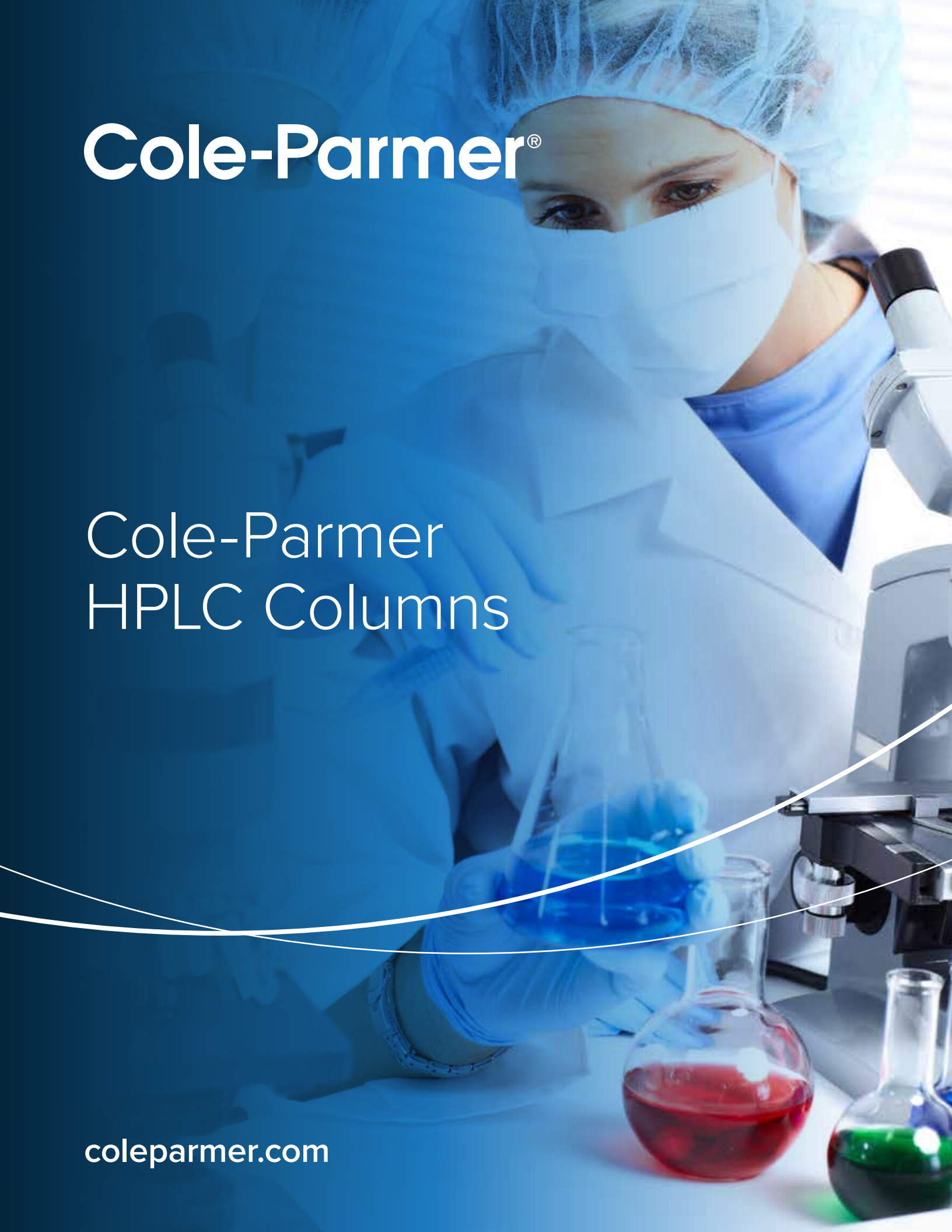
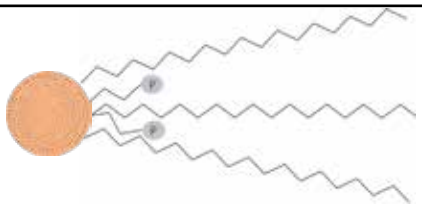
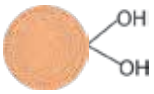
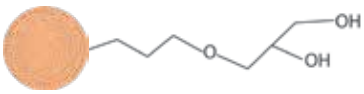
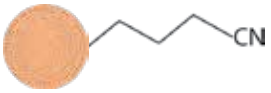
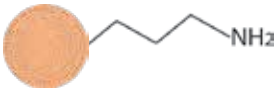
Cole-Parmer®

Cole-Parmer HPLC Columns



coleparmer.com

Phase Chemistry Selectivity

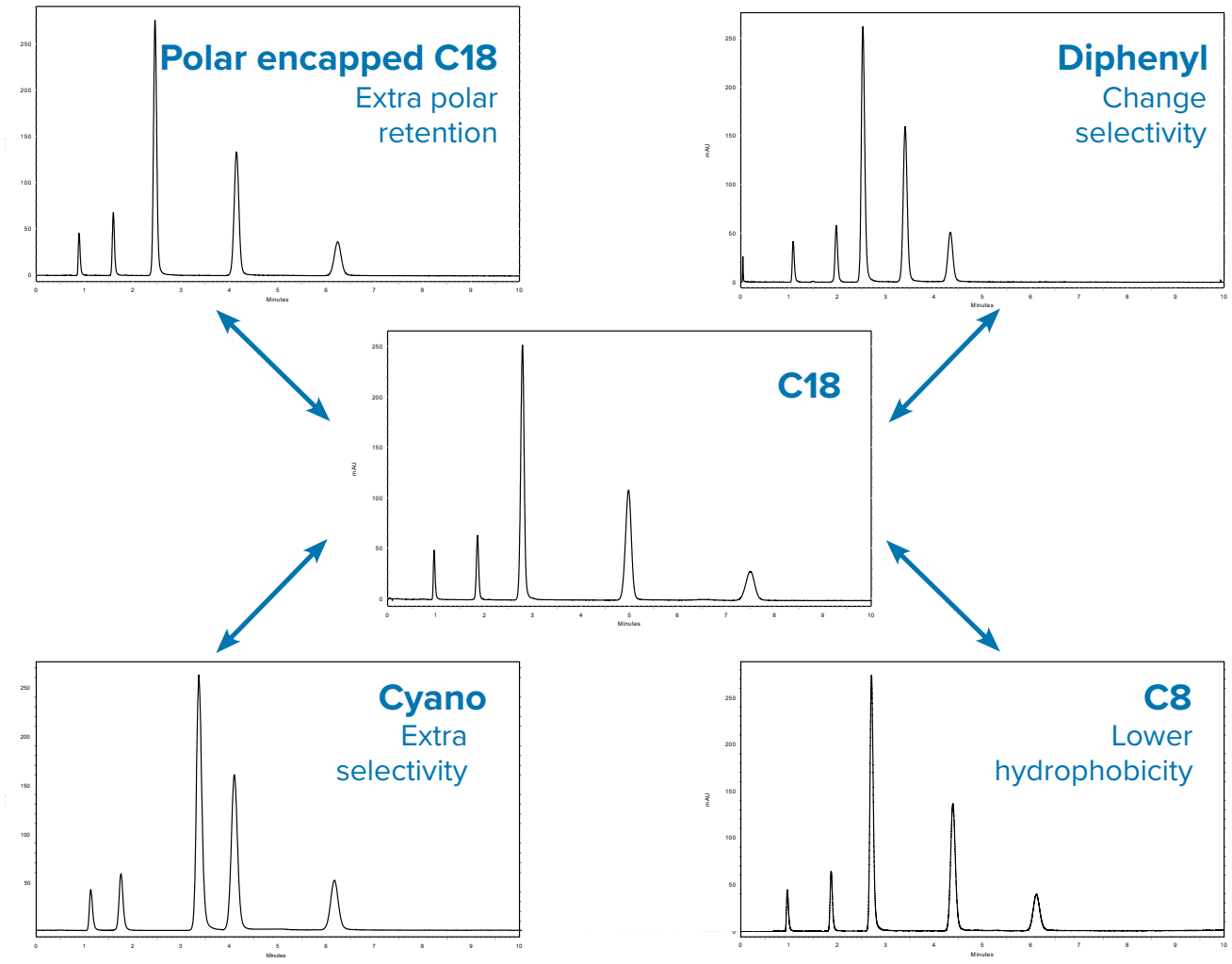
	**C18** – **General UHPLC use** – **Method development from pH 1–12**	Acids Bases Neutrals
	**Polar endcapped C18** – **Polar endcapped** – **Increased polar retention**	Hydrophilic analytes Organic acids Catecholamines
	**Diphenyl** – **Unique diphenyl structure** – **Metabolite profiling** – **Separate positional isomers**	Metabolites Positional isomers Hydrophilic / hydrophobic analytes
	**C8** – **General UHPLC use** – **Method development**	Lipids Steroids Highly hydrophobic analytes
	**HILIC** – **High polar retention** – **Homogenous silanol concentration** – **Improve MS sensitivity**	Carboxylic acids Nucleotides Vitamins
	**DIOL** – **Alternate selectivity to bare silica** – **Stable bonding** – **HILIC or normal phase mode**	Steroids Proteins Metabolites
	**Cyano** – **Cyano functionality** – **Reversed phase or normal phase**	Explosives Pesticides Steroids
	**Amino** – **Reproducible, robust bonding** – **Reversed phase, normal phase or ion exchange mode**	Saccarides Oligonucleotides Steroids

Method Development

Method development typically starts with a C18 or C8 column as both provide hydrophobic retention with good peak shapes for neutral, acidic and basic analytes. If retention of polar molecules is also needed then a polar endcapped stationary phase such as Polar endcapped C18 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.

Cyano stationary phase 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
- C18
- Diphenyl
- C8

Polar basic molecules
- C18 operated at high pH
- Polar endcapped C18
- Diphenyl

Polar acidic molecules
- Polar endcapped C18
- HILIC
- Cyano in NP mode

Alternate selectivity
- Diphenyl
- Cyano

Cole-Parmer C18

- **Superior peak shapes**
- **pH range 1–12**
- **Based on ultra-pure silica**

Cole-Parmer C18 is a pure silica based stationary phase with unique high and low pH performance. It provides the best in peak shape, resolution and extended pH range for method development flexibility for simple compound screens or complex metabolite identification.

Phase Characteristics

Chemistry	C18
Carbon loading	17%
Particle size	3 or 5 µm
Specific area	380 m^2/g
Pore size	100 Å
pH range	1 to 12
USP classification	L1

Optimized Peak Shape

The optimized hydrophobic bonding of Cole-Parmer C18 leads to peak symmetries being near perfect for all types of analytes.

Basic, acidic and neutral analyte performance is ensured across the pH spectrum.

- **Superior peak shapes**
- **Higher efficiencies**
- **Excellent reproducibility**

Column: Cole-Parmer C18 150x4.6mm 5µm
Luna® C18(2) 150x4.6mm 5µm

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

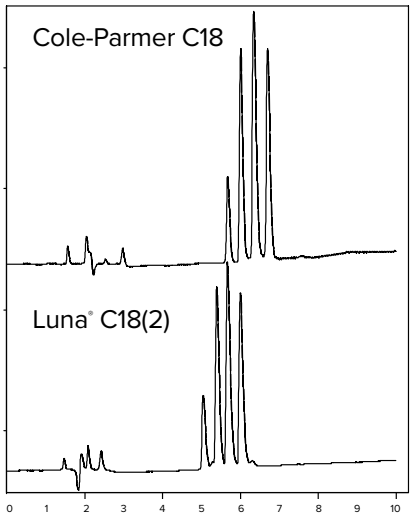
Gradient: 25 - 40% in 10 min

Flow: 1 mL/min

Temp: 20 °C

Wavelength: 254 nm

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

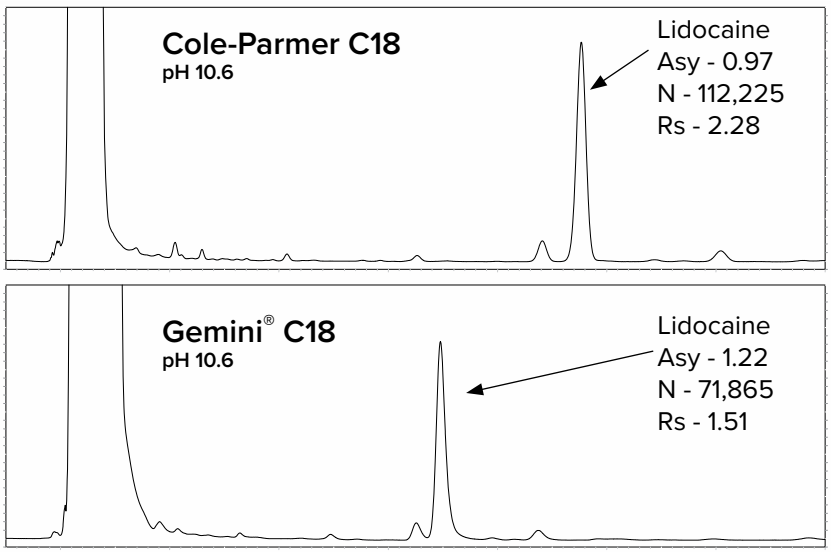


Extreme pH Range

Cole-Parmer 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 3µm **Mobile phase:** 50:50 0.1% NH_3 : MeCN **Flow:** 1.0 mL/min **Temp:** 25 °C **Wavelength:** 230 nm

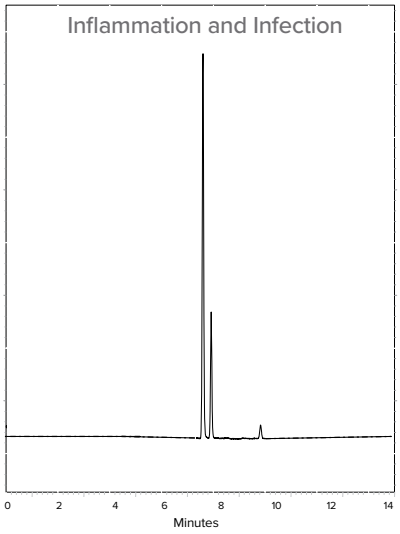
See page 20 for Ordering Information.

Cole-Parmer C18

Extended Operating pH Range

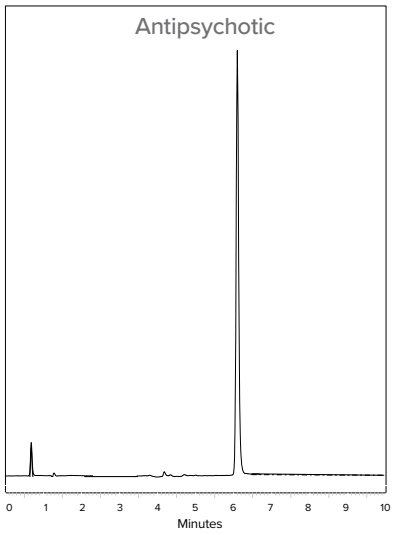
Column: C18 100x4.6mm 3µm
Item number: 16470-05
Mobile phase: A - H_2O + 0.1% Formic acid
B - ACN + 0.1% Formic acid
Gradient: 10 - 50% in 10 min
Flow: 1 mL/min
Temp: 20 °C
Wavelength: 254 nm

1. Dexamethasone
2. Neomycin sulphate
3. Acetic acid



Column: C18 100x4.6mm 5µm
Item number: 16470-02
Mobile phase: A - 50mM NH_4OAc
B - ACN
Gradient: 10 - 40% in 10 min
Flow: 1 mL/min
Temp: 20 °C
Wavelength: 254 nm

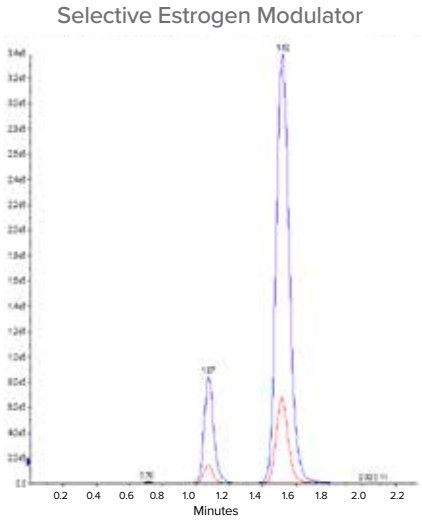
1. Quetiapine

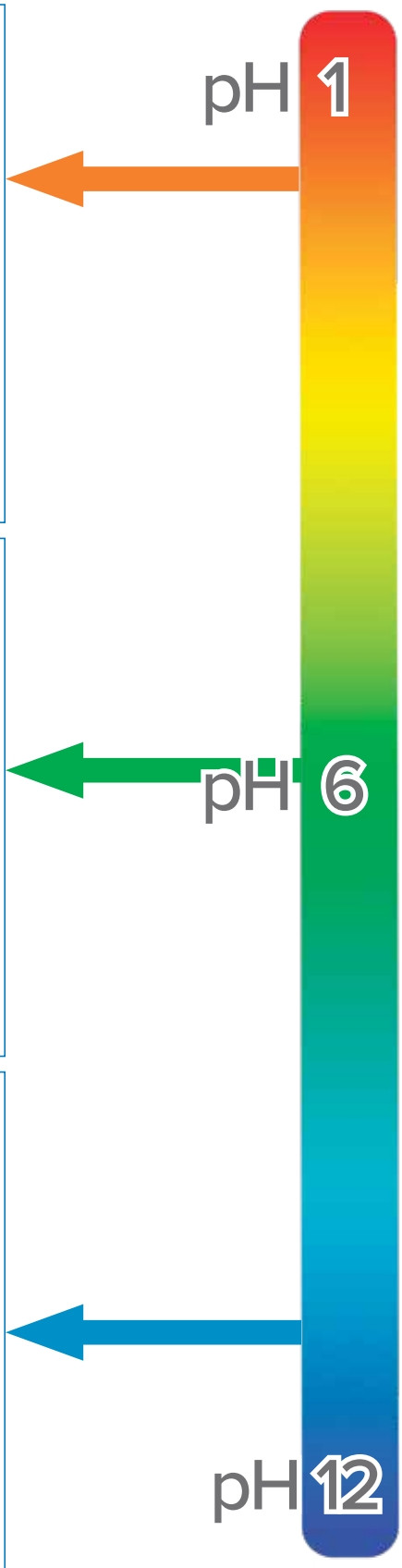


Column: C18 50x2.1mm 3µm
Item number: 16470-08
Mobile phase: 30:70 H_2O + 10mM ammonium bicarbonate : MeOH
Flow: 0.4 mL/min
Temp: 25 °C
Wavelength: MS detection

Raloxifene glucuronides

Data Courtesy of : Pharmaceutical company, USA



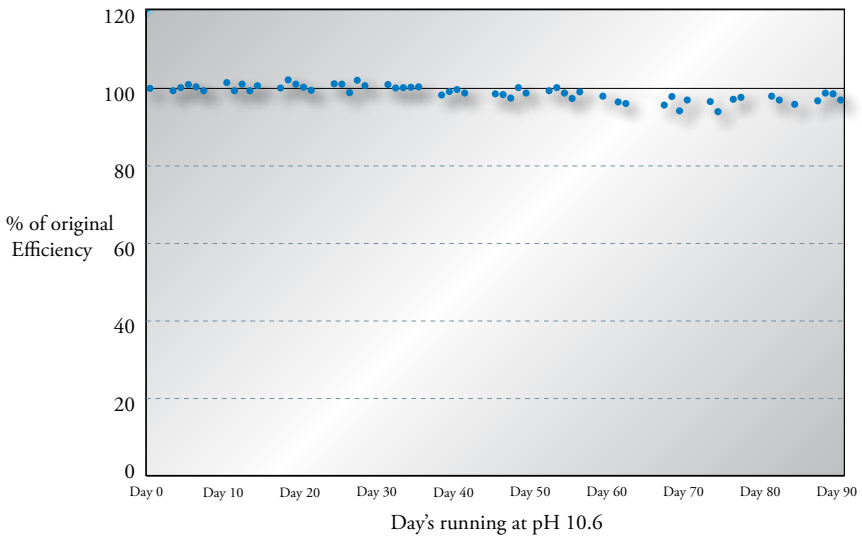


Cole-Parmer C18

High pH Stability

The unique bonding of Cole-Parmer C18 enables stability at extremes of pH to be maintained.

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



Advantages of Hydrophobicity

The high surface area of Cole-Parmer C18 combined with optimized C18 ligand bonding provides high retention for compounds, enabling some key advantages:

- Improved MS sensitivity with the possibility to use more organic modifier to elute

- Possibility to shorten the "dry-down" in fraction collection due to more organic leads

- Better resolution

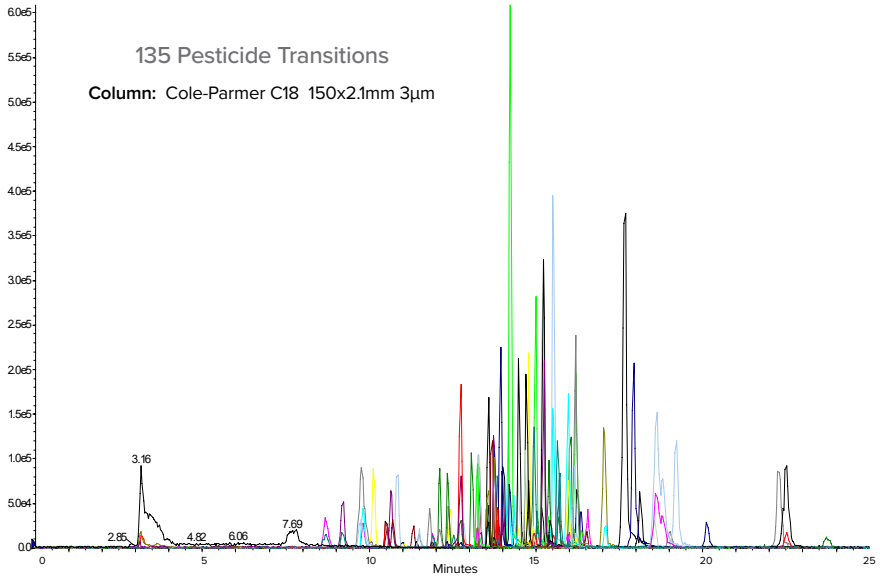
Cole-Parmer C18

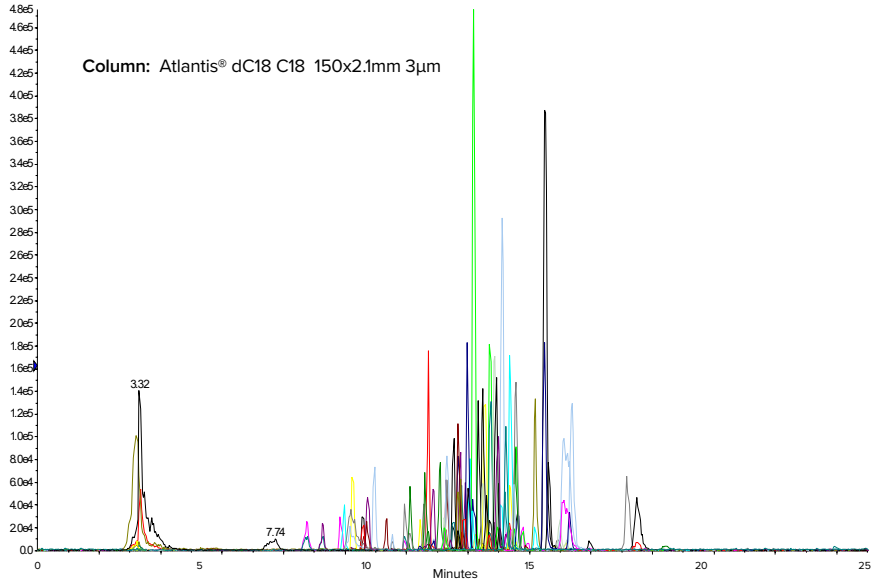
Optimized Resolution

With sharp peak shapes for both polar and non-polar analytes, Cole-Parmer C18 ensures reproducibility, robustness and the highest level of resolution.

The chromatogram shown here shows the analysis of 135 transitions of pesticide residue from an apple matrix.

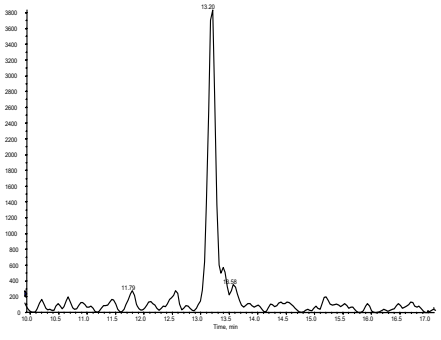
High retention is observed for polar organophosphates such as acephate and methamidophos.



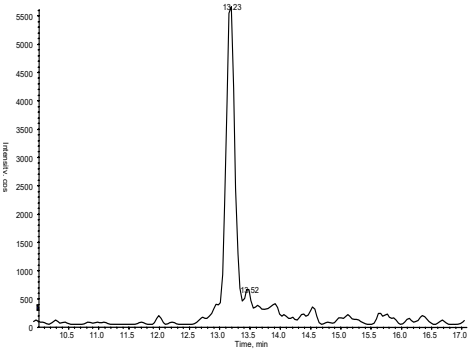


Optimized hydrophobicity also means less carryover as there is no secondary silanol interactions to bind with analytes.

Thiabendazole
0.9% column carryover
Cole-Parmer C18



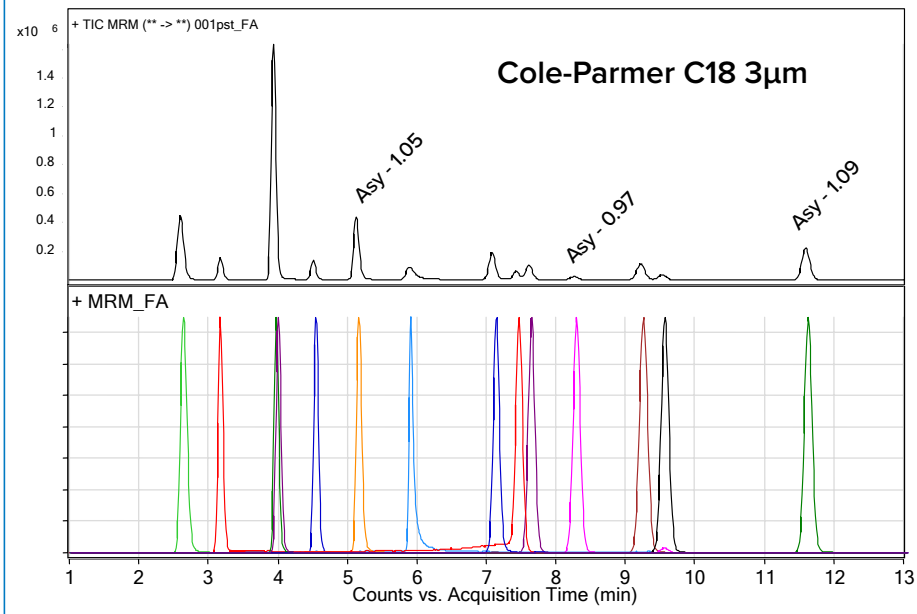
Thiabendazole
1.9% column carryover
Atlantis dC18

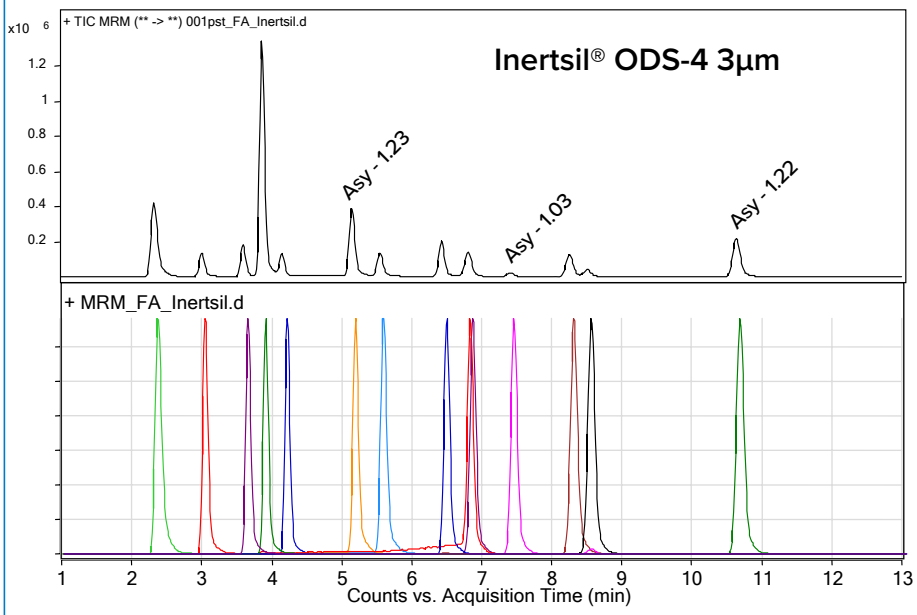


Data Courtesy of : Central Science Laboratories, UK

Cole-Parmer C18

Selectivity and Peak Shape





Data Courtesy of : Major Pharmaceutical, Norway

Column: Cole-Parmer C18 100x2.1mm 3µm

Item number : 16470-07

Mobile phase: A - H_2O + 0.1% formic acid
B - ACN

Gradient: 20–35% in 2 min
35–40% in 5 min
40–50% in 3 min
50–90% in 1 min

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

Cole-Parmer Polar Endcapped C18

- **Retention of polars by polar endcapping group**
- **Enhanced resolution**
- **100% Aqueous compatible**

Cole-Parmer polar endcapped C18 is designed to aid in the separation and retention of polar analytes. It provides additional interactions between the stationary phase and polar molecules, improving their retention and thus removing the need for complex mobile phase systems.

Phase Characteristics

Chemistry	Polar endcapped C18
Carbon loading	18%
Particle size	3 or 5 µm
Specific area	380 m^2/g
Pore size	100 Å
pH range	2 to 10
USP classification	L1

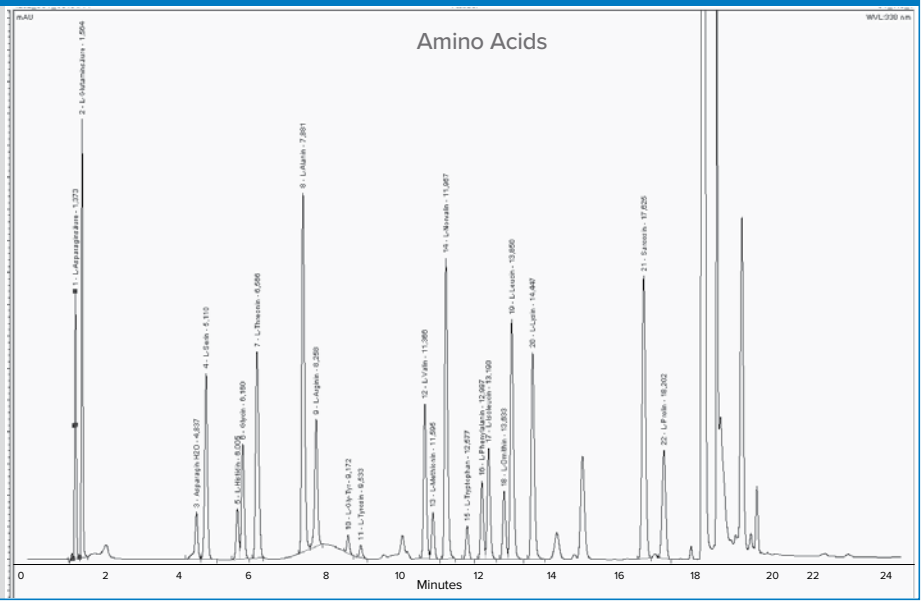
Retention of Polar Analytes - Amino Acids

Column : Cole-Parmer polar endcapped C18 150x2.1mm 3µm

Item number: 16470-48

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 - Steroids

Cole-Parmer polar endcapped C18 ensures reproducibility, robustness and high level of resolution thanks to its unique bonded character.

Column: Cole-Parmer polar endcapped C18 150x2.1mm 3µm

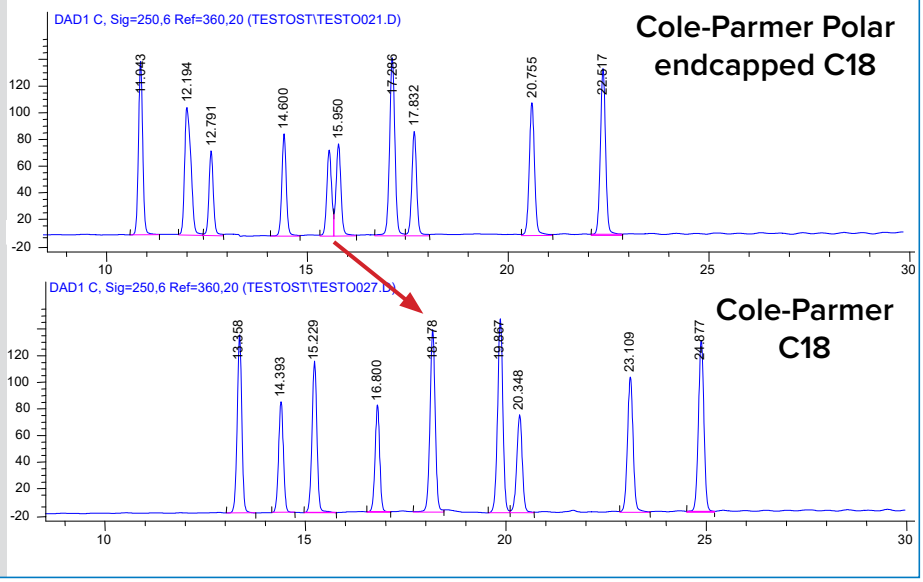
Item number: 16470-48

Flow: 0.2 mL/min

Temp: 25 °C

Wavelength: DAD 250 nm

Data Courtesy of : AstraZeneca, UK



See page 20 for Ordering Information.

Cole-Parmer Diphenyl

- **Unique selectivity**
- **Separate positional isomers**
- **No “MS bleed”, stable hydrophobic ligand**
- **Enhanced polar retention**

Cole-Parmer Diphenyl is designed to enhance selectivity. It provides extra retention of compounds containing aromatic functionality. Extra selectivity and retention is possible for polar substrates, along with metabolite profiling.

Phase Characteristics

Chemistry	Diphenyl
Carbon loading	13%
Particle size	3 or 5 µm
Specific area	380 m^2/g
Pore size	100 Å
pH range	2 to 9
USP classification	L11

Unique Functionality

Cole-Parmer Diphenyl provides unique resolution of closely related species and metabolites without the need for complex mobile phases due to a unique diphenyl functionality.

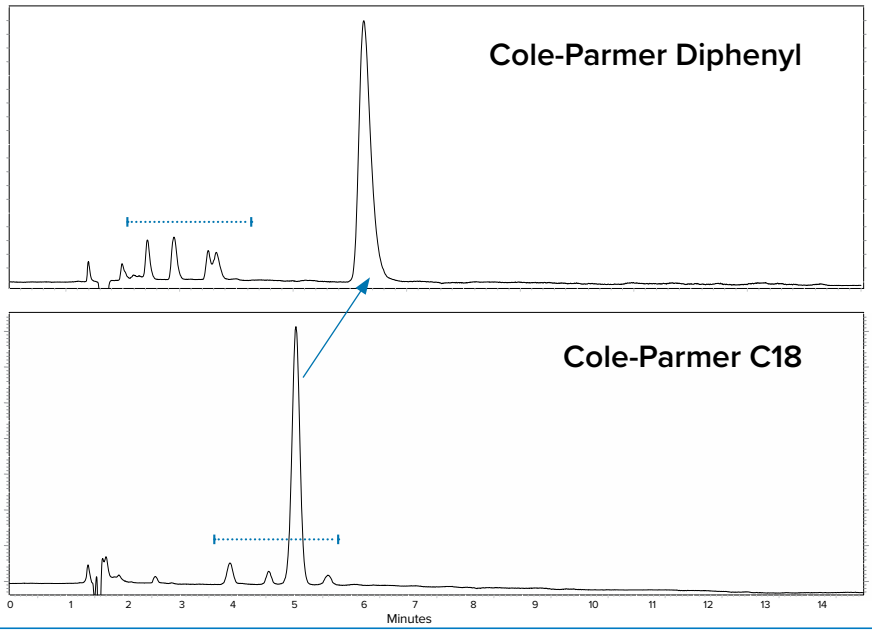
Diphenyl vs C18 Selectivity

Selectivity obtained with Cole-Parmer Diphenyl is different than with Cole-Parmer C18 as shown here.

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.

- **π-π interactions for high selectivity**
- **Resolution enhanced**
- **Sharp peak shapes**
- **Highly stable diphenyl ligand**

Data Courtesy of : Major Pharmaceutical company, USA



See page 20 for Ordering Information.

Cole-Parmer Diphenyl

Metabolite Profiling

Cole-Parmer Diphenyl is able to discriminate between very closely related species, such as those associated as metabolites or excipients. The stationary phase's three modes of interaction allow achieving separation between molecules that have only subtle changes in positional spacing, loss or gain of an atom or functional group.

Separate Positional Isomers

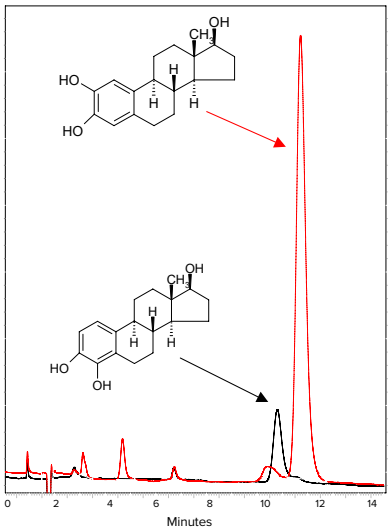
The π-π interactions provided by the phenyl functionality facilitates the separation of compounds difficult to resolve on a hydrophobic alkyl chain.

In this application two hydroxyestradiol steroids exhibit resolution from each other. No complex mobile phases are necessary.

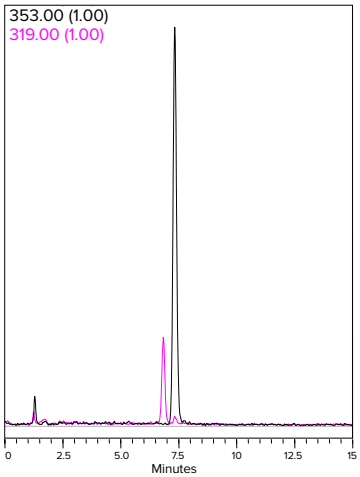
- **Isomer selectivity**
- **Metabolite resolution**
- **Alternate selectivity**

Column: Cole-Parmer Diphenyl 150x4.6mm 5µm
Item number: 16471-22
Mobile Phase: 40:60 H_2O : MeOH
Flow: 1 mL/min
Temp: 20 °C
Wavelength: 210 nm

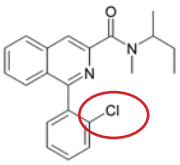
1. 4-Hydroxyestradiol (mw=288.38)
2. 2-Hydroxyestradiol (mw=288.38)



PET Tracer - PK11195



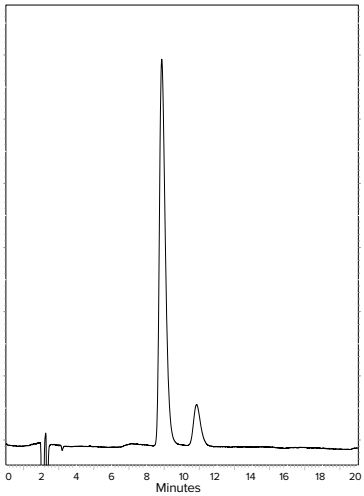
1. Dechlorinated PK11195
2. PK11195



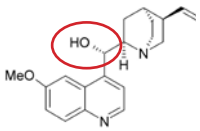
Column: Cole-Parmer Diphenyl 150x4.6mm 5µm
Item number: 16471-22
Mobile phase: 40 : 60 H_2O : ACN
Flow: 1 mL/min
Temp: 25 °C
Wavelength: MS detection

Data Courtesy of : Wolfson Molecular Imaging Centre

Antiarrhythmic



1. Quinidine
2. Dihydroquinidine



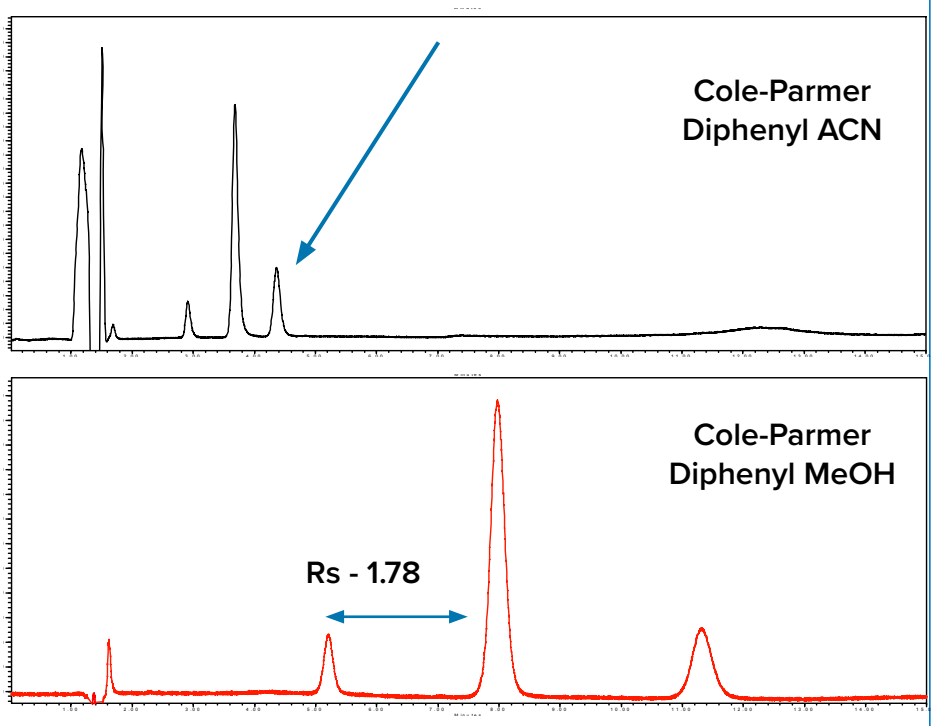
Column: Cole-Parmer Diphenyl 150x4.6mm 5µm
Item number: 16471-22
Mobile phase: 70 : 30 H_2O + 0.1% formic acid
MeOH
Flow: 1 mL/min
Temp: 25 °C
Wavelength: 235 nm

Cole-Parmer Diphenyl

Effect of Mobile Phase Choice

With a phenyl column, the choice of mobile phase is important. Acetonitrile is the standard organic modifier used but it can suppress retention and selectivity. Methanol as a modifier can provide better results by letting the π-π interactions occur on the phenyl rings.

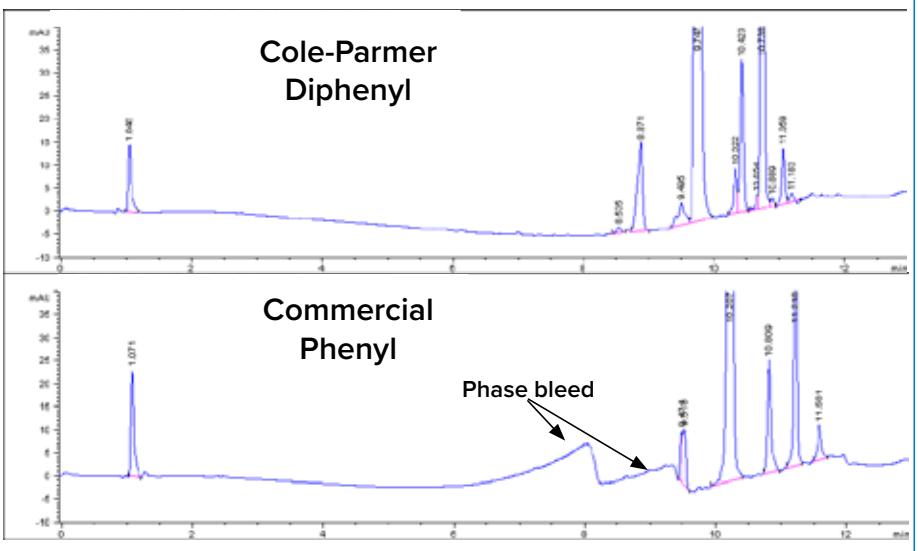
It can be seen how maximum retention and resolution is obtained on Cole-Parmer Diphenyl in MeOH mobile phase, even greater than C18. Once the organic modifier is substituted for ACN not only is resolution reduced but also a large amount of retention is lost in relation to that lost on a C18.



Phenyl Phase "Bleed"

Due to the phenyl ring chromophore nature and the possible stability issues when the phenyl ring is placed in close proximity with the silica surface, signals from UV detectors can be affected.

Cole-Parmer diphenyl provides clean baselines as it is a more stable bonding with the alkyl chain ligand removing the dipolar phenol/silica interactions.



Data Courtesy of : Major Pharmaceutical company, UK

Cole-Parmer C8

- **Reduced hydrophobicity over C18**
- **Excellent peak shapes**

Cole-Parmer C8 provides similar characteristics than Cole-Parmer C18 for situations where less hydrophobicity is required.

Phase Characteristics

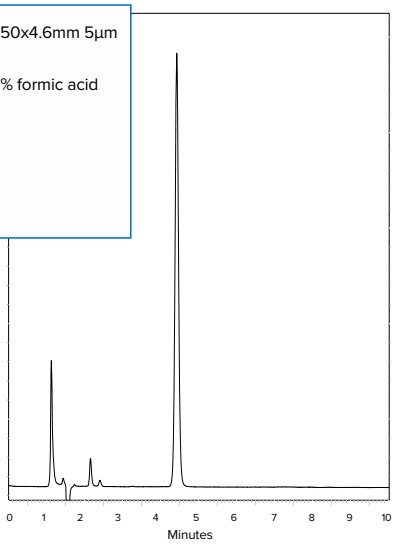
Chemistry	C8
Carbon loading	13%
Particle size	3 or 5 µm
Specific area	380 m^2/g
Pore size	100 Å
pH range	2 to 10
USP classification	L7

Anticonvulsant

Column: Cole-Parmer C8 150x4.6mm 5µm
Item number: 16470-22
Mobile phase: 40 : 60 H_2O + 0.1% formic acid ACN

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

1. Valproate semisodium

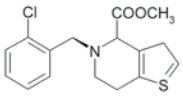


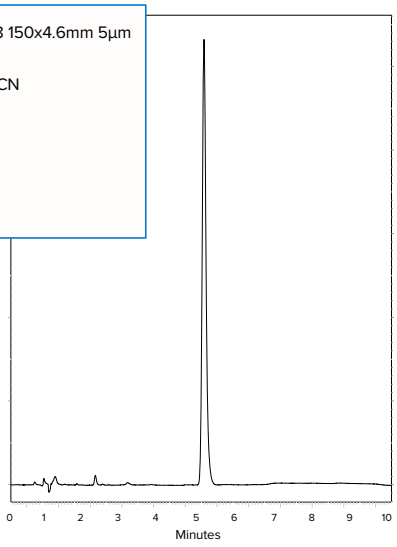
Antiplatelet

Column: Cole-Parmer C8 150x4.6mm 5µm
Item number: 16470-22
Mobile phase: 25 : 75 H_2O : ACN

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

1. Clopidogrel





See page 20 for Ordering Information.

Cole-Parmer HILIC

- **Retention of polar compounds**
- **Increased MS sensitivity**
- **Alternate selectivity**
- **Reduced extraction (SPE) and dry down times**

Cole-Parmer 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. Cole-Parmer HILIC can increase sensitivity in MS analysis and provide alternate selectivity to that achieved with reversed phase C18.

Phase Characteristics

Chemistry	HILIC
Carbon loading	N/A
Particle size	3 or 5 µm
Specific area	380 m^2/g
Pore size	100 Å
pH range	2 to 8
USP classification	L3

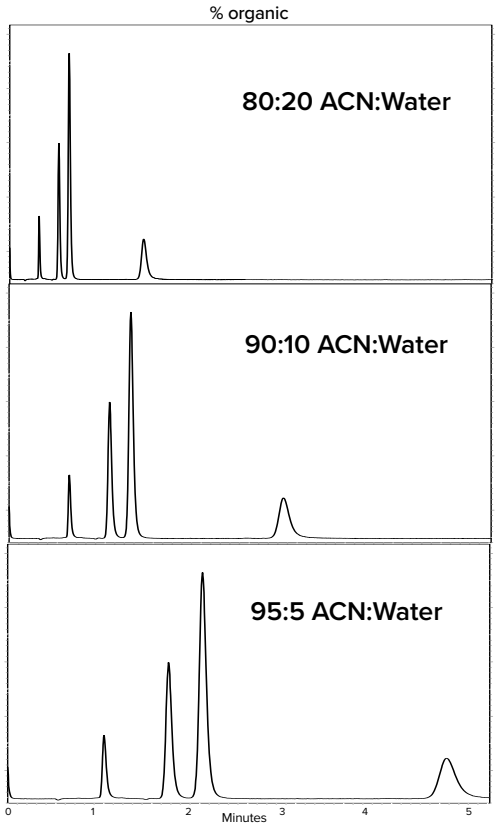
Polar Retention in HILIC Mode

Cole-Parmer HILIC is optimized to help retain and resolve polar analytes.

- **Polar retention**
- **Alternative selectivity**
- **Rapid equilibration**

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 to 30% water is needed in order to elute most analyte species.

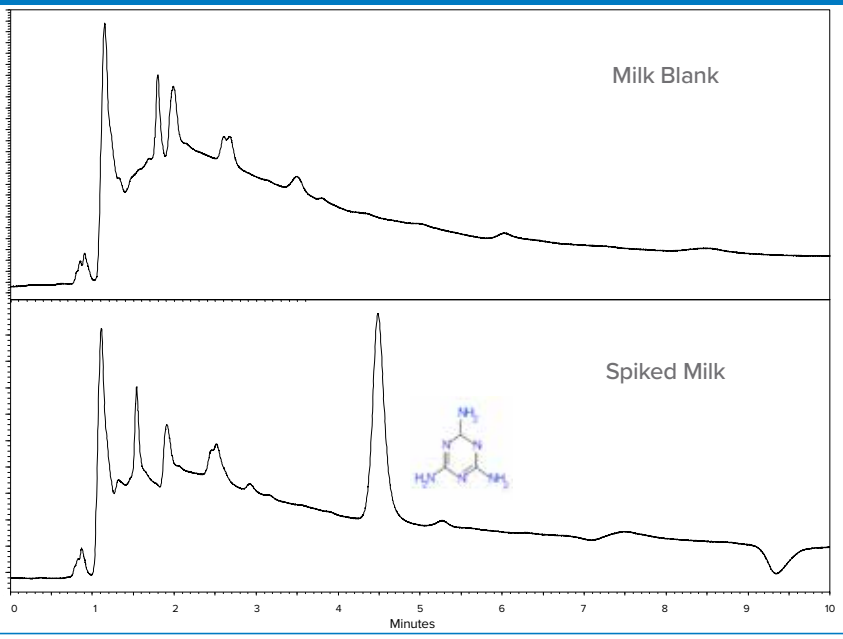


Cole-Parmer HILIC

Melamine Contamination

Melamine is used as an adulterant in many products, including baby milk formula. Due to its highly polar organic nature, 1,3,5-Triazine structure, it can be very difficult to retain in HPLC. Cole-Parmer HILIC provides a simple method in order to quickly quantitate melamine.

Column :	Cole-Parmer HILIC 100x2.1mm 3µm
Item number:	16471-91
Mobile phase:	90:10 ACN : 20mM NH_3OAc
Flow :	0.2 mL/min
Temp :	20 °C
Wavelength:	210 nm



See page 20 for Ordering Information.

Cole-Parmer DIOL

- **Retention of polar compounds**
- **Increased MS sensitivity**
- **Alternate selectivity**
- **Reduced extraction (SPE) and dry down times**

Cole-Parmer DIOL is a HILIC (Hydrophilic Interaction Chromatography) type phase that 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. Cole-Parmer DIOL can increase sensitivity in MS analysis and provide alternate selectivity to that achieved with reversed phase chemistries.

Phase Characteristics

Chemistry	DIOL
Carbon loading	4%
Particle size	3 or 5 µm
Specific area	380 m^2/g
Pore size	100 Å
pH range	2 to 8
USP classification	L20

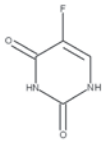
5-Fluorouracil / Uracil

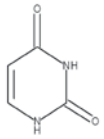
Cole-Parmer DIOL is optimized to help retain and resolve polar analytes and is complementary to other Cole-Parmer phases.

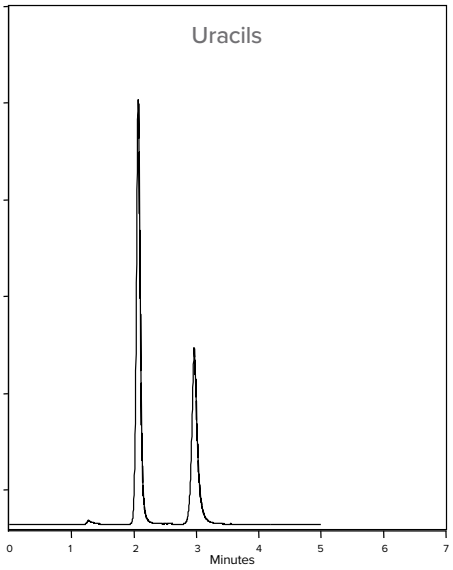
- **Hydrophilic interaction mode**
- **Strong polar retention**
- **Rapid equilibration**

Column : Cole-Parmer DIOL 100x2.1mm 3µm
Item number: 16471-70
Mobile phase: 99:1 ACN : H_2O
Flow : 0.2 mL/min
Temp : 20 °C
Wavelength: 254 nm

1. 5-Fluorouracil
2. Uracil







See page 20 for Ordering Information.

Cole-Parmer Cyano

- **Retention of polars**
- **Alternative selectivity**
- **Normal phase or reverse phase system**
- **Rapid equilibration**

Cole-Parmer Cyano allows the use of aqueous reversed phase conditions to provide less retention for compounds too heavily retained on C18 functionality. Can also be used in normal phase solvent systems to retain and separate polar analyte species. Cyano columns are particularly useful for polar species.

Phase Characteristics

Chemistry	Cyano
Carbon loading	7%
Particle size	3 or 5 µm
Specific area	380 m^2/g
Pore size	100 Å
pH range	2 to 7
USP classification	L10

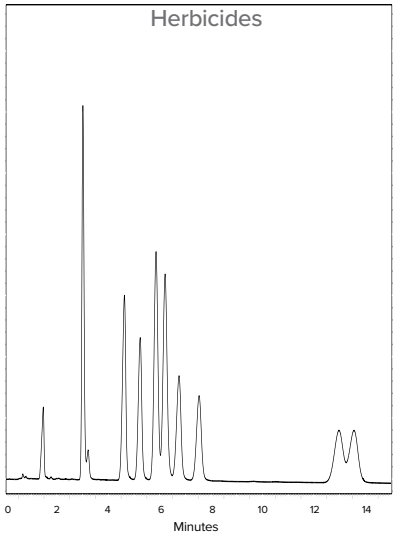
Herbicides

Cole-Parmer Cyano is optimized to help retain and resolve polar analytes and is complementary to other Cole-Parmer phases.

- **Normal phase as well as reversed phase use**
- **Alternative selectivity**
- **Rapid equilibration**

Column : Cole-Parmer Cyano 50x2.1mm 3µm
Item number: 16471-08
Mobile phase: 80:20 H_2O : ACN + 0.2% Acetic acid
Flow : 0.2 mL/min
Temp : 20 °C
Wavelength: 280 nm

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



See page 20 for Ordering Information.

Cole-Parmer Amino

- **Retention of polars**
- **Alternative selectivity**
- **Highly stable ligand density**
- **Rapid equilibration**

Cole-Parmer Amino allows the separation of compounds with reversed phase, normal phase or ion-exchange mechanisms. The Amino bonding is extremely rugged and reproducible to give stable baselines, retention times and selectivity. Amino columns are particularly suited for carbohydrate species.

Phase Characteristics

Chemistry	Amino
Carbon loading	5%
Particle size	3 or 5 µm
Specific area	380 m^2/g
Pore size	100 Å
pH range	2 to 8
USP classification	L8

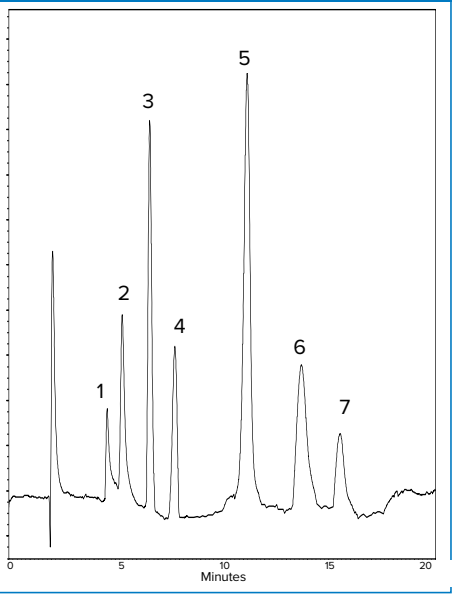
Carbohydrates

Cole-Parmer Amino is optimized to retain and resolve hydrogen bonding compounds and is complementary in resolution to other Cole-Parmer phases.

- **Exceptional for carbohydrate**
- **Alternative selectivity**
- **Rapid equilibration**

Column : Cole-Parmer Amino 150x4.6mm 5µm
Item number: 16471-43
Mobile phase: 75 : 25 ACN : H_2O
Flow : 1.0 mL/min
Temp : 30 °C
Wavelength: RI

1. Ribose
2. Xylose
3. Fructose
4. Glucose
5. Sucrose
6. Maltose
7. Lactose



See page 20 for Ordering Information.

Column Reproducibility

- **Robust column bondings**
- **Assured peak shapes**
- **20% Lower asymmetry specification**
- **10% Higher efficiency**

Each Cole-Parmer HPLC column is tested using a rigorous QC test, using basic analyte probes as well as neutral efficiency markers to ensure that the column reproducibility is of the highest quality.

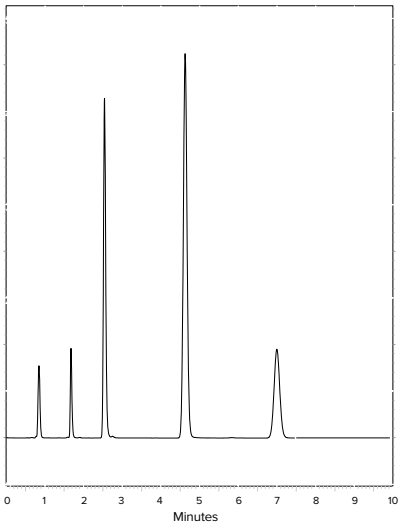
QC Test

Cole-Parmer 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 the quality of the column.

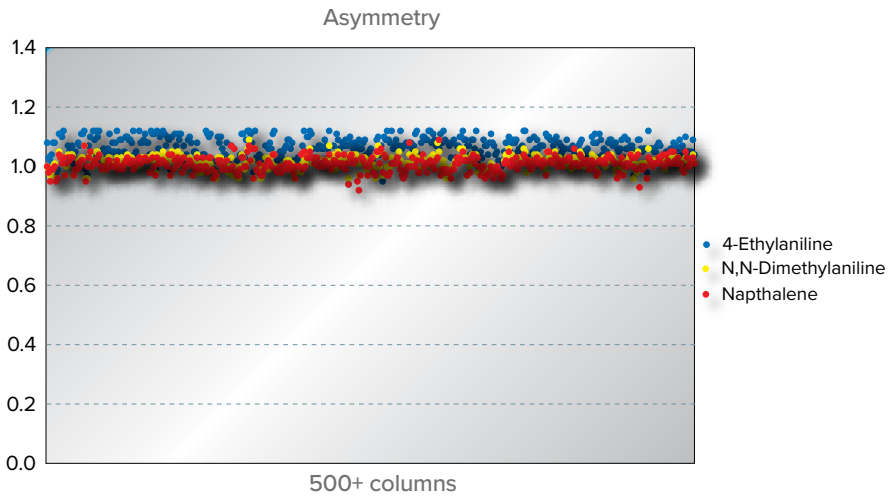
Column: Cole-Parmer C18 100x4.6mm 5µm
Item number: 16470-02
Mobile phase: 60:40 ACN:H_2O
Flow: 1.0 mL/min
Temp: 25 °C
Wavelength: 254 nm

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



Column Reproducibility

Cole-Parmer columns are subject to tight specification using basic analytes in an unbuffered mobile phase system. Any residual uncovered hydroxyl groups present will be highlighted by these basic probes.



Ordering Information

HPLC Columns

Particle size	Length	Column ID	Qty	C18 Item number	Polar endcapped C18 Item number	Diphenyl Item number	C8 Item number	HILIC Item number	DIOL Item number	Cyano Item number	Amino Item number
3 µm	50 mm	2.1 mm	1	16470-08	16470-50	16471-29	16470-29	16471-92	16471-71	16471-08	16471-50
	100 mm	2.1 mm	1	16470-07	16470-49	16471-28	16470-28	16471-91	16471-70	16471-07	16471-49
		4.6 mm	1	16470-05	16470-47	16471-26	16470-26	16471-89	16471-68	16471-05	16471-47
	150 mm	2.1 mm	1	16470-06	16470-48	16471-27	16470-27	16471-90	16471-69	16471-06	16471-48
		4.6 mm	1	16470-04	16470-46	16471-25	16470-25	16471-88	16471-67	16471-04	16471-46
5 µm	50 mm	2.1 mm	1	16470-03	16470-45	16471-24	16470-24	16471-87	16471-66	16471-03	16471-45
	100 mm	4.6 mm	1	16470-02	16470-44	16471-23	16470-23	16471-86	16471-65	16471-02	16471-44
	150 mm	4.6 mm	1	16470-01	16470-43	16471-22	16470-22	16471-85	16471-64	16471-01	16471-43
	250 mm	4.6 mm	1	16470-00	16470-42	16471-21	16470-21	16471-84	16471-63	16471-00	16471-42

Filter & Guard Options

- **Maintain chromatographic integrity and increase column lifetime**
- **Direct-connect guard system for all 3 µm and 5 µm phases**
- **Low-volume in-line filters change out in seconds, not minutes**

Cole-Parmer guards and filters are designed to ensure that erroneous materials do not find their way into the more important and expensive analytical column.

Guard cartridges provide extra protection and are quick to replace in the direct-connect guard holder, reducing downtime. Guards are 10 mm in length which adds sufficient protection to the system without changing retention or selectivity parameters. Available in formats to match your analytical columns.

An alternative to a guard catridge system is an in-line filter. These filters have a fingertight direct connection design, and are placed between the column and the fitting to trap particulate matter before it reaches the analytical column.

Guard Holder

Description	Qty	Item number
Direct-connect guard holder	1	16470-89

Guard Cartridges

Particle size	Length	Diameter	Qty	C18 Item number	Polar endcapped C18 Item number	Diphenyl Item number	C8 Item number	HILIC Item number	DIOL Item number	Cyano Item number	Amino Item number
3 µm	10 mm	2 mm	2	16470-19	16470-61	16471-40	16470-40	16472-03	16471-82	16471-19	16471-61
			4	16470-20	16470-62	16471-41	16470-41	16472-04	16471-83	16471-20	16471-62
		4 mm	2	16470-17	16470-59	16471-38	16470-38	16472-01	16471-80	16471-17	16471-59
			4	16470-18	16470-60	16471-39	16470-39	16472-02	16471-81	16471-18	16471-60
5 µm	10 mm	2 mm	2	16470-15	16470-57	16471-36	16470-36	16471-99	16471-78	16471-15	16471-57
			4	16470-16	16470-58	16471-37	16470-37	16472-00	16471-79	16471-16	16471-58
		4 mm	2	16470-13	16470-55	16471-34	16470-34	16471-97	16471-76	16471-13	16471-55
			4	16470-14	16470-56	16471-35	16470-35	16471-98	16471-77	16471-14	16471-56

In-Line Filters

Description	Qty	Item number
In-line filters, 2 µm	5	16470-90
	10	16470-91

Applications

Compound	Use	Column
1-Hydroxy-midazolam	Anxiolytic	C18
11 a-Hydroxyprogester-one	Steroid	Polar endcapped C18
11 a-Hydroxyprogester-one	Steroid	Cyano
17 a-Hydroxyproges-terone	Steroid	Polar endcapped C18
17-Hydroxyprogesterone	Hormone	C18
2,4-D	Herbicide	Cyano
2,4-DB	Herbicide	Cyano
2,4-DCP	Herbicide	C18
2,4-DP	Herbicide	Cyano
2,6-Dinitrotoluene	Explosives	Cyano
2-Hydroxybenzoic acid	Positional isomers	Diphenyl
2-Hydroxyestradiol	Positional isomers	Diphenyl
2-Nitroaniline	Explosives	Cyano
3-Hydroxyanabsinthin	Sesquiterpene lactones	C18
3-Hydroxybenzoic acid	Positional isomers	Diphenyl
3-Methoxytyramine	Catecholamine	HILIC
3-Nitrobenzoic acid		C18
3-Octanon	Fragrance	C18
4-Ethylaniline		C18
4-Hydroxybenzoic acid	Positional isomers	Diphenyl
4-Hydroxyestradiol	Positional isomers	Diphenyl
4-Nitroaniline	Explosives	Cyano
5-HIAA	Catecholamines	Polar endcapped C18
6-Monacetylmorphine	Drugs of abuse	C18
7-Aminoclonazepam	Hypnotic	C18
7-Aminoflunitrazepam	Benzodiazepines	C18
7-Aminonitrazepam	Anxiolytic	C18
Absinthin	Sesquiterpene lactones	C18
Acetaminophen	Flu relief	C18
Acetic acid	Ear infections	C18
Adenine	Polars	HILIC
ALA	Amino acids	C18
Aldehydes	Aldehydes	C18
Alprazolam	Anxiolytic	C18
Amiloride	Diuretic	C18
Amitriptyline	Antidepressant	C18
Amoxicillin	Antibiotic	C18
Amphetamine	Drugs of abuse	C18
Amprenavir	HIV drugs	C18
Anabsin	Sesquiterpene lactones	C18
Anabsinthin	Sesquiterpene lactones	C18
Apigenin	Natural dyes	C18
ARG	Amino acids	C18
Artemisetin	Sesquiterpene lactones	C18

Compound	Use	Column
Ascisic acid	Plant hormone	C18
Ascorbic acid	Vitamins	HILIC
ASP	Amino acids	C18
Atazanavir	HIV drugs	C18
Atenolol	Beta blocker	Polar endcapped C18
Atorvastatin	Statins	C18
Azithromycin	Antibiotic	C18
Banvel	Herbicide	C18
Bendroflumethiazide	Thiazide diuretic	Polar endcapped C18
Benoquinone acetic acid		Polar endcapped C18
Benzene	Alkyl benzenes	C18
Benzoylecgonine	Drugs of abuse	C18
Benzyladenine	Plant hormone	C18
Bromazepam	Benzodiazepines	C18
Butylbenzene	Alkyl benzenes	C18
Campher	Fragrance	C18
Candesartan cilexetil	Hypertension	C18
Cefachlor	Antibiotic	C18
Cefadroxil	Antibiotic	C18
Cefalexin	Antibiotic	C18
Cefradine	Antibiotic	C18
Chloramphenicol	Antibiotic	Polar endcapped C18
Cineol	Fragrance	C18
Ciprofloxacin	Antibiotic	Diphenyl
Citalopram	Antidepressant	C18
Clonaepam	Hypnotic	C18
Clopidogrel hydrogen SO_4	Antiplatelet	C8
Clozapine	Drugs of abuse	C18
CMPP	Herbicide	Cyano
Co-amoxiclav	Antibiotic	C18
Co-codamol	Pain relief	C18
Cortisone	Anti-inflammatory	C18
CYS-CYS	Amino acids	C18
Cytosine	Nuclosides	HILIC
D3-Digitoxin	Cardiac glycosides	C18
Dalbavancin	Antibiotic	Diphenyl
Demoxepam	Benzodiazepines	C18
Desmethyldiazepam	Anxiolytic	C18
Dexamethasone	Ear infections	C18
Diamorphine	Opioid analgesic	Polar endcapped C18
Dianette	Alkaloid	C18
Diazepam	Anti anxiety	C18

Applications

Compound	Use	Column
Diclofenac sodium	Painkiller	C18
Diethylaniline		C18
Digitoxin	Cardiac glycosides	C18
Dihydroquinidine	Antiarrhythmic	Diphenyl
Diltiazem	High blood pressure	Polar endcapped C18
Dimethylaniline		C18
Diphenhydramine	Antihistamine	C18
D-metafetamine	Drugs of abuse	C18
DOPAC	Catecholamines	Polar endcapped C18
Dopamine	Catecholamine	HILIC
Doxazosin	Apha blocker	Diphenyl
Entecavir	Antiviral	Diphenyl
Epinephrine	Catecholamine	HILIC
Epiyangambin	Sesquiterpene lactones	C18
Erythromycin	Erythromycin	HILIC
Estradiols	Estradiols	C18
Fenuron		C18
Flucloxacillin	Antibiotic	C18
Flunitrazepam	Anxiolytic	C18
Fluoruracil	Polars	HILIC
Fluoxetine	Antidepressant	C18
Folic acid	Vitamin	Polar endcapped C18
Fructose	Monosaccharide	Amino
Gabapentin	Epilepsy	C18
Gibberellin acid	Plant hormone	C18
Gliclazide	Diabetes	C18
GLU	Amino acids	C18
Glucose	Monosaccharide	Amino
GLY	Amino acids	C18
Guanosine	Nuclosides	HILIC
Haloperidol	Antipsychotic	C18
Heptylbenzene	Alkyl benzenes	C18
Hexylbenzene	Alkyl benzenes	C18
HIS	Amino acids	C18
Homogentisic acid		Polar endcapped C18
Hydroxy-21-acetate	Steroid	Cyano
Hydroxyphenylacetic acid		Polar endcapped C18
Hydroxyphenylpyruvic acid		Polar endcapped C18
Hydroxytisone-21-acetate	Steroid	Polar endcapped C18
Ibuprofen	Painkiller	C18
ILE	Amino acids	C18
Indol-3-yl-acetate	Plant hormone	C18

Compound	Use	Column
Irbesartan	Angiotensin II antagonist	C18
Isoascorbic acid	Vitamins	HILIC
Isonicatinamide	Positional isomers	Diphenyl
Ketopelenolide	Sesquiterpene lactones	C18
Kinetin	Plant hormone	C18
Lactose	Disaccharide	Amino
Lamotrigine	Epilepsy	C8
Lanalool	Fragrance	C18
Lanandulyl acetate		C18
Lansoprazole	Stomach ulcers	C18
Lavandulol		C18
LEU	Amino acids	C18
Levocetirizine	Antihistamine	Polar endcapped C18
Lidocaine	Irregular heartbeats	C18
Limonen	Fragrance	C18
Linalyl acetate	Fragrance	C18
Lopinavir	HIV drugs	C18
Loratadine	Antihistamine	C18
Lorazepam	Anti anxiety	Diphenyl
LSD	Drugs of abuse	C18
Luteolin	Natural dyes	C18
LYS	Amino acids	C18
Maltose	Disaccharide	Amino
MCPA	Agrochemicals	C18
MCPB	Weed control	Cyano
MDA	Drugs of abuse	C18
MDEA	Drugs of abuse	C18
MDMA (Ecstasy)	Drugs of abuse	C18
Melamine		HILIC
MET	Amino acids	C18
Metanephrine	Catecholamine	HILIC
Methamphetamine	Drugs of abuse	C18
Methyl melonic acid	Organic acids	Polar endcapped C18
Methylbenzoate		C18
Midazolam	Anxiolytic	C18
Mirtazapine	Antidepressant	C18
Morphine	Drugs of abuse	C18
N,N-Dimethylaniline	QC test	C18
Naphthalene	QC test	C18
Nelfinavir	HIV drugs	C18
Neomycin sulphate	Ear Infections	C18
Nicotinamide	Positional isomers	Diphenyl
Nicotinic acid	Vitamins	HILIC
Nitosininone		Polar endcapped C18

Applications

Compound	Use	Column
Nitrazepam	Anxiolytic	C18
Nitrobenzene	Explosives	Cyano
Nordiazepam	Drugs of abuse	C18
Normetanephrine	Catecholamine	HILIC
Norpinephrine	Catecholamine	HILIC
Nortriptyline	Tricyclic antidepressants	C18
OH-Dalbavancin	Antibiotic	Diphenyl
Omeprazole	Stomach ulcers	C18
Oseltamivir	Antiviral	C18
Oxazepam	Hypnotic	C18
PAH	16 PAH EPA	C18
Paracetamol	Flu relief	C18
Paroxetine	Antidepressant	Polar endcapped C18
PCOC	Weed control	Cyano
Pentylbenzene	Alkyl benzenes	C18
Pesticides	KFDA 83 - 59 pesticides	C18
PHE	Amino acids	C18
Phenoxymethylpenicillin	Antibiotic	C18
Phenylephrine	Flu relief	C18
Pheophorbide		C18
Pheophytin		C18
PK11195	PET tracer	Diphenyl
PK11195 Dechlorinated	PET tracer	Diphenyl
Prednisolone	Steroid	Polar endcapped C18
Prednisone	Steroid	Polar endcapped C18
PRO	Amino acids	C18
Procaine	Anestetic	C18
Prochlorperazine maleate	Phenothiazine antipsychotics	Diphenyl
Progesterone	Steroid	Polar endcapped C18
Proguanil	Anti-malarial	Diphenyl
Promethazine theoclate	Nausea	C18
Propylbenzene	Alkyl benzenes	C18
Protriptyline	Antidepressant	C18
Pyrazoline		C18
Pyridine		C18
Pyridoxine	Polars	HILIC
Pyropheophytin		C18
Quinidine	Antiarrhythmic	Diphenyl
Raloxifene glucoronides	Treat osteoporosis	C18
Riboflavin	Vitamins	HILIC
Ribose	Monosaccharide	Amino
Ritonavir	HIV drugs	C18

Compound	Use	Column
Rosuvastatin	Statins	C18
Sequinavir	HIV drugs	C18
SER	Amino acids	C18
Serotonin	Catecholamines	Polar endcapped C18
Sesartemin	Sesquiterpene lactones	C18
Simvastatin	High blood pressure	Polar endcapped C18
Sotalol	Beta blocker	C18
Succinic acid	Organic acids	Polar endcapped C18
Sucrose	Disaccharide	Amino
Sulfamerazine	Sulfa drugs	C18
Sulfamethoxazole	Sulfa drugs	C18
Sulfathiazole	Sulfa drugs	C18
Telmisartan	Hypertension	C8
Temazepam	Anti anxiety	C18
Tenofovir	HIV drugs	Polar endcapped C18
Terpinen 4 ol	Fragrance	C18
Terpineol	Plant hormone	C18
Testosterone	Hormone	C18
Theophylline	Alkaloid	C18
THR	Amino acids	C18
Thymidine (IS)	HIV drugs	Polar endcapped C18
Tiotropium bromide	Bronchodilator	C18
Toluene	Polars	HILIC
Tramadol	Opioid painkiller	C18
Trimipramine	Antidepressant	C18
TYR	Amino acids	C18
Tyrosine	Amino acids	Polar endcapped C18
Uracil	Nuclosides	HILIC
Uridine	Nuclosides	HILIC
VAL	Amino acids	C18
Valproate semisodium	Manic depression	C8
Verapamil	Irregular heartbeats	C18
Vitamin C	Vitamins	HILIC
Warfarin	Anticoagulant	Polar endcapped C18
Xylose	Monosaccharide	Amino
Zolpidem	Hypnotic	C18
Zopiclone	Hypnotic	C18

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