - Impurities

With sensitivity of degradents and impurities being an issue in pharmaceutical analysis, peak shapes and peak height need to be optimal in order to obtain low level LOD (limits of detection).
Fortis 2.5um particles allow higher sensitivity to be obtained than 3um particles, therefore lower LOD's.



Increased Peak Capacity

As we run faster and faster we get to the point where peak capacity starts to fall, by being able to increase efficiency by moving to a smaller particle we can increase the efficiency and therefore maintain peak capacity.
An improvement in baseline resolution can be seen by the use of 2.5um particles at higher linear velocities.



2.5µm Fortis C18 particles can be provided packed in hardware that is fully compatible with UHPLC systems so the low dead volume capability of these systems can be fully utilised:

To learn more about the stability and peak shapes of Fortis C18 turn to page 14.

2.5µm Fortis C18		Column Length			
		30	50	100	150
Column Diameter	2.1	F18-020202	F18-020302	F18-020502	F18-020702
	3.0	F18-030202	F18-030302	F18-030502	-
	4.6	F18-050202	F18-050302	F18-050502	-

2.5µm Fortis C18 in UHPLC Hardware		Column Length			
		30	50	100	150
Column Diameter	2.1	F18-020202UHP	F18-020302UHP	F18-020502UHP	F18-020702UHP
	3.0	F18-030202UHP	F18-030302UHP	F18-030502UHP	-
	4.6	F18-050202UHP	F18-050302UHP	-	-

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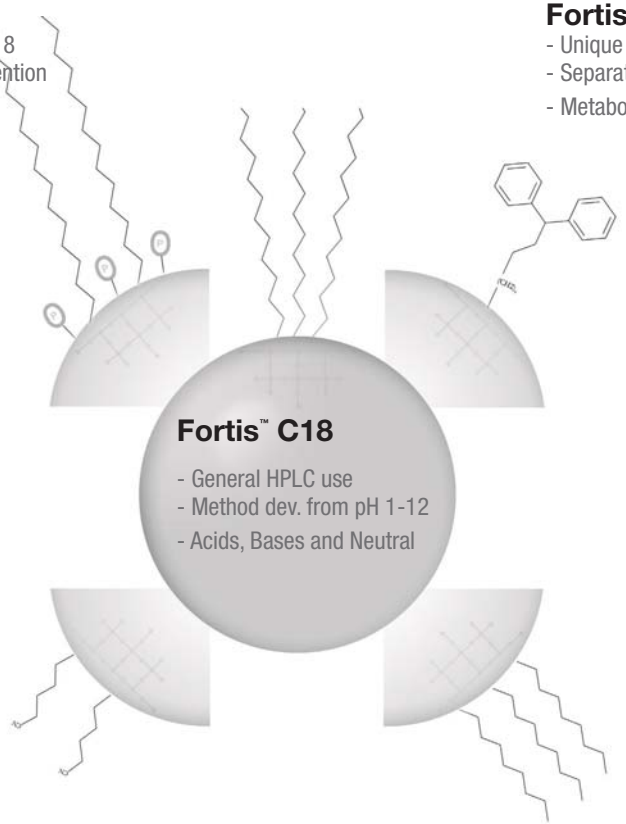
Fortis Method Development Options

- **Choice of Stationary phase functionality**
- **Based on Ultra pure silica**
- **Reversed Phase (RP) and Normal Phase (NP) options**

Fortis™ H2o
- Polar endcapped C18
- Increased polar retention
- *Organic acids*
- *Catecholamines*

Fortis™ Diphenyl
- Unique di-phenyl structure
- Separate Positional Isomers
- Metabolite profiling



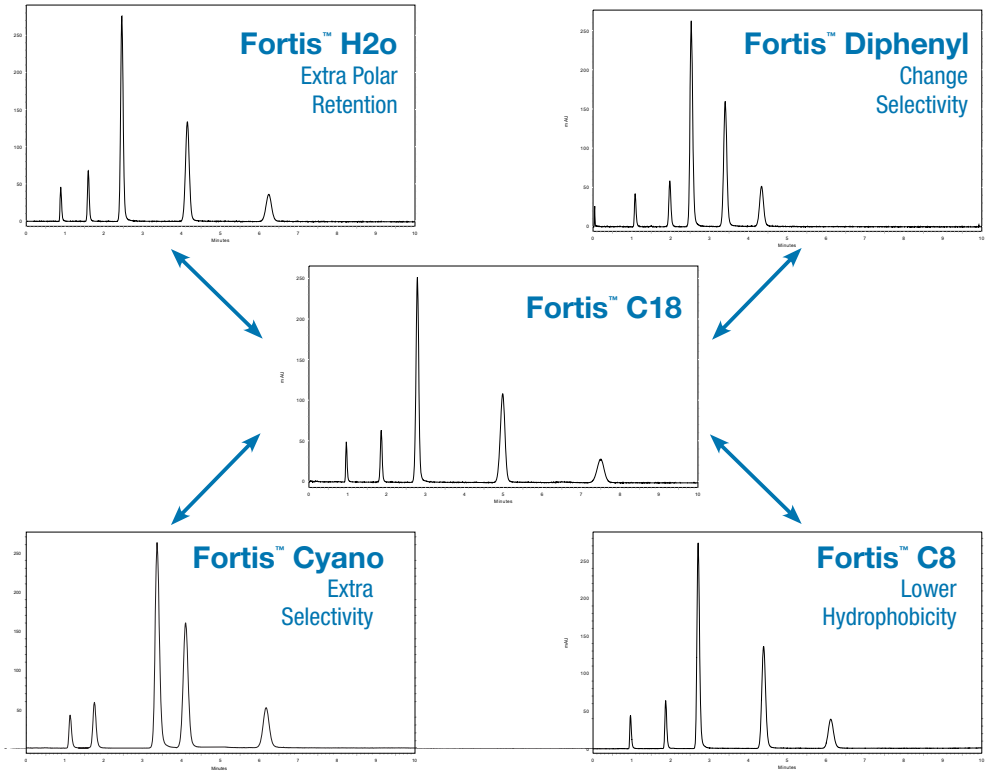
Fortis™ Cyano
- Cyano functionality
- RP or NP use
- *Explosives*
- *Pesticides*

Fortis™ HILIC
- High Polar Retention
- Highly Pure Silica
- *Carboxylic acids*
- *Nucleotides*

Fortis™ C8
- Reduced Hydrophobicity
- *Lipids*
- *Steroids*

Getting Started :

Method development typically starts with a C18 or C8 column, both provide Hydrophobic retention with good peak shapes for neutral, acidic and basic analytes. Generally if retention of polar molecules is also needed then a polar endcapped stationary phase such as Fortis H2o is a good starting choice.
If selectivity is insufficient then Diphenyl or Cyano stationary phases are a good alternative, they will change selectivity and even elution order since they work on dipole characteristics as opposed to just hydrophobicity.
Fortis Cyano is good in normal phase (NP) conditions for polar analytes with COOH, NH2, NHR2 or NR2 groups. If small polar molecules still do not retain then HILIC chromatography is a suitable alternative.



Acidic, Neutral & basic analytes
- Fortis C18
- Fortis C8
- Fortis Diphenyl

Polar basic molecules
- Fortis C18 operated at high pH
- Fortis Diphenyl
- Fortis H2o

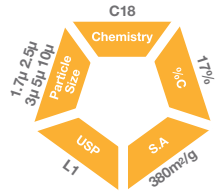
Polar acidic molecules
- Fortis H2o
- Fortis HILIC
- Fortis Cyano in NP mode

Alternate Selectivity
- Fortis Diphenyl
- Fortis Cyano

Method Dev

Fortis™ C18

- **Superior Peak Shapes**
- **pH Range 1-12**
- **Based on Ultra Pure Silica**
- **Fully Scalable - UHPLC to Prep**



Fortis C18 is a pure silica based stationary phase with unique high and low pH performance. Whether carrying out simple compound screens or complex metabolite identification Fortis C18 will provide the best in peak shape, resolution and extended pH range for method development flexibility.

Optimised Peak Shape

Whatever the compound functionality the optimised hydrophobic bonding of Fortis C18 leads to peak symmetries being near perfect whatever the analyte type.

Basic, Acidic and Neutral analyte performance is first class across the pH spectrum.

- **Superior Peak Shapes**
- **Higher Efficiencies**
- **Excellent Reproducibility**

Column: Fortis™ C18 150x4.6mm 5µ
Luna® C18(2) 150x4.6mm 5µ

Mobile Phase: A - H_2O + 0.1% Formic acid
B - ACN + 0.1% Formic acid

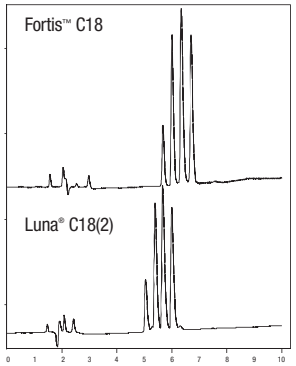
Gradient: 25 - 40% in 10min

Flow: 1ml/min

Temp: 20°C

Wavelength: 254nm

1. Protriptyline
2. Nortriptyline
3. Amitriptyline
4. Trimipramine

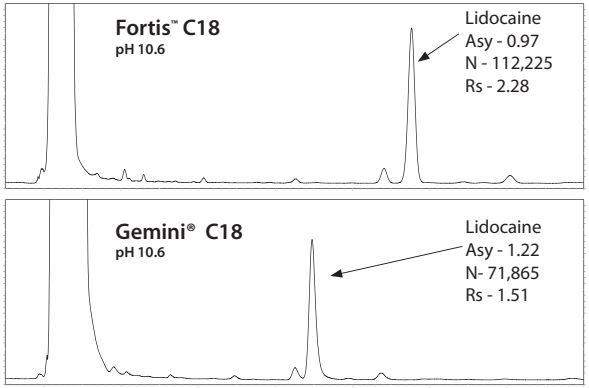


Extreme pH range

Fortis C18 has the ability to not only operate at low pH like other silica based phases, but also to operate at high pH like hybrid phases to aid with basic analyte retention and performance.

The ability to quickly equilibrate from formic acid or TFA into ammonia or bicarbonate aids in method development. Mass transfer, loadability and precision of a silica matrix are all maintained.

- **Higher Efficiency than Hybrids**
- **Excellent Reproducibility**
- **Retain Polar Basic Analytes**

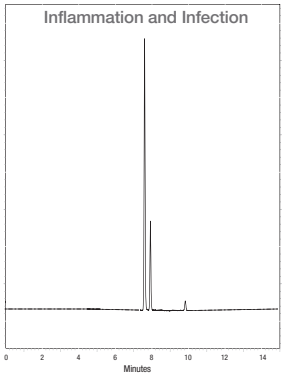


Columns: 150x4.6mm 3µ **Mobile Phase:** 50:50 0.1% NH_3 : MeCN **Flow:** 1.0ml/min **Temp:** 25°C **Wavelength:** 230nm

Extended operating pH range

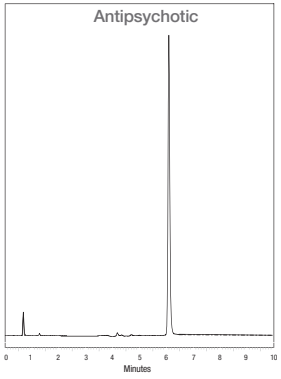
Column: Fortis C18 100x4.6mm 3µ
p/n: F18-050503
Mobile Phase: A - H_2O + 0.1% Formic acid
B - ACN + 0.1% Formic acid
Gradient: 10 - 50% in 10min
Flow: 1ml/min
Temp: 20°C
Wavelength: 254nm

1. Dexamethasone
2. Neomycin Sulphate
3. Acetic acid



Column: Fortis C18 50x4.6mm 5µ
p/n: F18-050305
Mobile Phase: A - 50mM NH_4OAc
B - ACN
Gradient: 10 - 40% in 10min
Flow: 1ml/min
Temp: 20°C
Wavelength: 254nm

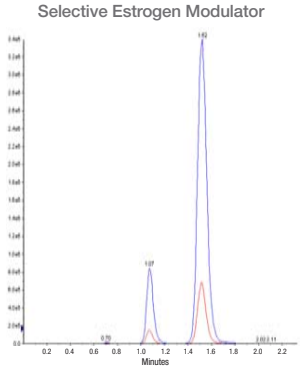
1. Quetiapine

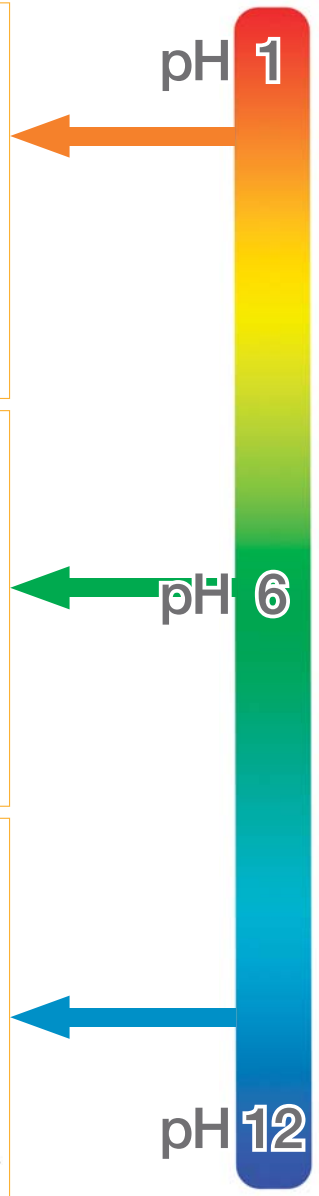


Column: Fortis C18 50x3.0mm 3µ
p/n: F18-030303
Mobile Phase: 30:70 H_2O + 10mM ammonium bicarbonate : MeOH
Flow: 0.4ml/min
Temp: 25°C
Wavelength: MS Detection

Raloxifene Glucuronides

Data Courtesy of : Pharmaceutical company, USA



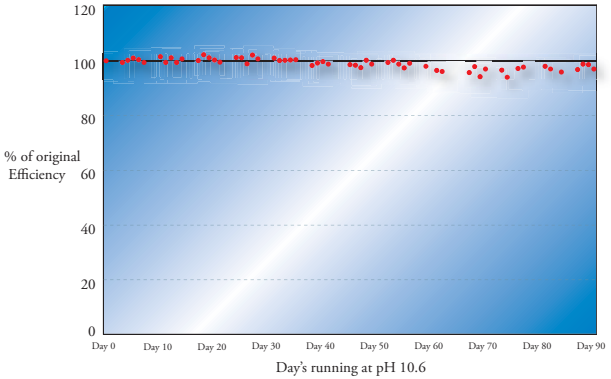


Fortis™ C18

High pH Stability

The unique bonding of Fortis C18 enables stability at extremes of pH to be maintained.

Run continuously in 0.1% ammonia Fortis C18 shows no deterioration in efficiency over a 90 day period.



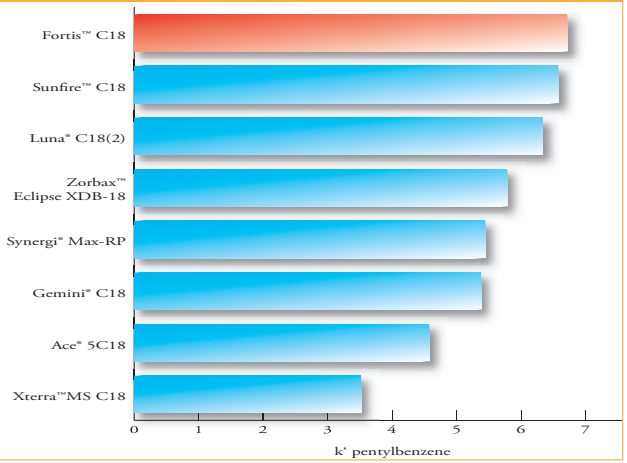
Advantages of Hydrophobicity

Fortis C18 high surface area combined with the optimised C18 ligand bonding provides high retention for compounds.
This is advantageous in a number of ways:

- Higher retention of analytes, more organic modifier can be used to elute, therefore greater MS sensitivity.

- Higher retention of analytes, more organic leads to shorter 'dry-down' in fraction collection.

- Higher retention of analytes, more chance of resolution



Fortis™ C18

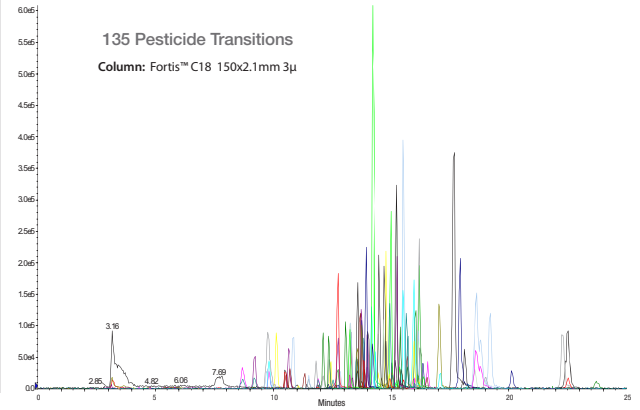
Optimised Resolution

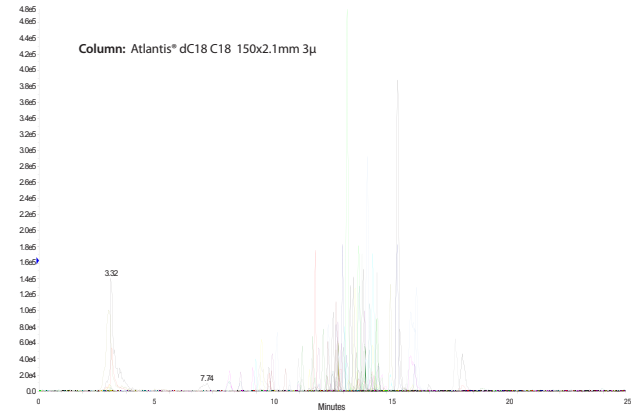
Only by optimising all factors of stationary phase design can the analyst be assured of the best possible chromatography.

Fortis C18's unique bonded character ensures that not only is reproducibility and robustness assured, but also that resolution is of the highest level. Only by obtaining sharp peak shapes for many analyte types both polar and non polar can this sort of resolution be achieved.

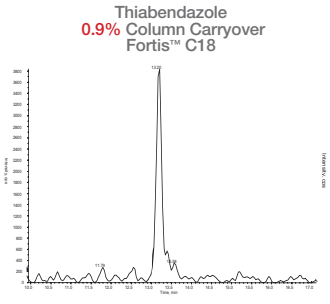
Analysed here are 135 transitions of pesticide residue from an apple matrix. Good LC resolution leads to excellent sensitivity in MS detection.

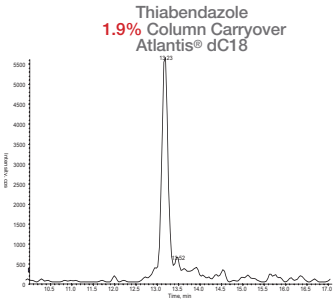
Polar organophosphates such as Acephate and Methamidophos are retained well due to the high surface area of the Fortis C18 phase.





Thiabendazole can be bound on the column from one gradient cycle to the next, the optimised hydrophobicity of Fortis C18 means that carryover on column is greatly reduced since there is no secondary silanol activity to bind with analytes.





Data Courtesy of : Central Science Laboratories, UK

Fortis™ C18

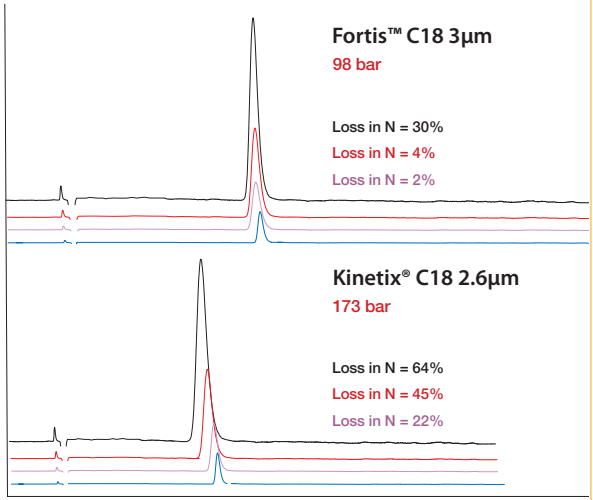
Analyte Loading

Based on a silica template Fortis C18 has high loading capability for those wishing either scale up to preparative separation or needing to load in order to correctly identity low level components.

Having a 380m2/g surface area means that the phase chemistry will not overload causing poor peak shapes. This can be especially important in biological work where a high concentration of matrix interference is also often present

Smaller surface area phases and solid-core-shell particles can suffer from lower loading capability and potentially higher backpressure.
Overload can be viewed as loss of efficiency and/or peak shape.

Column: 50x3.0mm
Mobile Phase: H_2O + 0.01% formic acid : ACN
Flow: 0.6ml/min
Temp: 30°C
Diphenhydramine 0.02, 0.2, 0.5 & 1mg/ml



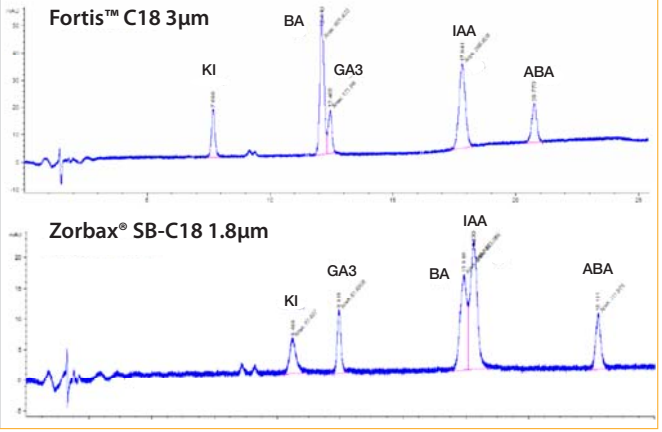
Loss in efficiency figures are in relation to 0.02mg/ml injection (Blue Trace).

Selectivity of C18 - Plant Hormones

All C18 chemistries are capable of providing different selectivity. Selectivity can be just as important as efficiency, here we see radically different peak shapes and resolution regardless of C18 particle size for some plant hormones.

Column: 50x2.1mm
Mobile Phase: A - H_2O + 0.01% formic acid
B - MeOH + 0.1% formic acid
Gradient: 10-40% in 30min
Flow:
Temp: 30°C
Wavelength: MS Detection

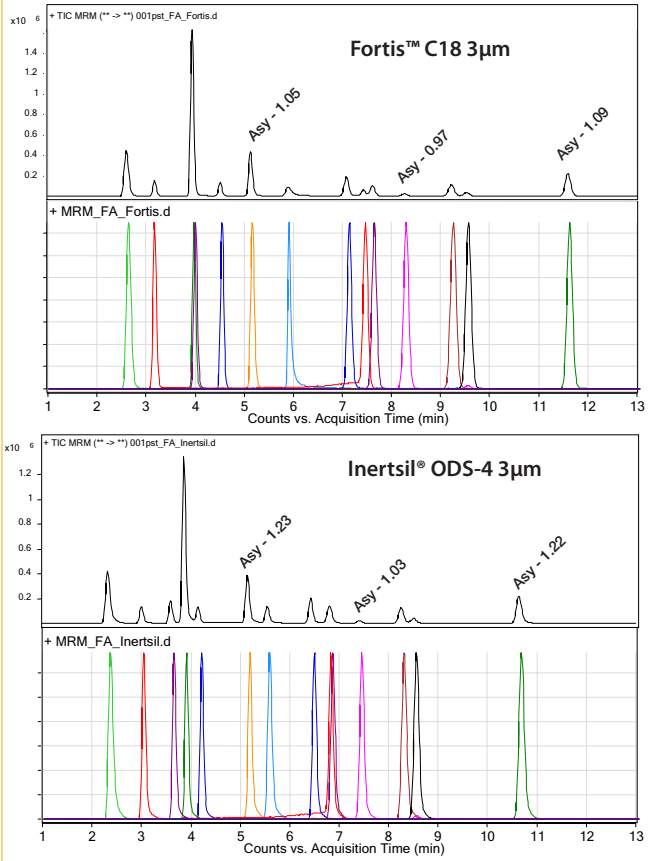
KI = Kinetin
BA = Benzyladenine
IAA = Indol-3-yl acetate
ABA = Abscisic acid
GA3 = Gibberellin acid



Data Courtesy of : Kings College, UK

Fortis™ C18

Selectivity and Peak Shape Comparison



Data Courtesy of : Major Pharmaceutical, Norway

Column: 100x2.1mm 3µ
Mobile Phase: A - H_2O + 0.1% formic acid
B - ACN
Gradient: 20-35%B in 2min
35-40% in 5min
40-50% in 3min
50-90% in 1min
Flow:
Temp: 30°C
Wavelength: MS Detection

1. Zopiclone
2. Diazepam
3. 7-Aminoflunitrazepam
4. Nitrazepam
5. Desmethyldiazepam
6. 7-Aminonitrazepam
7. 1-Hydroxy-midazolam
8. Midazolam
9. Clonazepam
10. Flunitrazepam
11. Alprazolam
12. Zolpidem
13. Oxazepam
14. 7-Aminoclonazepam

Fortis C18		Column Length			
		50	100	150	250
Column Diameter	2.1	F18-0203xx	F18-0205xx	F18-0207xx	-
	3.0	F18-0303xx	F18-0305xx	F18-0307xx	-
	4.6	F18-0503xx	F18-0505xx	F18-0507xx	F18-0509xx

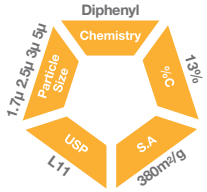
Replace xx -01 for 1.7µm - 02 for 2.5µm - 03 for 3µm - 05 for 5µm - 10 for 10µm

Fortis C18 Guards		Length
		10
Column Diameter	2.1	DC18-0200xxG
	4.6	DC18-0500xxG

Fortis™ Diphenyl

- **Unique Selectivity**
- **Separate Positional Isomers**
- **No "MS bleed", Stable Hydrophobic Ligand**
- **Enhanced Polar Retention**

Fortis Diphenyl is designed to provide characteristics which will enhance selectivity. It provides the analyst with extra retention of compounds containing aromatic functionality. Extra selectivity and retention can be found for polar substrates, along with metabolite profiling. Fortis Diphenyl is now available in 1.7µm particle size for UHPLC.

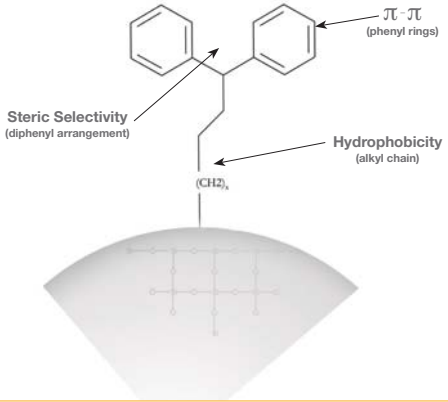


Unique Functionality

Fortis Diphenyl is based upon a unique di-phenyl functionality. Three controlled mechanisms of interaction can occur.

This allows for unique resolution of closely related species, and metabolites. No complex mobile phases are necessary simplifying method development.

- π-π **High Selectivity**
- **Resolution Enhanced**
- **Sharp Peak Shapes**
- **Highly Stable Diphenyl Ligand**

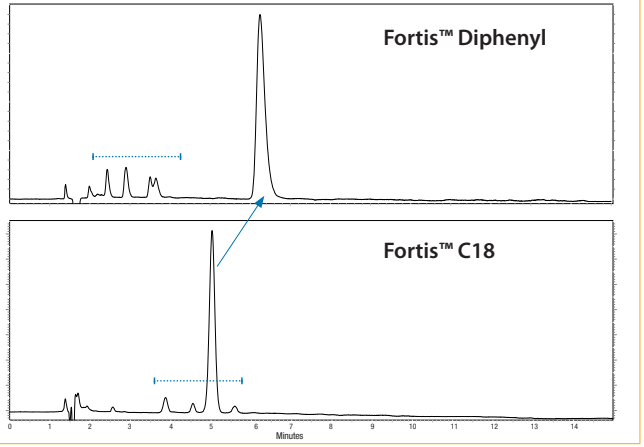


Diphenyl vs C18 Selectivity

Selectivity of the Fortis Diphenyl is radically different to that of a C18 stationary phase.

In this pharmaceutical mixture we can see an increase in retention of the parent drug, whilst the degradents are all eluted quickly, removing them from co-elution with the parent.

Selectivity such as this can be extremely useful, combined with the ability to separate closely related species such as metabolites and positional isomers.



Data Courtesy of : Major Pharmaceutical company, USA

Metabolite Profiling

Fortis Diphenyl's extended selectivity leads to its ability to discriminate between very closely related species, such as those often associated as metabolites or excipiants. The stationary phase's three modes of interaction allow subtle changes in positional spacing, loss or gain of an atom or functional group to be differentiated and separation to be achieved.

Separate Positional Isomers

Selectivity of compounds normally difficult to resolve on a hydrophobic alkyl chain stationary phase is simplified by the π-π interactions provided by the phenyl functionality.

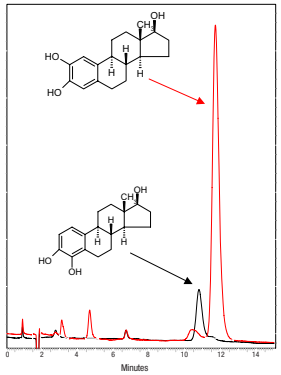
In this application two hydroxyestradiol steroids exhibit resolution from each other, which is not achievable on alkyl chain phases. No complex mobile phases are necessary.

- **Isomer Selectivity**
- **Metabolite Resolution**
- **Alternate Selectivity**

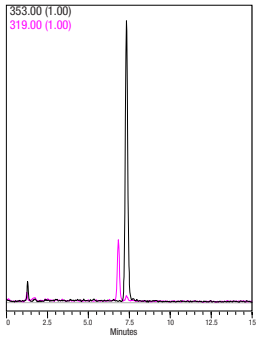
Column: Fortis Diphenyl 150x4.6mm 5µ
p/n: FPH-050705
Mobile Phase: 40:60 H_2O : MeOH

Flow: 1ml/min
Temp: 20°C
Wavelength: 210nm

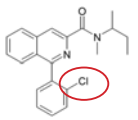
1. 4-Hydroxyestradiol (mw=288.38)
2. 2-Hydroxyestradiol (mw=288.38)



PET Tracer - PK11195



1. Dechlorinated PK11195
2. PK11195

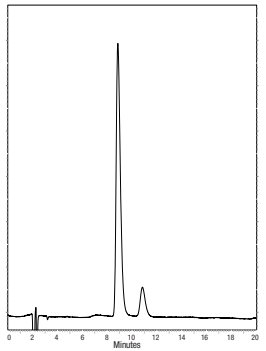


Column: Fortis Diphenyl 150x4.6mm 5µ
p/n: FPH-050705
Mobile Phase: 40 : 60 H_2O : ACN

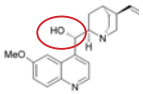
Flow: 1ml/min
Temp: 25°C
Wavelength: MS Detection

Data Courtesy of : Wolfson Molecular Imaging Centre

Antiarrhythmic



1. Quinidine
2. Dihydroquinidine



Column: Fortis Diphenyl 150x4.6mm 5µ
p/n: FPH-050705
Mobile Phase: 70 : 30 H_2O + 0.1% formic acid MeOH

Flow: 1ml/min
Temp: 25°C
Wavelength: 235nm

1.7µm Fortis Diphenyl page 7

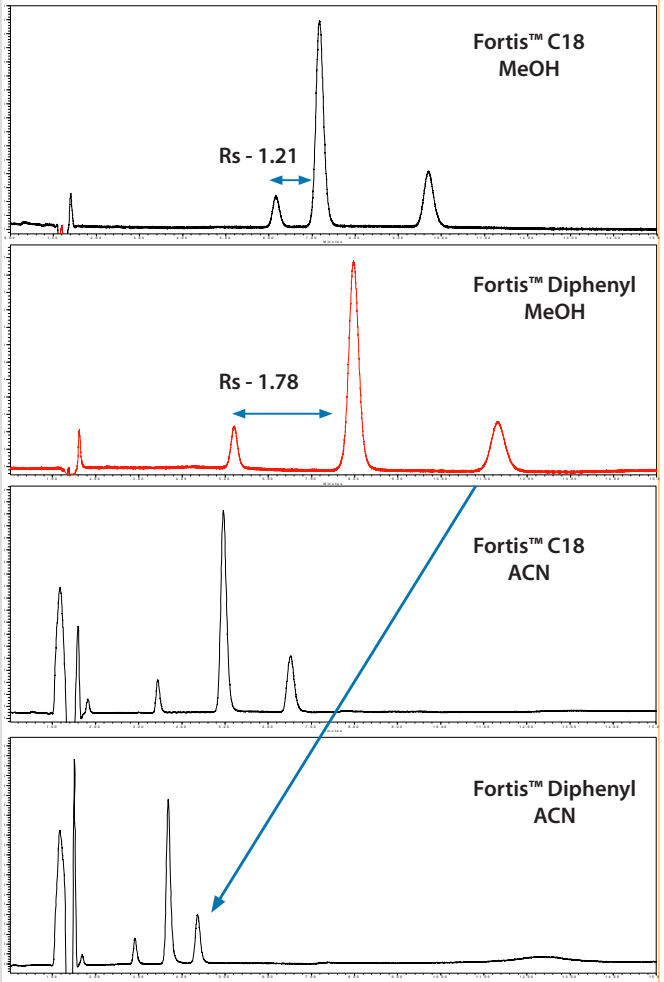
Fortis Diphenyl

Fortis™ Diphenyl

Effect of Mobile phase choice

Choice of mobile phase can be very important in a running a phenyl column. Whilst many people have standardised upon ACN as the organic modifier of choice, MeOH is a better choice in order to let the π-π interactions occur on the phenyl rings.
Using ACN can not only suppress retention but also selectivity.

It can be seen how maximum retention and resolution is obtained on Fortis Diphenyl in MeOH mobile phase, even greater than C18. Once the organic modifier is substituted for ACN not only is resolution reduced but also a large amount of retention is lost in relation to that lost on a C18.



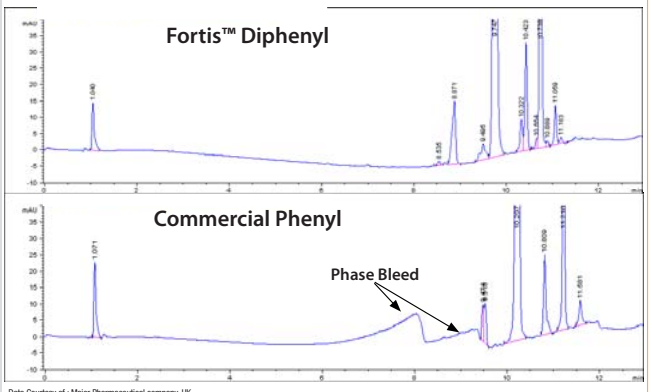
Fortis™ Diphenyl

Phenyl phase "bleed"

Due to the chemical nature of the charge on a phenyl ring, when placed in close proximity to a silica surface it does not tend to be a very stable bond.
As the phenyl ring contains a chromaphore, UV baselines could be seriously affected if the bonding is not stable.

Fortis Diphenyl is a more stable bonding process since the alkyl chain ligand removes the dipolar phenol/silica interactions.

- **No observable "MS-bleed"**
- **Clean baselines**
- **No sample contamination**



Data Courtesy of : Major Pharmaceutical company, UK

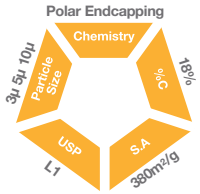
Fortis Diphenyl		Column Length			
		50	100	150	250
Column Diameter	2.1	FPH-0203xx	FPH-0205xx	FPH-0207xx	-
	3.0	FPH-0303xx	FPH-0305xx	FPH-0307xx	-
	4.6	FPH-0503xx	FPH-0505xx	FPH-0507xx	FPH-0509xx

Replace xx - 01 for 1.7µm - 02 for 2.5µm - 03 for 3µm - 05 for 5µm - 10 for 10µm

Fortis Diphenyl Guards		Length
		10
Column Diameter	2.1	DCPH-0200xxG
	4.6	DCPH-0500xxG

Fortis™ H2o

- **Retention of Polars by Polar Endcapping Group**
- **Enhanced Resolution**
- **100% Aqueous Compatible**
- **Fully Scalable**



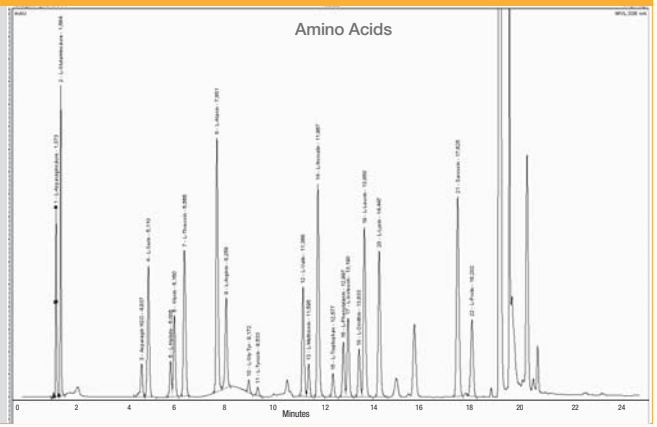
Fortis H2o is designed to aid in the separation and retention of polar analytes. Complex mobile phase systems can be bypassed if sufficient retention can be provided by the stationary phase chemistry. Fortis H2o is designed to supply additional interaction with polar molecules which allows their successful retention.

Retention of Polar analytes - Amino Acids

Column : Fortis H2o 150x2.1mm 5µ
p/n : FH0-020705

1. L-Aspartic acid
2. L-Glutamic acid
3. Asparagine
4. L-Serine
5. L-Histidine
6. Glycine
7. L-Threonine
8. L-Alanine
9. L-Arginine
10. L-Gly-Tyr
11. L-Tyrosin
12. L-Valine
13. L-Methionine
14. L-Norvalin
15. L-Tryptophan
16. L-Phenylalanine
17. L-Isoleucine
18. L-Ornithine
19. L-Leucine
20. L-Lysine
21. Sarcosin
22. L-Proline

Data Courtesy of : Major Pharmaceutical Company, Austria



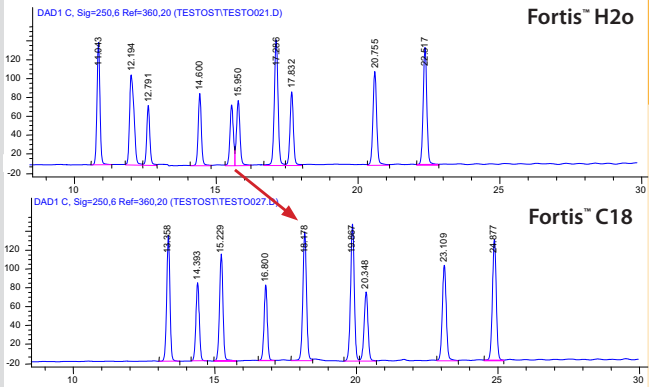
Alternative Selectivity - Steriods

Fortis H2o's unique bonded character ensures that not only is reproducibility and robustness assured, but also that resolution is of the highest level. Different selectivity can also be achieved from that of our Fortis C18 stationary phase.

Column: Fortis H2o 150x2.1mm 3µ
p/n: FH0-020703
Mobile Phase:

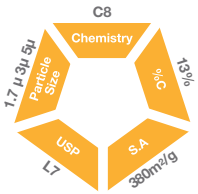
Flow: 0.2ml/min
Temp: 25°C
Wavelength: DAD 250

Data Courtesy of : AstraZeneca, UK



Fortis™ C8

- **Reduced Hydrophobicity over C18**
- **Excellent Peak Shapes**
- **Fully Scalable**



Fortis C8 is designed to provide characteristics similar to Fortis C18 but specifically for situations where less hydrophobicity is required. The same gains in peak shape, efficiency, resolution and scaleability are available providing increased productivity to the analyst.

Optimised Peak Shape

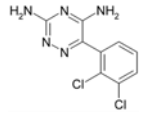
Fortis C8 is optimised to provide the best possible peak shapes and efficiency.

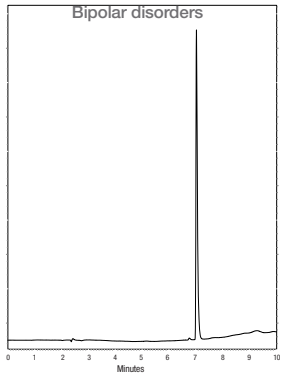
Basic, Acidic and Neutral analyte performance is first class.

- **Higher Efficiencies**
- **Greater Reproducibility**
- **Symmetrical peak shapes**
- **Lower Hydrophobicity**

Column: Fortis C8 150x4.6mm 5µ
p/n: F08-050705
Mobile Phase: A - H_2O + 0.1% Formic acid
B - MeOH + 0.1% Formic acid
Gradient: 10 - 90% in 10min
Flow: 1ml/min
Temp: 25°C
Wavelength: 254nm

1. Lamotrigine



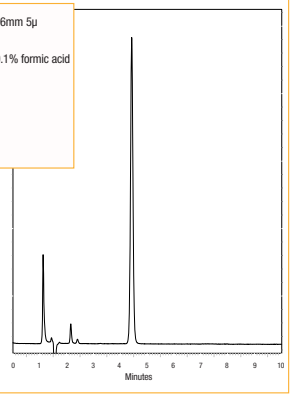


Anticonvulsant

Column: Fortis C8 150x4.6mm 5µ
p/n: F08-050705
Mobile Phase: 40 : 60 H_2O + 0.1% formic acid ACN

Flow: 1ml/min
Temp: 25°C
Wavelength: 220nm

1. Valproate Semisodium

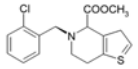


Antiplatelet

Column: Fortis C8 150x4.6mm 5µ
p/n: F08-050705
Mobile Phase: 25 : 75 H_2O : ACN

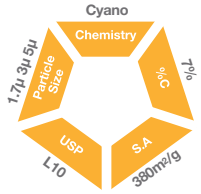
Flow: 1ml/min
Temp: 25°C
Wavelength: 254nm

1. Clopidogrel



Fortis™ Cyano

- **Retention of Polars**
- **Alternative Selectivity**
- **Normal Phase or Reverse Phase system**
- **Rapid Equilibration**



Fortis Cyano allows the use of aqueous reversed phase conditions to provide less retention for compounds too heavily retained on C18 functionality. However, it can also be used in normal phase solvent systems to retain and separate polar analyte species.
Cyano columns are particularly useful for polar species. Fortis Cyano is now also available in 1.7µm particle size for UHPLC work.

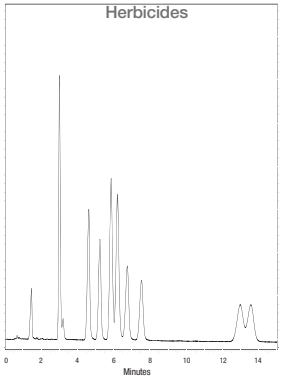
Herbicides

Fortis Cyano is optimised not only to help retain and resolve polar analytes, but also to be complimentary in resolution to other Fortis phases.

- **Normal phase as well as Reversed phase use**
- **Alternative Selectivity**
- **Rapid Equilibration**

Column : Fortis Cyano 50x2.1mm 3µ
p/n : FCN-020303
Mobile Phase: 80:20 H_2O : ACN + 0.2% Acetic acid
Flow : 0.2ml/min
Temp : 20°C
Wavelength: 280nm

1. Banvel
2. Internal Std
3. 2,4-D
4. MCPA
5. PCOC
6. 2,4-DCP
7. 2,4-DP
8. CMPP
9. 2,4-DB
10. MCPB



To see more applications on Fortis Cyano turn to page 37. To learn more about Fortis Cyano 1.7µm see page 7.

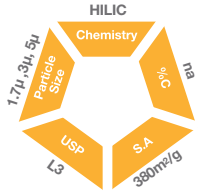
Fortis Cyano		Column Length			
		50	100	150	250
Column Diameter	2.1	FCN-0203xx	FCN-0205xx	FCN-0207xx	-
	3.0	FCN-0303xx	FCN-0305xx	FCN-0307xx	-
	4.6	FCN-0503xx	FCN-0505xx	FCN-0507xx	F18-0509xx

Replace xx - 01 for 1.7µm - 03 for 3µm - 05 for 5µm

Fortis Cyano Guards		Length
		10
Column Diameter	2.1	DCCN-0200xxG
	4.6	DCCN-0500xxG

Fortis™ HILIC

- **Retention of Polar Compounds**
- **Increased MS Sensitivity**
- **Alternate Selectivity**
- **Reduced Extraction (SPE) and Dry Down Times.**

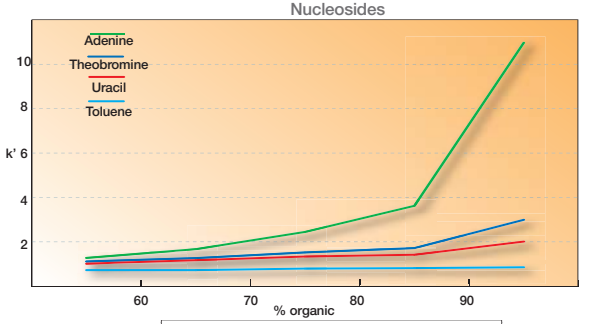


Fortis HILIC (Hydrophilic Interaction Chromatography) is designed to aid in the separation and retention of very polar analytes. Extended retention is afforded by the partitioning, ion-exchange and hydrogen bonding that can occur on a HILIC stationary phase. Fortis HILIC can increase sensitivity in MS analysis and provide alternate selectivity to that achieved with reversed phase C18. Fortis HILIC is now also available in 1.7µm particle size for UHPLC work.

Polar retention in HILIC mode

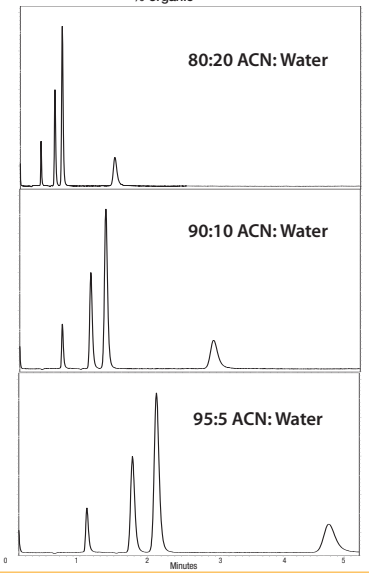
Fortis HILIC is optimised to help retain and resolve polar analytes. By use of high concentrations of organic solvent polar analytes partition with the stationary phase.

- **Polar Retention**
- **Alternative Selectivity**
- **Rapid Equilibration**



Hydrophilic Interaction Chromatography (HILIC) works in a similar way to normal phase chromatography. A polar surface combined with a non-polar mobile phase, typically ACN, allows for partition of the polar analytes and hence retention and separation. Water is used in low concentration as the strong solvent in order to elute the compounds.

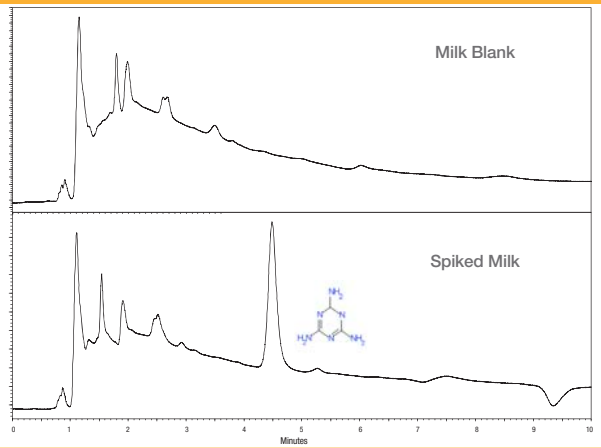
Usually no more than 20%-30% water is needed in order to elute most analyte species.



Melamine Contamination

Melamine has been adulterated into many products, but most importantly into baby milk in order to increase the apparent protein content. Due to its highly polar organic nature, 1,3,5-Triazine structure, it can be very difficult to retain in HPLC. HILIC provides a simple method in order to quickly quantitate melamine.

Column : Fortis HILIC 100x2.1mm 3µ
p/n : FHI-020503
Mobile Phase: 90:10 ACN : 20mM NH_3OAc
Flow : 0.2ml/min
Temp : 20°C
Wavelength: 210nm

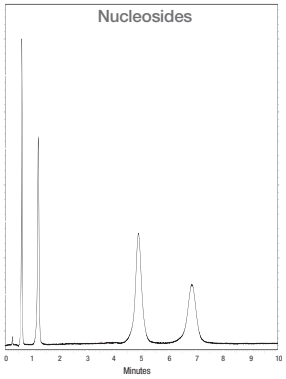


Nucleosides

Nucleosides are typically difficult to retain due to the ribose or deoxyribose sugar that forms part of their structure. Fortis HILIC provides a good tool to retain and separate these polar analytes in simple mobile phase conditions.

Column : Fortis HILIC 50x4.6mm 5µ
p/n : FHI-050305
Mobile Phase: 95:5 ACN : 100mM NH_3OAc
Flow : 1ml/min
Temp : 20°C
Wavelength: 254nm

1. Uracil
2. Uridine
3. Cytosine
4. Guanosine



Fortis HILIC		Column Length			
		50	100	150	250
Column Diameter	2.1	FHI-0203xx	FHI-0205xx	FHI-0207xx	-
	3.0	FHI-0303xx	FHI-0305xx	FHI-0307xx	-
	4.6	FHI-0503xx	FHI-0505xx	FHI-0507xx	FHI-0509xx

Replace xx - 01 for 1.7µm - 03 for 3µm - 05 for 5µm - 10 for 10µm

Fortis HILIC Guards		Length
		10
Column Diameter	2.1	DCHI-0200xxG
	4.6	DCHI-0500xxG

Fortis Pace™

- **LC/MS Optimised Column Hardware**
- **20mm and 30mm Column Lengths**
- **High Throughput**
- **High Efficiency and Resolution**

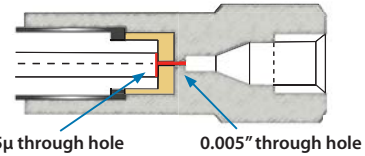
Fortis Pace™ columns are designed with High Throughput Screening (HTS) applications in mind. Optimised for use in LC/MS to provide greatest sensitivity by achieving sharp peak shapes combined with excellent resolution and retention. Any Fortis stationary phase and particle sizes can be supplied in this hardware.

Optimised Hardware

Fortis Pace column hardware is specifically designed for HTS, whether isocratic or by ballistic gradients.
Optimised packing density in this low volume hardware leads to ultra sharp peak shapes combined with maximum efficiency.

By combining a low volume flow path with an optimised frit Fortis PACE columns provide improved efficiency, Asymmetry and pressure.

- **Reduced peak widths**
- **Higher Efficiency**
- **Eliminated dead volume**



Hardware Comparison			
	plates/m	Sym	Bar
Standard Hardware	93,100	1.173	48
PACE™ Hardware	100,176	1.113	38
% Change	+7.6%	-5.4%	-21%

Complimentary Stationary Phases

Fortis stationary phases have been proven to exhibit excellent peak shapes and efficiency, packed in Pace hardware allows speed and resolution to be achieved without the need for UHPLC systems.

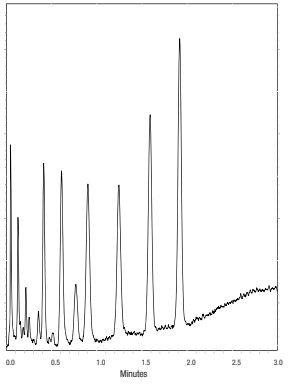
Providing highly retentive and selective phases allows strong retention properties, enabling high concentrations of organic modifier to be utilised optimising the MS ionisation process.

Gains are also made in:

- **Reduced analysis time**
- **Increased productivity**
- **Lower solvent consumption**

Column: Fortis Pace C18 30x2.1mm 5µ
p/n: F18-020205
Mobile Phase: A - H_2O + 0.1% Formic acid
B - ACN + 0.1% Formic acid
Gradient: 60 - 90% in 2min
Flow: 1ml/min
Temp: 25°C
Wavelength: 254nm

1. Uracil
2. Benzene
3. Ethylbenzene
4. Propylbenzene
5. Butylbenzene
6. Pentylbenzene
7. Hexylbenzene
8. Heptylbenzene



Fortis™ Prep

- **5µm and 10µm particles**
- **High Loadability**
- **Optimised Packing Efficiency**
- **Narrow peak profile, High Efficiency and Resolution**

Fortis Prep columns are designed for high sample loading, high throughput applications. The optimised packed bed (OPB) process ensures excellent peak shapes and efficiency, whilst the lifetime of the column is increased.

Columns & Bulk

Fortis Prep columns come in sizes from 30mm to 250mm in length and from 10mm in diameter all the way up to 50mm (2" i.d.).
Pre-packed columns are advised for < 2" i.d. after this Bulk material can be supplied for those wishing to pack DAC (Dynamic Axial Compression) columns.

If preparative columns are packed with the identical media to their analytical counterpart then the ability to scale up with the theoretical calculations will be accurate.

- 10mm, 21.2mm and 30mm i.d.
- 5µm and 10µm particles
- 100g to multi Kg bulk available

Contact us for more information on availability of prep options/bulk packings, or to discuss your application and the ability to scale up. Our technical experts will be happy to discuss your needs with you.

Filter & Guard Options

- **Guard system for all 3µm, 5µm and 10µm phases**
- **Low volume in-line filters for LC and UHPLC**
- **Maintain chromatographic integrity**

Fortis Guards and filters are designed to ensure that erroneous materials do not find there way onto the more important and expensive analytical column. Guards are available in sizes to match all analytical and preparative column dimensions. Filters are particularly suitable for short fast LC/MS (Pace™) columns and UHPLC columns.

- **Direct connect guard system for all 3µm, 5µm and 10µm phases**
- **Quick replacement cartridges**
- **Highly Cost Effective**

- **Preparative guard system 10mm & 21.2mm**
- **Quick replacement cartridges**
- **Highly Cost Effective**
- **Reduced volume coupler available**

- **In-line Filter for all LC columns**
- **Low volume in-line filters**
- **Change over time is seconds not minutes**

Fortis in-line filters are fingertight direct connect design, fitting in between the column and the conventional peek fitting to filter out particulate matter, it contains low dead volume and pressure. In-line filters are ideal for very short fast columns such as Fortis Pace™ LC/MS columns where extra packed bed from a guard would be detrimental.
In-line filters are also available in UHPLC format, capable of withstanding the elevated pressures involved.

- **Filter for all UHPLC columns**
- **No backpressure increase**
- **Increase lifetime of UHPLC columns**
- **Low volume in-line filter**
- **Change over time is seconds not minutes**

In-line Filters	
2-SAV5	2µm In-line filter pk 5
2-SAV10	2µm In-line filter pk 10
UHPSAV2	UHPLC In-line filter pk 2
UHPSAV4	UHPLC In-line filter pk 4

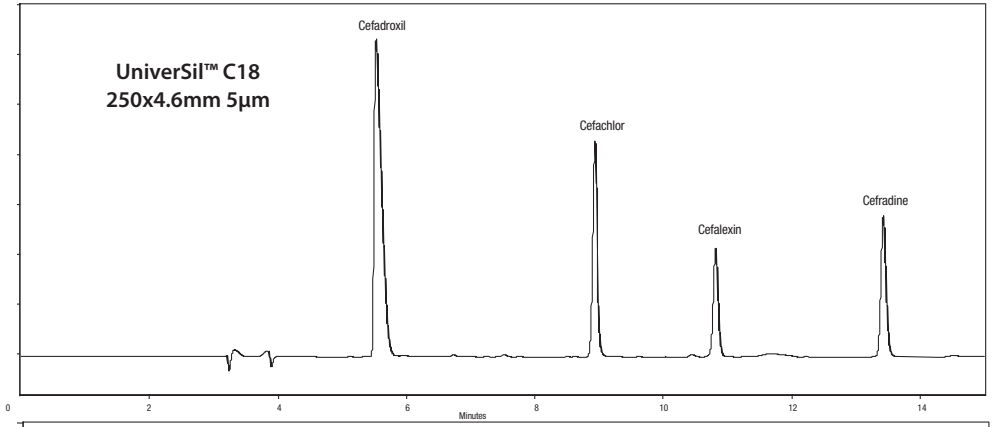
Surface Area - **175m²/g**

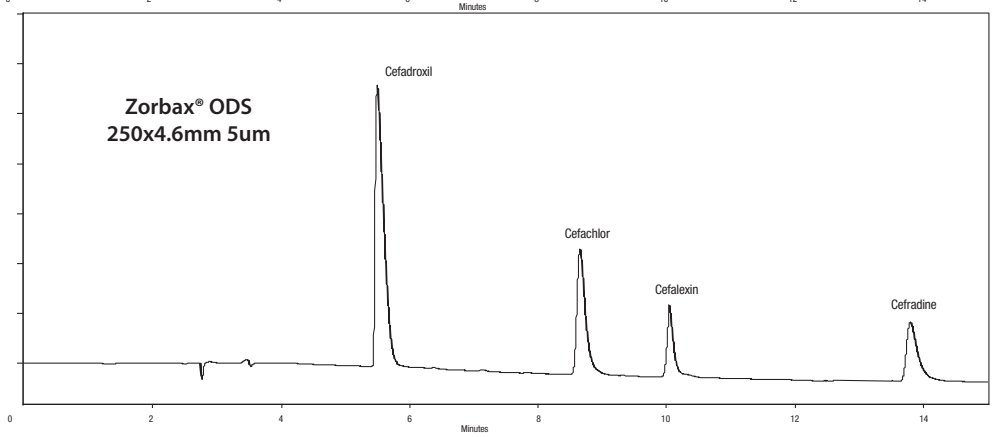
Pore Size - **140Å**

% Carbon - **11%C**

UniverSil HPLC columns are a suitable economical alternative to many of the older brands on the marketplace from Alltech, Macherey-Nagel, Hypersil and Waters. Many of the phases have very similar physical characteristics meaning that UniverSil will provide similar selectivity and resolution as your current chromatography. Use UniverSil to upgrade your method in terms of peak shape, robustness and reproducibility, or just to provide a economical back-up to your current column. UniverSil silica is a new Type B silica meaning improved peak shape and improved lifetime.

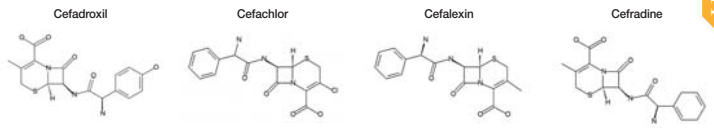
UniverSil™ C18 is an alternative to:		
Alltech® ODS2	Alltech	220m²/g
Alltech® Exsil® C18	Alltech	220m²/g
Hypersil® ODS	Thermo Electron	170m²/g
Hypersil® BDS	Thermo Electron	170m²/g
Nucleosil® 120 C18	Macherey-Nagel	200m²/g
Pinnacle® C18	Restek	170m²/g
Spherisorb® ODS1	Waters	200m²/g
Spherisorb® ODS2	Waters	200m²/g
Supelcosil® LC18	Supelco	170m²/g
Ultrasphere® C18	Beckman	200m²/g
YMC® ODS-A	YMC	170m²/g
Zorbax® Rx-C18	Agilent	180m²/g





Column: UniverSil™ C18 250x4.6mm 5µ
p/n: U18-050905
Mobile Phase: A: Phosphate pH3
B: ACN

Flow: 1.0ml/min
Temp: 25°C
Wavelength: 254nm



UniverSil™ C18		Column Length			
		50	100	150	250
Column Diameter	2.1	U18-0203xx	U18-0205xx	U18-0207xx	-
	3.0	U18-0303xx	U18-0305xx	U18-0307xx	-
	4.6	U18-0503xx	U18-0505xx	U18-0507xx	U18-0509xx

Replace xx - 03 for 3µm - 05 for 5µm

UniverSil C18 Guards		Length
		10
Column Diameter	2.1	DCU18-0200xxG
	4.6	DCU18-0500xxG

UniverSil™ HS C18

Surface Area - **325m²/g**

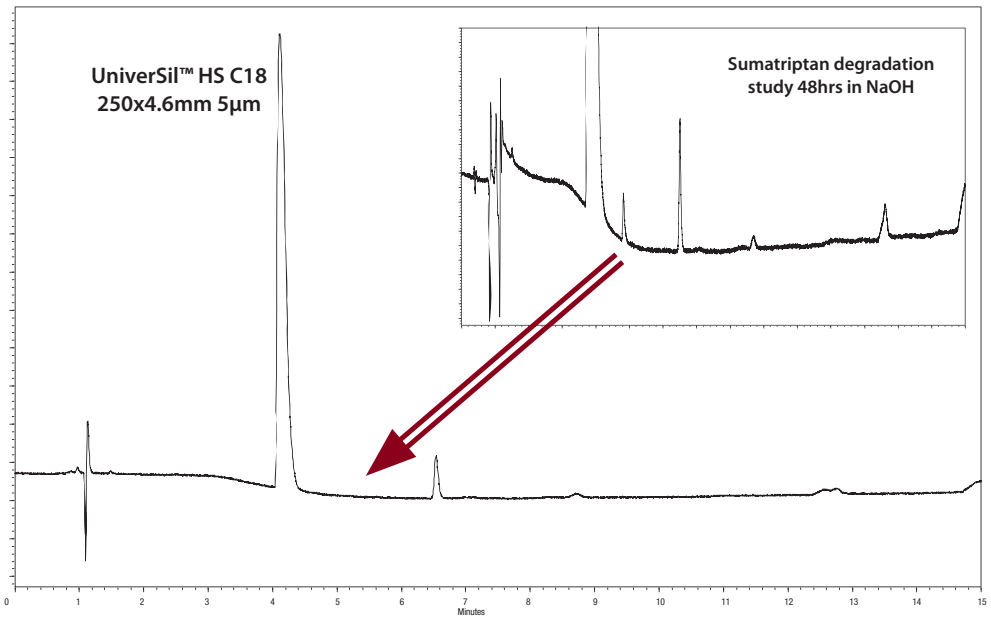
Pore Size - **100Å**

% Carbon - **16%C**

UniverSil HPLC columns are a suitable economical alternative to many of the older brands on the marketplace from Kromasil, Macherey Nagel, Hypersil and Merck. Many of the phases have very similar physical characteristics meaning that UniverSil will provide similar selectivity and resolution as your current chromatography. Use UniverSil to upgrade your method in terms of peak shape, robustness and reproducibility, or just to provide a economical back-up to your current column. UniverSil silica is a new Type B silica meaning improved peak shape and improved lifetime.

UniverSil™ HS C18 is an alternative to:		
Alltech® Alltima	Alltech	300m²/g
Betasil® C18	Thermo Electron	300m²/g
Cosmosil® 18	Nacalai Tesque	330m²/g
Genesis® ODS	Jones	300m²/g
Hypersil® HS	Thermo Electron	300m²/g
Inertsil® ODS2	GL Sciences	320m²/g
Kromasil® C18	Akzo Nobel	340m²/g
Lichrosphere® RP18	Merck	350m²/g
Nucleosil® 100 C18	Macherey Nagel	350m²/g
Symmetry® C18	Waters	335m²/g
YMC® Pack ODS AL	YMC	300m²/g
Zorbax® C18	Agilent	300m²/g

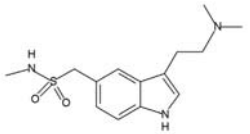
Sumatriptan



Column: UniverSil™ HS C18 250x4.6mm 5µ
p/n: UHS18-050905
Mobile Phase:

Flow: 1.0ml/min
Temp: 25°C
Wavelength: 254nm

Sumatriptan



UniverSil™ HS C18		Column Length			
		50	100	150	250
Column Diameter	2.1	UHS18-0203xx	UHS18-0205xx	UHS18-0207xx	-
	3.0	UHS18-0303xx	UHS18-0305xx	UHS18-0307xx	-
	4.6	UHS18-0503xx	UHS18-0505xx	UHS18-0507xx	UHS18-0509xx

Replace xx - 03 for 3µm - 05 for 5µm

UniverSil HS C18 Guards		Length
		10
Column Diameter	2.1	DCUHS18-0200xxG
	4.6	DCUHS18-0500xxG

Column Reproducibility

- **Robust Column Bondings**
- **Assured Peak Shapes**
- **20% Lower Asymmetry Specification**
- **10% Higher Efficiency**

Fortis HPLC columns are tested using the industries most rigorous QC test, utilising basic analyte probes as well as neutral efficiency markers ensures that the column reproducibility is first class. Fortis columns are also subject to a 20% lower peak shape specification than other manufacturers columns.

QC Test

Fortis stationary phases have been proven to exhibit excellent peak shapes and efficiency for the full range of analyte species.

By employing a QC mix that accurately probes silanol activity (the measure of good peak shape) the analyst can be assured of quality time and time again.

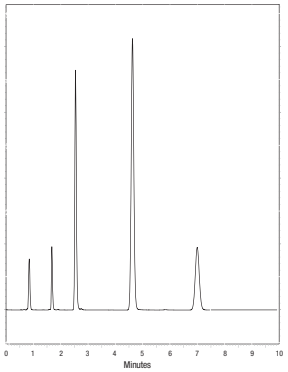
Gains are also made in:

- **Sample carry over**
- **Increased Resolution**
- **Increased Sensitivity**

Column: Fortis C18 100x4.6mm 5µ
p/n: F18-050505
Mobile Phase: 60:40 ACN:H_2O

Flow: 1.0ml/min
Temp: 25°C
Wavelength: 254nm

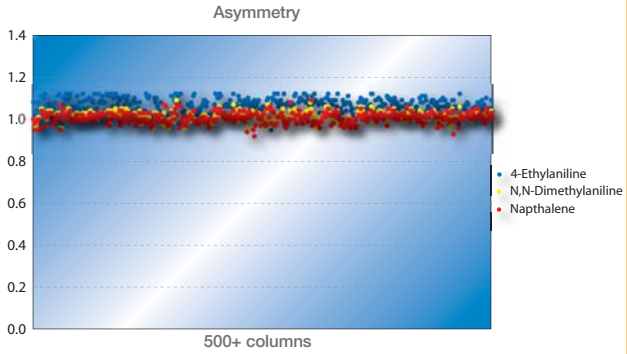
1. Uracil
2. Phenol
3. 4-Ethylaniline
4. N,N-Dimethylaniline
5. Napthalene



Column Reproducibility

Fortis columns are subject to tight specification using basic analytes in an unbuffered mobile phase system.
If there were residual uncovered hydroxyl groups present then these basic probes would highlight this fact.

Fortis Technologies unique bondings combined with the ultra pure silica matrix ensure that the peak shapes achieved are first class.



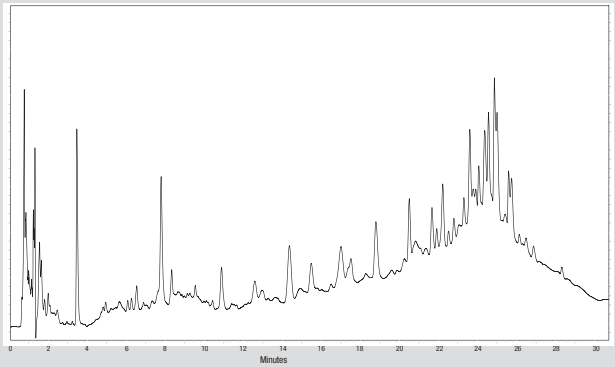
Applications

Casein Tryptic Digest

Column: 1.7µm Fortis C18 100x2.1mm
p/n: F18-020501
Mobile Phase: A - H_2O + 0.1% Formic acid
B - ACN + 0.1% Formic acid
Gradient: 0min 5% B
5min 5% B
30min 20% B
35min 50% B

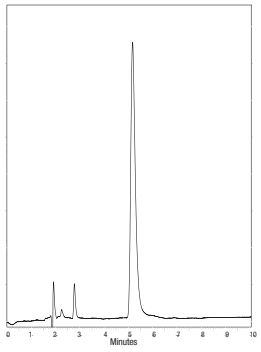
Flow: 0.25 ml/min
Temp: 35°C
Wavelength: 200nm

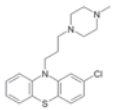
1. Casein



Antipsychotic

1. Prochlorperazine Maleate

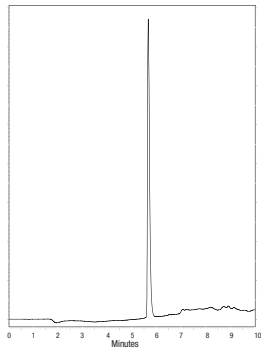


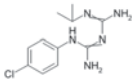


Column: Fortis Diphenyl 150x4.6mm 5µ
p/n: FPH-050705
Mobile Phase: 35:65 H_2O + 0.1% Formic acid
: MeOH
Flow: 1ml/min
Temp: 25°C
Wavelength: 254nm

Antimalarial

1. Proguanil

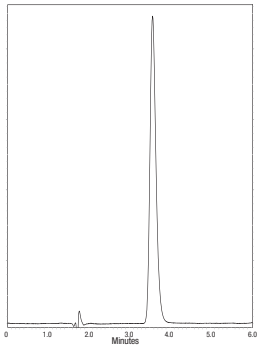




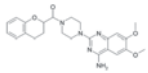
Column: Fortis Diphenyl 50x4.6mm 5µ
p/n: FPH-050305
Mobile Phase: A: H_2O + 0.1% formic acid
B: MeOH + 0.1% formic acid
Gradient: 10 - 90% in 10mins
Flow: 1ml/min
Temp: 25°C
Wavelength: 254nm

Applications

Adrenergic alpha-antagonist

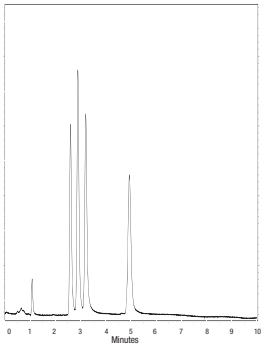


1. Doxazosin

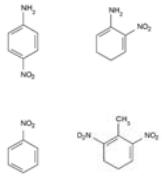


Column:	Fortis Diphenyl 150x4.6mm 5µ
p/n:	FPH-050705
Mobile Phase:	30:60 H_2O + 0.1% Formic acid : MeOH
Flow:	1ml/min
Temp:	25°C
Wavelength:	254nm

Explosives

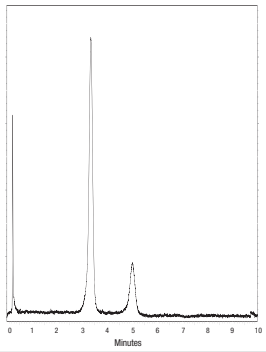


1. 4-Nitroaniline
2. 2-Nitroaniline
3. Nitrobenzene
4. 2,6-Dinitrotoluene

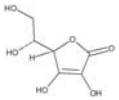


Column:	Fortis Cyano 50x2.1mm 3µ
p/n:	FCN-020303
Mobile Phase:	A: 80:20 H_2O : MeOH B: ACN 90 : 10 Isocratic
Flow:	0.2ml/min
Temp:	Ambient
Wavelength:	254nm

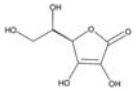
Stereoisomers



1. Isoascorbic acid

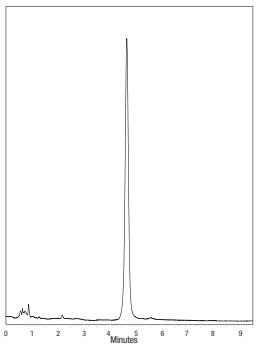


2. Ascorbic acid

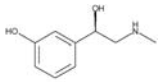


Column:	Fortis HILIC 50x4.6mm 5µ
p/n:	FHI-050305
Mobile Phase:	90 : 10 ACN : NH_3OAc
Flow:	1ml/min
Temp:	25°C
Wavelength:	254nm

Decongestant



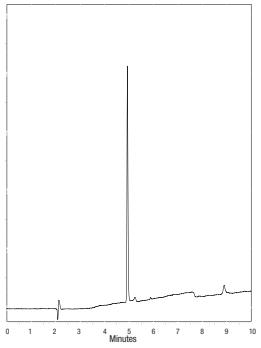
1. Phenylephrine



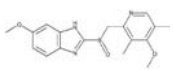
Column:	Fortis C18 100x4.6mm 3µ
p/n:	F18-050503
Mobile Phase:	90 : 10 H_2O : MeOH + 0.1% NH_3
Flow:	1.2ml/min
Temp:	25°C
Wavelength:	210nm

Applications

Proton Pump Inhibitor

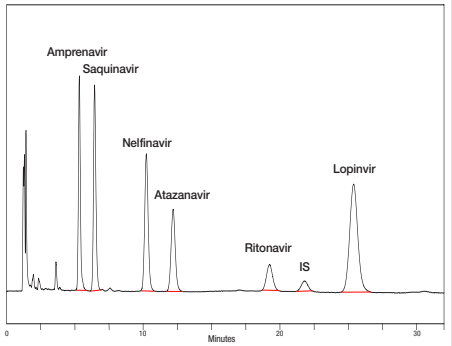


1. Omeprazole



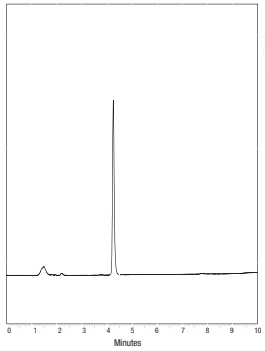
Column:	Fortis C18 100x4.6mm 3µ
p/n:	F18-050503
Mobile Phase:	A: H_2O + 0.1% Formic acid B: ACN + 0.1% Formic acid
Gradient:	10 - 100% in 10mins
Flow:	1.0ml/min
Temp:	25°C
Wavelength:	254nm

Antiretroviral - HIV

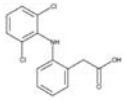


Column:	Fortis C18 150x4.6mm 5µ
p/n:	F18-050705
Mobile Phase:	A: H_2O + Buffer B: MeOH + ACN
Flow:	1.0ml/min
Temp:	25°C
Wavelength:	215nm

Non Steroid Anti-Inflammatory

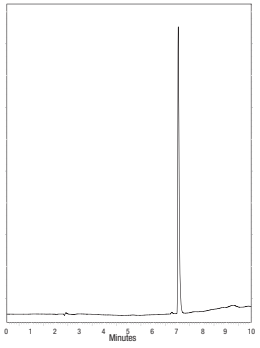


1. Diclofenac Sodium

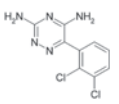


Column:	Fortis C18 100x4.6mm 5µ
p/n:	F18-050505
Mobile Phase:	A: H_2O + 0.1% Formic acid B: ACN + 0.1% Formic acid
Gradient:	50 - 100% in 10mins
Flow:	1.0ml/min
Temp:	Ambient
Wavelength:	254nm

Anticonvulsant



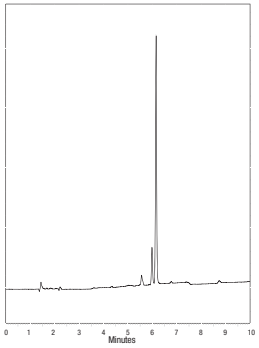
1. Lamotrigine



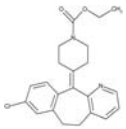
Column:	Fortis C8 150x4.6mm 5µ
p/n:	F08-050705
Mobile Phase:	A: H_2O + 0.1% formic acid B: MeOH + 0.1% formic acid
Gradient:	10 - 90% in 10mins
Flow:	1.0ml/min
Temp:	25°C
Wavelength:	254nm

Applications

Antihistamine

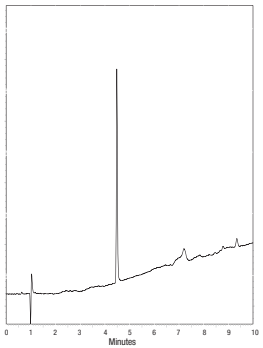


1. Loratadine

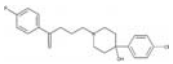


Column:	Fortis C18 100x4.6mm 5µ
p/n:	F18-050505
Mobile Phase:	A: H_2O + 0.1% Formic acid B: ACN + 0.1% Formic acid
Gradient:	10 - 100% in 10mins
Flow:	1.0ml/min
Temp:	22°C
Wavelength:	254nm

Antipsychotic

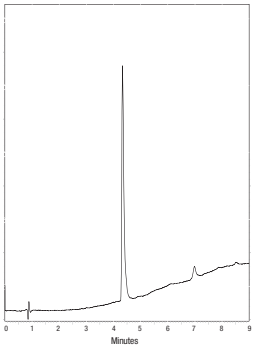


1. Haloperidol

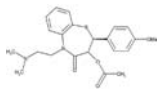


Column:	Fortis C18 50x4.6mm 5µ
p/n:	F18-050305
Mobile Phase:	A: H_2O + 0.1% formic acid B: ACN + 0.1% formic acid
Gradient:	10 - 100% in 5mins
Flow:	1.0ml/min
Temp:	25°C
Wavelength:	254nm

Hypertension

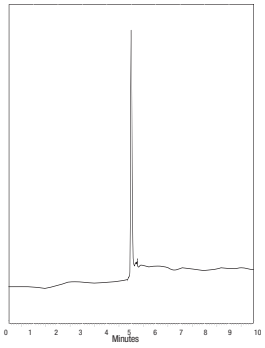


1. Diltiazem

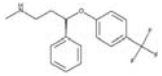


Column:	Fortis H2o 50x4.6mm 5µ
p/n:	FH0-050305
Mobile Phase:	A: H_2O + 0.1% formic acid B: ACN + 0.1% formic acid
Gradient:	10 - 100% in 10mins
Flow:	1.0ml/min
Temp:	25°C
Wavelength:	254nm

Antidepressant



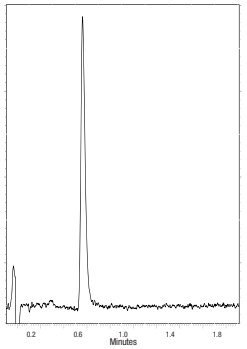
1. Fluoxetine



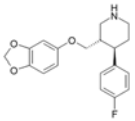
Column:	Fortis C18 50x4.6mm 3µ
p/n:	F18-050303
Mobile Phase:	A: H_2O + 0.1% formic acid B: ACN + 0.1% formic acid
Gradient:	10 - 100% in 10mins
Flow:	1.0ml/min
Temp:	20°C
Wavelength:	254nm

Applications

SSRI Antidepressant

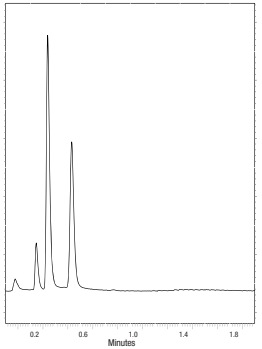


1. Paroxetine

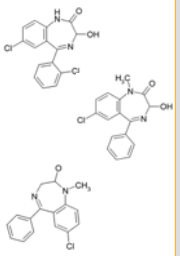


Column:	Fortis Pace H2o 30x2.1mm 3µ
p/n:	FH0-020203
Mobile Phase:	70:30 H_2O : ACN + 0.1% Formic acid
Flow:	0.6ml/min
Temp:	25°C
Wavelength:	200nm

Benzodiazepines

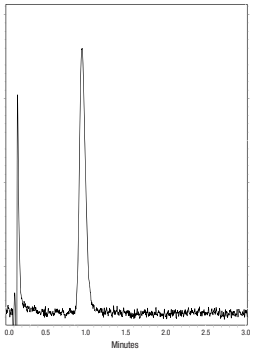


1. Lorazepam
2. Temazepam
3. Diazepam

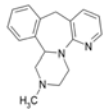


Column:	Fortis Pace H2o 30x2.1mm 3µ
p/n:	FH0-020203
Mobile Phase:	50:50 ACN : H_2O
Flow:	0.7ml/min
Temp:	25°C
Wavelength:	220nm

Antidepressant

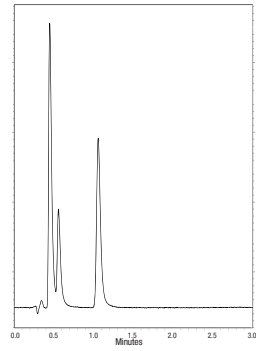


1. Mirtazapine

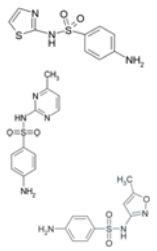


Column:	Fortis Pace C18 30x2.1mm 5µ
p/n:	F18-020205
Mobile Phase:	80:20 H_2O : MeOH + 0.1% Formic acid
Flow:	0.7ml/min
Temp:	25°C
Wavelength:	254nm

Sulfa Drugs



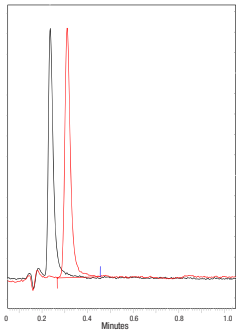
1. Sulfathiazole
2. Sulfamerazine
3. Sulfamethoxazole



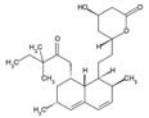
Column:	Fortis Pace H2o 30x2.1mm 3µ
p/n:	FH0-020203
Mobile Phase:	70:30 H_2O : ACN + 0.1% Formic acid
Flow:	0.2ml/min
Temp:	25°C
Wavelength:	254nm

Applications

Statins



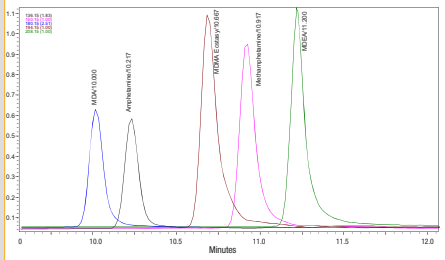
1. Rosuvastatin
2. Atorvastatin



Column: Fortis Pace C18 30x2.1mm 5µ
p/n: F18-020205
Mobile Phase: 75:25 H_2O:ACN + 0.1% Formic acid

Flow: 0.4ml/min
Temp: 25°C
Wavelength: 254nm

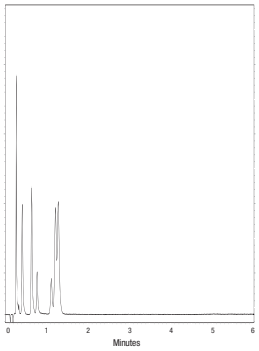
Drugs of Abuse



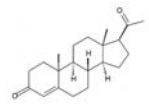
1. MDA (3,4-Methylenedioxyamphetamine)
2. Amphetamine
3. MDMA (Ecstasy)
4. Methaphetamine
5. MDEA (3,4-Methylenedioxy-N-ethylamphetamine)

Column: Fortis C18 150x3.0mm 5µ
p/n: F18-030705
Mobile Phase: A: H_2O + 0.1% ammonia
B: ACN + 0.1% ammonia
Gradient:
Flow: 0.4ml/min
Temp: 20°C
Wavelength: MS Detection

Steriods



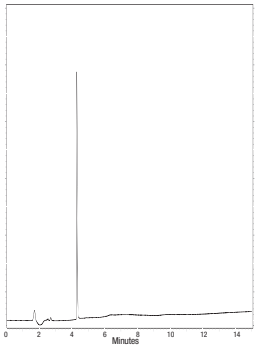
1. Progesterone
2. 17αHydroxyprogesterone
3. 11αHydroxyprogesterone
4. Hydroxy-21-acetate
5. Cortisone
6. Prednisone
7. Prednisolone



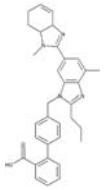
Column: Fortis Cyano 50x2.1mm 1.7µ
p/n: FCN-020301
Mobile Phase: Heptane : THF : MeOH 90:5:5

Flow: 1.0ml/min
Temp: 25°C
Wavelength: 254nm

Hypertension



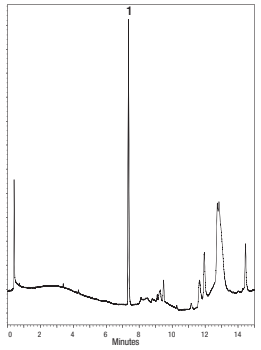
1. Telmisartan



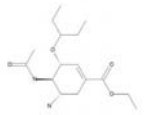
Column: Fortis C8 50x2.1mm 2.1µ
p/n: F208-020302
Mobile Phase: A: H_2O + 0.1% formic acid
B: ACN + 0.1% formic acid
Gradient: 10 - 90% in 15min
Flow: 0.4ml/min
Temp: 20°C
Wavelength: 254nm

Applications

Tamiflu®

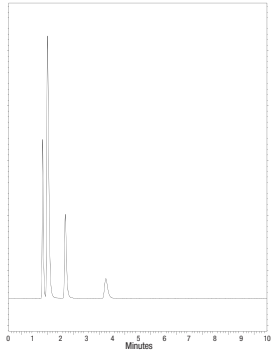


1. Oseltamivir

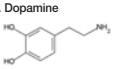


Column: Fortis C18 100x4.6mm 3µ
p/n: F18-050503
Mobile Phase: A: H_2O + 0.1% ammonia
B: ACN + 0.1% ammonia
Gradient: 10 - 100% in 15mins
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

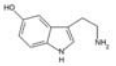
Neurotransmitters



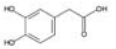
1. Dopamine



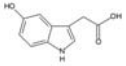
2. Serotonin



3. DOPAC



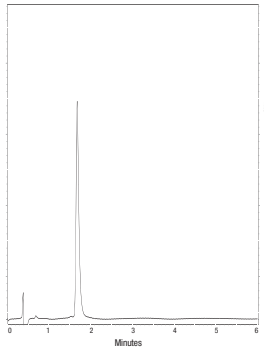
4. 5-HIAA



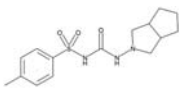
Column: Fortis H2o 150x4.6mm 5µ
p/n: FH0-050705
Mobile Phase: H_2O + 0.1% formic acid

Flow: 0.8ml/min
Temp: 20°C
Wavelength: 270nm

Anti-Diabetic



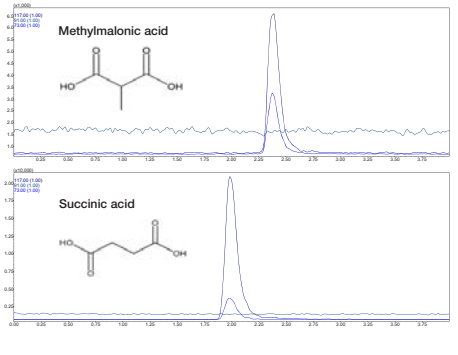
1. Gliclazide



Column: Fortis Diphenyl 50x2.1mm 1.7µ
p/n: FPH-020301
Mobile Phase: 80:20 H_2O : ACN + 0.1% formic acid

Flow: 0.8ml/min
Temp: 25°C
Wavelength: 254nm

Organic acids

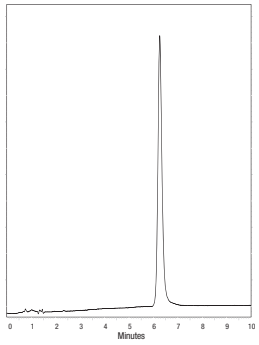


Column: Fortis H2o 150x2.1mm 3µ
p/n: FH0-020703
Mobile Phase: 5mM Ammonium formate + 0.5% formic acid

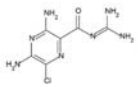
Flow: 0.4ml/min
Temp: 60°C
Wavelength: MS Detection

Applications

Diuretic



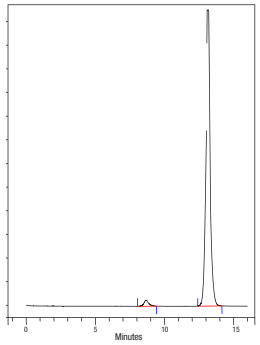
1. Amiloride



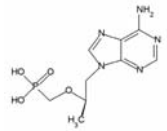
Column: Fortis C18 100x4.6mm 3µ
p/n: F18-050503
Mobile Phase: 75:25 H_2O+ 0.1% NH_3:MeOH

Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

Protease Inhibitors



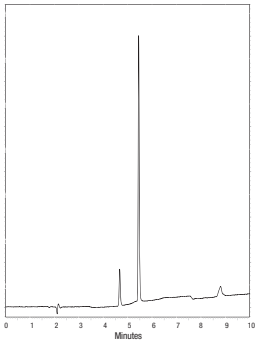
1. Tenofovir
2. Thymidine (IS)



Column: Fortis H2o 150x4.6mm 5µ
p/n: FHO-030705
Mobile Phase: 95:5 10mM Ammonium formate pH6.5 : MeOH

Flow: 0.4ml/min
Temp: 20°C
Wavelength: 259nm

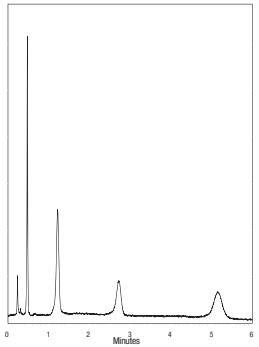
Antihistamine



1. Promethazine theoclate

Column: Fortis C18 100x4.6mm 3µ
p/n: F18-050503
Mobile Phase: A: H_2O + 0.1% ammonia
B: ACN + 0.1% ammonia
Gradient: 10 - 100% in 10mins
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

Vitamins



1. Nicotinamide

2. Riboflavin

3. Nicotinic acid

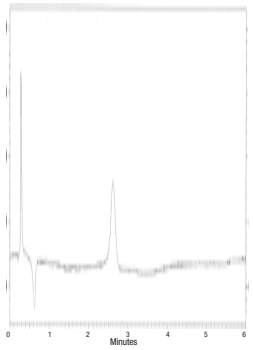
4. Vitamin C

Column: Fortis HILIC 50x4.6mm 5µ
p/n: FHI-050305
Mobile Phase: 90:10 ACN : 100mM ammonium acetate

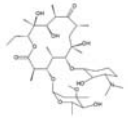
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

Applications

Erythromycin



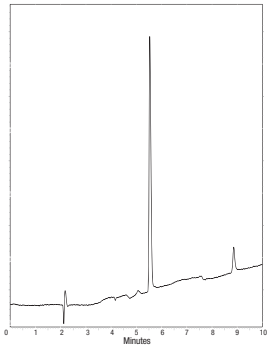
1. Erythromycin



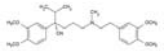
Column: Fortis HILIC 50x4.6mm 5µ
p/n: FHI-050305
Mobile Phase: 90: 10 ACN : 100mM ammonium acetate

Flow: 0.8ml/min
Temp: 20°C
Wavelength: 200nm

Calcium Channel Blocker

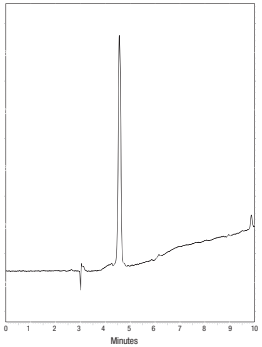


1. Verapamil

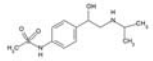


Column: Fortis C18 100x4.6mm 3µ
p/n: F18-050503
Mobile Phase: A: H_2O + 0.1% formic acid
B: ACN + 0.1% formic acid
Gradient: 10 - 90% in 10min
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

Beta-Blockers

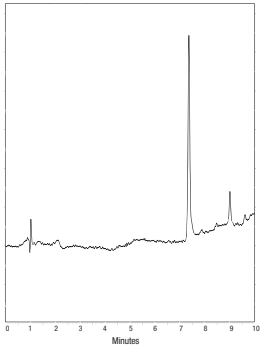


1. Sotalol

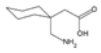


Column: Fortis C18 150x4.6mm 5µ
p/n: F18-050705
Mobile Phase: A: H_2O + 0.1% formic acid
B: ACN + 0.1% formic acid
Gradient: 5 - 100% in 10min
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

Anti-epileptic



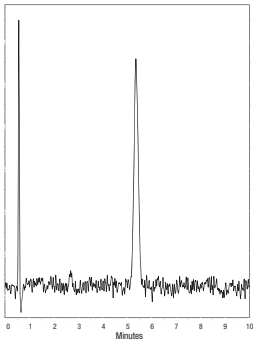
1. Gabapentin



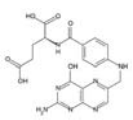
Column: Fortis C18 50x4.6mm 5µ
p/n: F18-050305
Mobile Phase: A: H_2O + 0.1% formic acid
B: ACN + 0.1% formic acid
Gradient: 10 - 100% in 5min
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 270nm

Applications

Vitamin

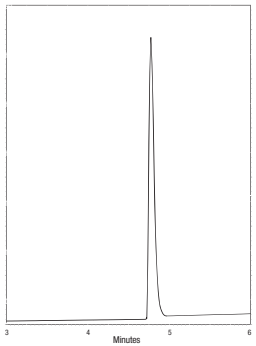


1. Folic acid

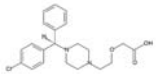


Column: Fortis H2o 50x4.6mm 5µ
p/n: FHO-050305
Mobile Phase: 60:40 H_2O : ACN
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 210nm

Antihistamine

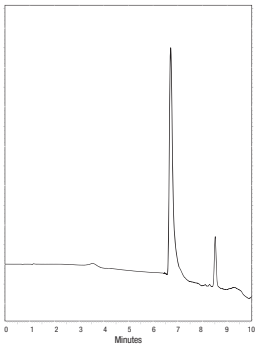


1. Levocetirizine

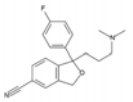


Column: Fortis H2o 50x4.6mm 5µ
p/n: FHO-050305
Mobile Phase: A: H_2O + 0.1% formic acid
B: ACN + 0.1% formic acid
Gradient: 10 - 100% in 10min
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 230nm

Antidepressant

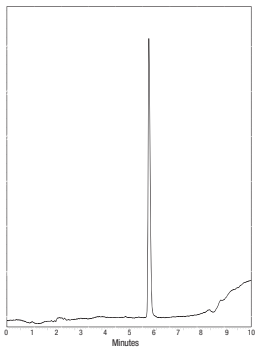


1. Citalopram

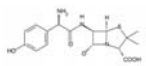


Column: Fortis C18 50x4.6mm 5µ
p/n: F18-050305
Mobile Phase: A: 50mM ammonia acetate
B: ACN
Gradient: 10 - 100% in 10mins
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 230nm

Antibiotic



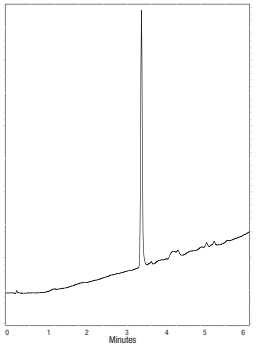
1. Amoxicillin



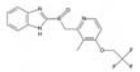
Column: Fortis C18 100x4.6mm 3µ
p/n: F18-050503
Mobile Phase: A: H_2O + 0.1% formic acid
B: ACN + 0.1% formic acid
Gradient: 5 - 50% in 10min
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

Applications

Proton Pump Inhibitor

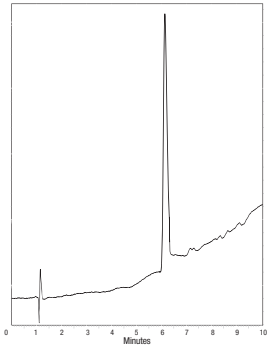


1. Lansoprazole

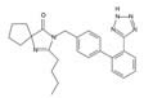


Column: Fortis C18 50x4.6mm 5µ
p/n: F18-050305
Mobile Phase: A: H_2O + 0.1% formic acid
B: ACN + 0.1% formic acid
Gradient: 10 - 100% in 10min
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

Angiotensin II Receptor Antaganist

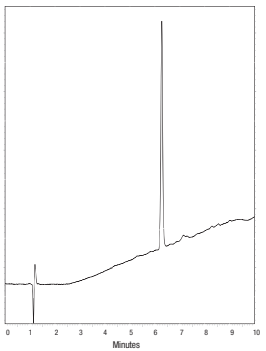


1. Irbesartan

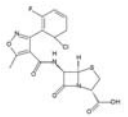


Column: Fortis C18 50x4.6mm 5µ
p/n: F18-050305
Mobile Phase: A: H_2O + 0.1% formic acid
B: ACN + 0.1% formic acid
Gradient: 10 - 100% in 10min
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

Antibiotics

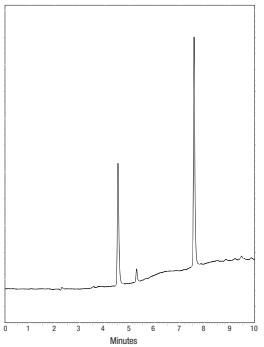


1. Flucloxacillin

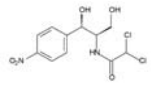


Column: Fortis C18 50x4.6mm 5µ
p/n: F18-050305
Mobile Phase: A: H_2O + 0.1% formic acid
B: ACN + 0.1% formic acid
Gradient: 10 - 100% in 10min
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 254nm

Antibiotic



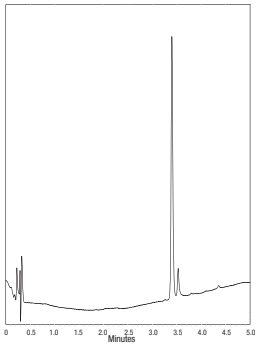
1. Chloramphenicol



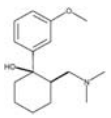
Column: Fortis C18 100x4.6mm 5µ
p/n: F18-050505
Mobile Phase: A: H_2O + 0.1% formic acid
B: ACN + 0.1% formic acid
Gradient: 5 - 70% in 10min
Flow: 1.0ml/min
Temp: 20°C
Wavelength: 270nm

Applications

Opioid analgesic

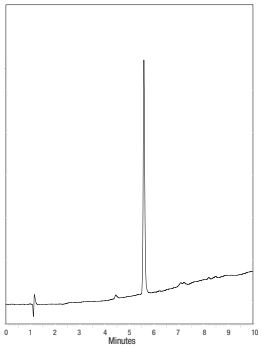


1. Tramadol

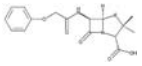


Column:	Fortis C18 50x2.1mm 5µ
p/n:	F18-020305
Mobile Phase:	A: H_2O + B: ACN + 0.1% NH_3
Gradient:	10 - 100% in 5mins
Flow:	0.2ml/min
Temp:	Ambient
Wavelength:	220nm

Antibiotic

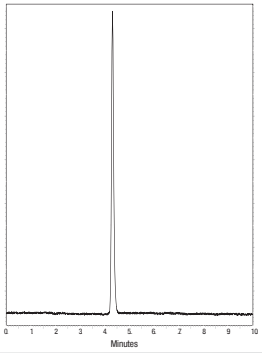


1. Phenoxymethylpenicilin

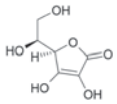


Column:	Fortis C18 50x4.6mm 5µ
p/n:	F18-050305
Mobile Phase:	A: H_2O + 0.1% formic acid B: ACN + 0.1% formic acid
Gradient:	10 - 100% in 10mins
Flow:	1ml/min
Temp:	25°C
Wavelength:	254nm

Vitamin

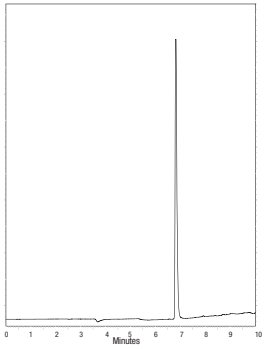


1. Vitamin C

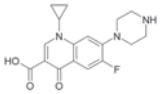


Column:	Fortis Diphenyl 150x4.6mm 5µ
p/n:	FPH-050705
Mobile Phase:	100% H_2O + 0.1% Formic acid
Flow:	0.8ml/min
Temp:	25°C
Wavelength:	254nm

Antibiotic



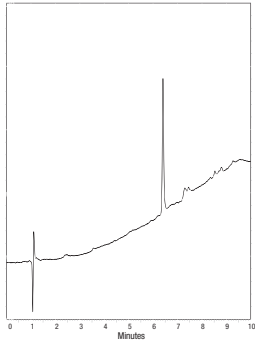
1. Ciprofloxacin



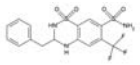
Column:	Fortis Diphenyl 150x4.6mm 5µ
p/n:	FPH-050705
Mobile Phase:	A: H_2O + 0.1% formic acid B: MeOH + 0.1% formic acid
Gradient:	10 - 90% in 10mins
Flow:	1ml/min
Temp:	25°C
Wavelength:	254nm

Applications

Thiazide Diuretic

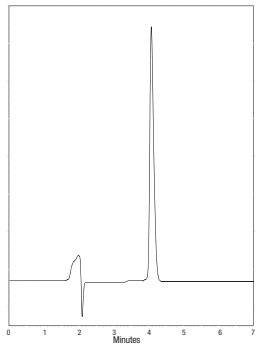


1. Bendroflumethiazide

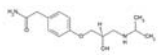


Column:	Fortis H2o 50x4.6mm 5µ
p/n:	FHO-050305
Mobile Phase:	A: H_2O + 0.1% formic acid B: ACN + 0.1% formic acid
Gradient:	10 - 100% in 10min
Flow:	1.0ml/min
Temp:	20°C
Wavelength:	254nm

Beta-Blocker

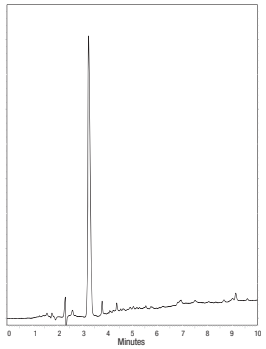


1. Atenolol



Column:	Fortis H2o 150x4.6mm 5µ
p/n:	FHO-050705
Mobile Phase:	92:8 H_2O : ACN + 0.1% formic acid
Flow:	1.0ml/min
Temp:	20°C
Wavelength:	220nm

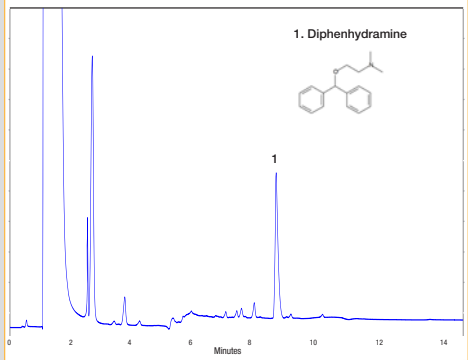
Antibiotic



1. Co-amoxiclav

Column:	Fortis C18 150x4.6mm 5µ
p/n:	F18-050705
Mobile Phase:	A: H_2O + 0.1% formic acid B: ACN + 0.1% formic acid
Gradient:	10 - 90% in 10mins
Flow:	1.0ml/min
Temp:	25°C
Wavelength:	254nm

Antihistamine



1. Diphenhydramine

Column:	Fortis C18 100x4.6mm 3µ
p/n:	F18-050503
Mobile Phase:	A: H_2O + 0.1% NH_3 B: ACN + 0.1% formic acid
Gradient:	0 - 100% in 10mins
Flow:	1ml/min
Temp:	25°C
Wavelength:	220nm

Applications Index

Part number tables

Fortis C18		Column Length					
		20	30	50	100	150	250
Column Diameter	2.1	F18-0201xx	F18-0202xx	F18-0203xx	F18-0205xx	F18-0207xx	-
	3.0	-	F18-0302xx	F18-0303xx	F18-0305xx	F18-0307xx	-
	4.6	-	F18-0502xx	F18-0503xx	F18-0505xx	F18-0507xx	F18-0509xx

Replace xx -01 for 1.7µm - 02 for 2.5µm - 03 for 3µm - 05 for 5µm - 10 for 10µm

Fortis Diphenyl		Column Length					
		20	30	50	100	150	250
Column Diameter	2.1	FPH-0201xx	FPH-0202xx	FPH-0203xx	FPH-0205xx	FPH-0207xx	-
	3.0	-	FPH-0302xx	FPH-0303xx	FPH-0305xx	FPH-0307xx	-
	4.6	-	FPH-0502xx	FPH-0503xx	FPH-0505xx	FPH-0507xx	FPH-0509xx

Replace xx - 01 for 1.7µm - 02 for 2.5µm - 03 for 3µm - 05 for 5µm - 10 for 10µm

Fortis H2o		Column Length					
		20	30	50	100	150	250
Column Diameter	2.1	FHO-0201xx	FHO-0202xx	FHO-0203xx	FHO-0205xx	FHO-0207xx	-
	3.0	-	FHO-0302xx	FHO-0303xx	FHO-0305xx	FHO-0307xx	-
	4.6	-	FHO-0502xx	FHO-0503xx	FHO-0505xx	FHO-0507xx	FHO-0509xx

Replace xx - 03 for 3µm - 05 for 5µm

Fortis C8		Column Length					
		20	30	50	100	150	250
Column Diameter	2.1	F08-0201xx	F08-0202xx	F08-0203xx	F08-0205xx	F08-0207xx	-
	3.0	-	F08-0302xx	F08-0303xx	F08-0305xx	F08-0307xx	-
	4.6	-	F08-0502xx	F08-0503xx	F08-0505xx	F08-0507xx	F08-0509xx

Replace xx - 03 for 3µm - 05 for 5µm

Fortis Cyano		Column Length					
		20	30	50	100	150	250
Column Diameter	2.1	FCN-0201xx	FCN-0202xx	FCN-0203xx	FCN-0205xx	FCN-0207xx	-
	3.0	-	FCN-0302xx	FCN-0303xx	FCN-0305xx	FCN-0307xx	-
	4.6	-	FCN-0502xx	FCN-0503xx	FCN-0505xx	FCN-0507xx	F18-0509xx

Replace xx - 01 for 1.7µm - 03 for 3µm - 05 for 5µm

Fortis HILIC		Column Length					
		20	30	50	100	150	250
Column Diameter	2.1	FHI-0201xx	FHI-0202xx	FHI-0203xx	FHI-0205xx	FHI-0207xx	-
	3.0		FHI-0302xx	FHI-0303xx	FHI-0305xx	FHI-0307xx	-
	4.6		FHI-0502xx	FHI-0503xx	FHI-0505xx	FHI-0507xx	FHI-0509xx

Replace xx - 01 for 1.7µm - 03 for 3µm - 05 for 5µm - 10 for 10µm

5µm Fortis Guard Cartridges	
DCGUA-1	Guard Cartridge Holder
DCxx-040005G/2	10x4mm Fortis 5µm Guard pk 2
DCxx-040005G/4	10x4mm Fortis 5µm Guard pk 4
DCxx-020005G/2	10x2mm Fortis 5µm Guard pk 2
DCxx-020005G/4	10x2mm Fortis 5µm Guard pk 4

3µm Fortis Guard Cartridges	
DCGUA-1	Guard Cartridge Holder
DCxx-040003G/2	10x4mm Fortis 3µm Guard pk 2
DCxx-040003G/4	10x4mm Fortis 3µm Guard pk 4
DCxx-020003G/2	10x2mm Fortis 3µm Guard pk 2
DCxx-020003G/4	10x2mm Fortis 3µm Guard pk 4

Replace xx 18 for Fortis C18 PH for Fortis Diphenyl HO for Fortis H2o 08 for Fortis C8 CN for Fortis Cyano HI for Fortis HILIC

Analytical In-line Filters	
2-SAV5	2µm In-line filter pk 5
2-SAV10	2µm In-line filter pk 10

UHPLC In-line Filters	
UHPSAV2	UHPLC In-line filter pk 2
UHPSAV4	UHPLC In-line filter pk 4

WORLDWIDE AVAILABILITY

Fortis™ Technologies Ltd.

45 Coalbrookdale Road
Clayhill Industrial Park
Neston
Cheshire, UK
CH64 3UG

t: +44 151 336 2266
f: +44 151 336 2669
www.fortis-technologies.com
e: info@fortis-technologies.com

Company No. 5449466
VAT No. 866 8966 43

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