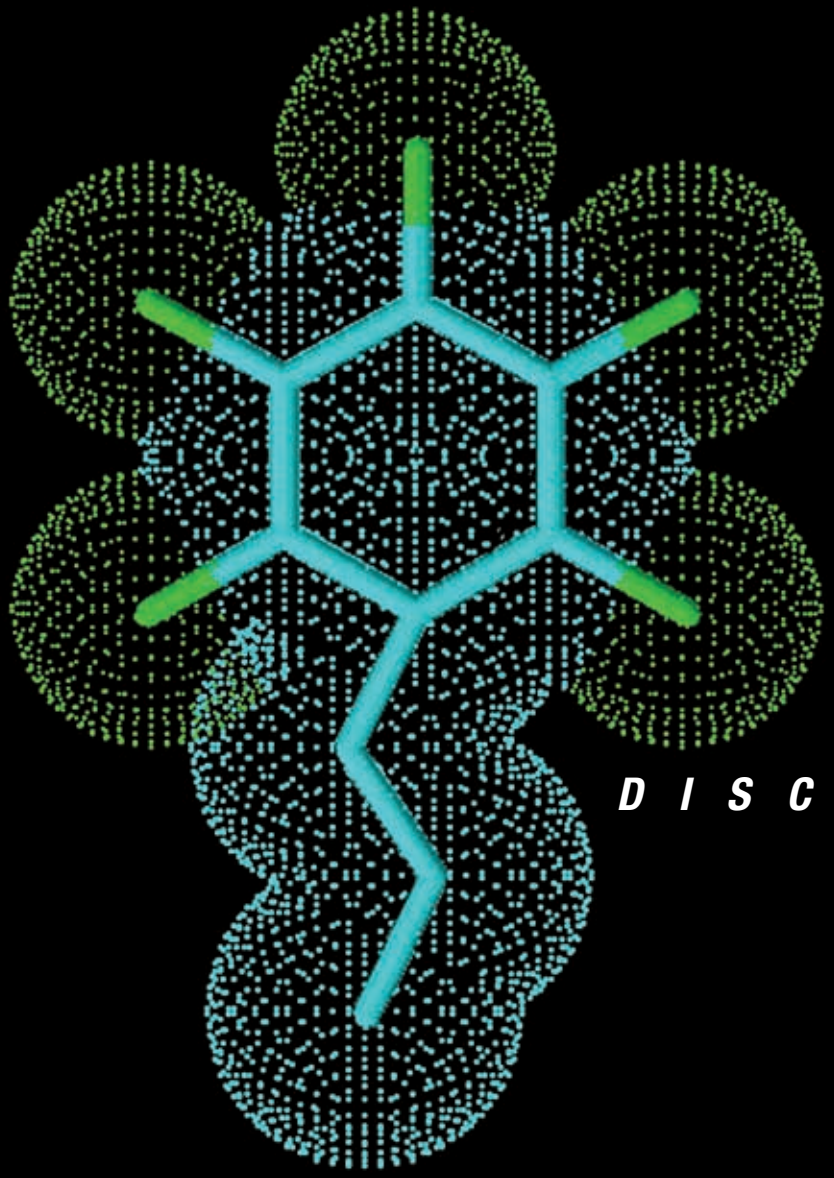


explore

LUNA®

PFP(2)

DISCOVER SELECTIVITY

Pentafluorophenyl Propyl Ligand

phenomenex®

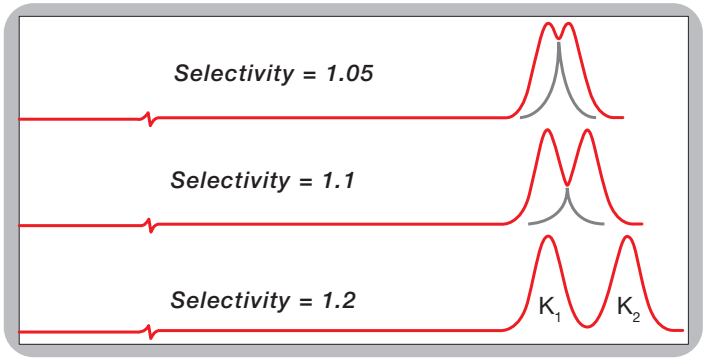
...breaking with tradition℠

Discover New Selectivity

Resolution (R_s) is the goal of every chromatographic method. It describes the separation power of the complete chromatographic system relative to the particular components of the mixture.

$$R_s = \frac{\sqrt{N}}{4}\left(\frac{\alpha\text{-}1}{\alpha}\right)\left(\frac{k}{k+1}\right)$$

Selectivity (α) describes the relative retention time (k_2 / k_1) of two peaks. It is the most important variable in chromatographic performance.



Notice how even small changes in Selectivity can dramatically affect chromatographic performance.

In HPLC, Selectivity is achieved through 5 mechanisms of interaction

	Bond Type	Relative Strength
1	**Ionic Interaction**	**1000**
2	**Hydrogen Bonding**	**100**
3	**Dipole-Dipole Interactions**	**10**
4	Aromatic and **π-π** Interactions	**5**
5	**Hydrophobic Interaction**	**1** Alkyl phases will use hydrophobic selectivity.

Explore the Advantages of Luna PFP(2)

- Multiple mechanisms for alternative selectivity
- Orthogonal selectivity (to traditional C18 phases) for more hits in your method screening
- Unique polar interactions for trace impurity identification

Luna PFP(2) Selectivity is achieved through 4 of the 5 mechanisms of interaction

1	**Hydrogen Bonding**
2	**Dipole-Dipole Interactions**
3	**Aromatic and π-π Interactions**
4	**Hydrophobic**

A typical alkyl phase (C18, C8) achieves selectivity through only 1 mechanism of interaction.

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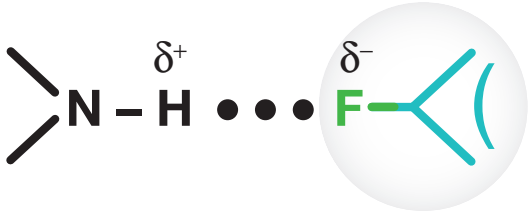
Explore the Mechanisms

1. Hydrogen bonding interactions

Hydrogen bonding is an extremely effective retention mechanism for polar compounds. The presence of hydrogen atoms bonded to heteroatoms (i.e., oxygen, nitrogen, or sulfur) produces polar groups that exhibit a significant difference in electronegativity between the heteroatom (electron rich) and hydrogen atom (electron poor). These functional groups (i.e. -OH, -NH, or –SH) allow potential hydrogen bonding interactions to occur.

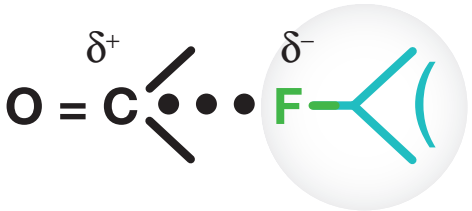
- Hydrogen atoms, when covalently bound in a solute molecule, as they are in protonated amines and hydroxyl groups, will interact electrostatically with the electronegative fluorine (F) atom on the PFP ligand
- Low pH mobile phases, which cause bases to be protonated, increase opportunities for hydrogen bonding interactions with fluorine (F) atoms

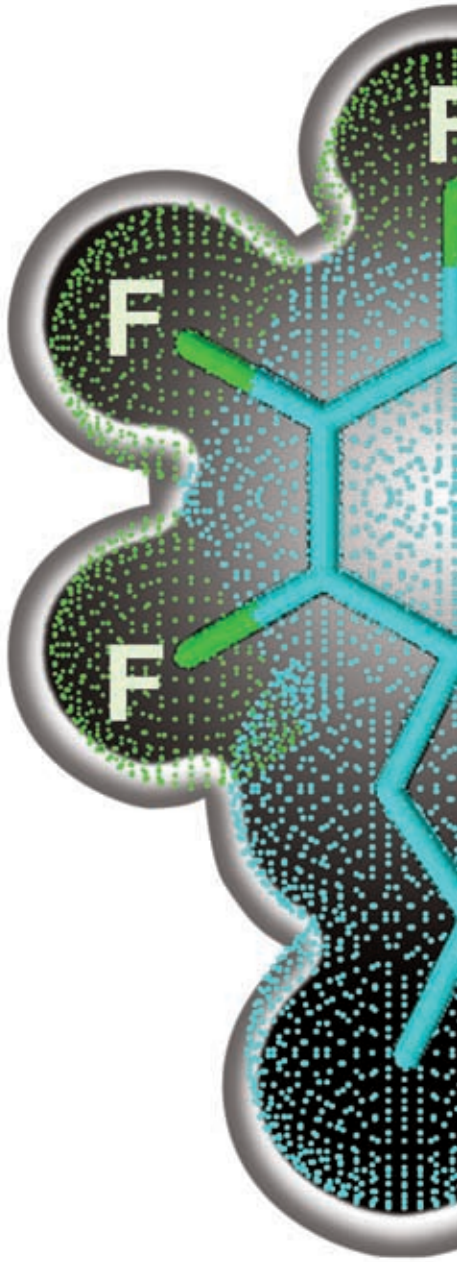


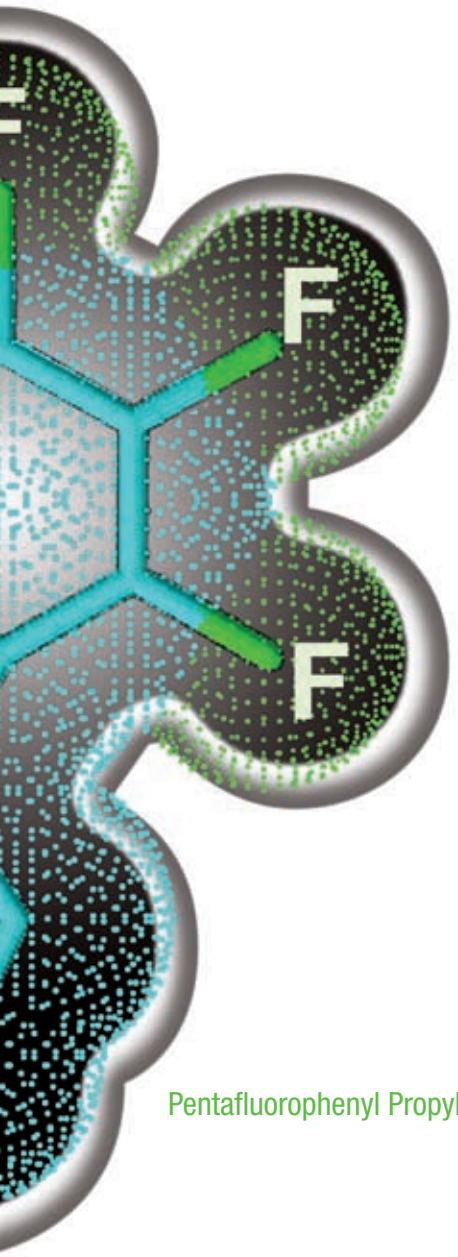
2. Dipole-Dipole interactions

Luna PFP(2) can participate in both dipole-dipole interactions and induced dipole-dipole interactions, increasing the potential for solute/ stationary phase interactions. Dipole-dipole interactions act upon polar solutes in much the same way as ionic interaction, only the effect is much weaker due to the partial charge. Induced dipole-dipole interactions may actually accommodate a brief electrostatic interaction between the PFP ligands and neutral solutes.

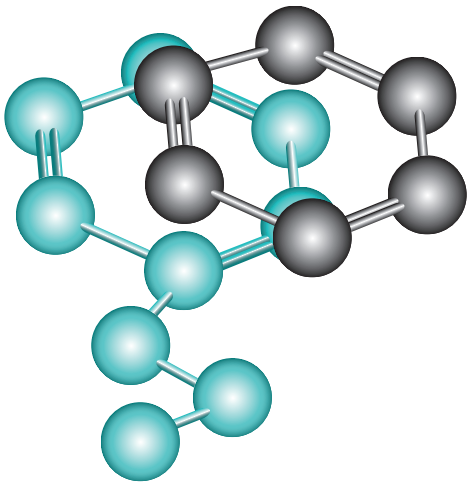
- Polar interactions are created as the highly electronegative fluorine (F) atoms on the PFP ligands are in a constant partially negative charged state that will attract the partial positive charge on polar solutes
- Induced dipole-dipole can create interactions between the stationary phase and neutral solutes as the highly electronegative fluorine atom can induce an asymmetrical distribution of charge in the neutral solute and create a brief electrostatic interaction







Pentafluorophenyl Propyl Ligand



3. Aromatic and π-π interactions

Many important organic compounds will contain conjugated groups such as aromatic rings or double / triple bonds that may be attracted to Luna PFP(2). The PFP ligand contains a benzene ring, an unsaturated aromatic hydrocarbon with alternating double and single bonds, which is highly prone to electrophilic interactions due to the delocalized electrons in p-orbitals above and below the planar ring.

- Solutes containing aromatic rings may participate in a stacking interaction occuring with the benzene ring of the PFP ligand. π-π interactions caused by the overlapping p-orbitals of both rings create an attraction that may initiate the solute to arrange itself over the stationary phase group in a discriminating interaction

- Non-aromatic solutes containing double or triple bonds have p-orbital electrons that are ready to interact with the delocalized electron field of the PFP benzene ring. Compounds differing only in the presence or absence of double or triple bonds will receive dissimilar stationary phase interaction

4. Hydrophobic interactions

Hydrophobic interactions will occur with any carbon containing solute. These are ‘reversed phase’ type interactions that are difficult to quantify in terms of strength, but are the mainstay of many HPLC methods in practice. What is commonly referred to as ‘hydrophobic bonding’ is actually a consequence of water’s attempt to maximize polar interactions through its own hydrogen bonding network.

- Hydrophobic interaction is not really bonding, but it is often referred to as such. In an aqueous rich HPLC mobile phase acting upon a hydrophobic stationary phase, water will continuously move, through exclusion, hydrophobic organic groups into that stationary phase. This action is more thermodynamically stable than forming a cavity around the hydrophobic solute

- The propyl linkage and the benzene ring of the PFP ligand both permit an organic rich layer on the silica surface that is a partitioning target for the aqueous excluded carbon solutes

explore LUNA® PFP(2)

DISCOVER SELECTIVITY

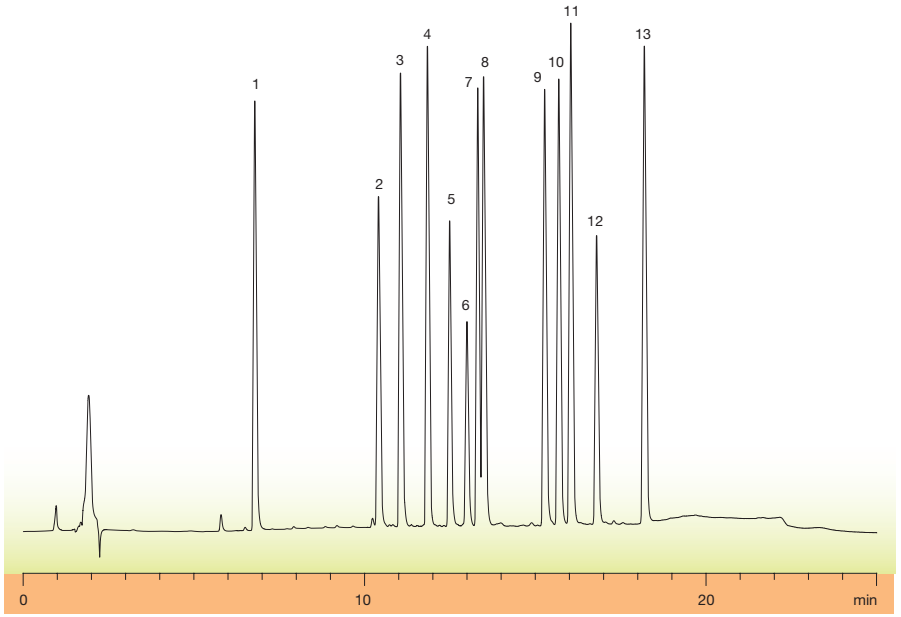
Complex Natural Products

Paclitaxel (Taxol®) and taxane analogs have shown results as anticancer and antitumor drugs. With ever increasing demands for testing, more stable and reproducible columns for new testing methods are required.

- New Luna PFP(2) column addresses the need for better and more reliable taxane separations
- Luna PFP(2) is an improvement in the analysis of complex taxane analogs

Taxanes on Luna 3 µm PFP(2) App ID 16300

Column:	Luna 3 µm PFP(2)
Dimension:	150 x 4.6 mm
Part No.:	00F-4447-E0
Mobile Phase:	A: Water B: Acetonitrile
Gradient:	A/B (75:25) to (30:70) in 20 min
Flow Rate:	1 mL/min
Temperature:	22 °C
Detection:	UV @ 225 nm
Sample:	1. 10-Deacetylbaccatin III 2. Paccatin III 3. 10-Deacetyl-7-xylosyltaxol B 4. Taxinine M 5. 10-Deacetyl-7-xylosyltaxol 6. 10-Deacetyl-7-xylosyltaxol C 7. 10-Deacetyltaxol 8. 7-Xylosyltaxol 9. Cephalomannine 10. 10-Deacetyl-7-epitaxol 11. Paclitaxel 12. Taxol C 13. 7-Epitaxol



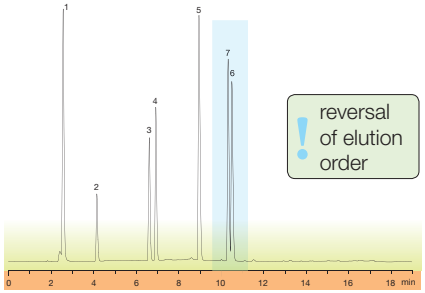
Highly Polar Compounds

Compounds containing charged amine groups are highly polar and very difficult to be accurately quantitated on traditional reversed phase columns.

Selectivity to detect and quantify low level nitrogen containing analytes containing primary, secondary and tertiary amine groups

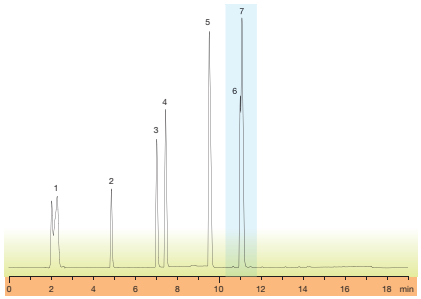
Antihistamines on Luna PFP(2) at Low pH App ID 16284

Column: Luna 5 µm PFP(2)
Dimension: 150 x 4.6 mm
Part No.: 00F-4448-E0
Mobile Phase: A: 20mM Potassium phosphate, pH 2.5
B: Acetonitrile
Gradient: A/B (90:10) to (20:80) in 15 min
Flow Rate: 1 mL/min
Temperature: 22 °C
Detection: UV @ 220 nm
Sample:
1. Malic acid
2. Doxylamine
3. Chlorpheniramine
4. Bromopheniramine
5. Diphenhydramine
6. Chlorphenoxamine
7. Loratadine



Antihistamines on Synergi™ Polar-RP™ at Low pH App ID 16283

Column: Synergi 4 µm Polar-RP
Dimension: 150 x 4.6 mm
Part No.: 00F-4336-E0
Mobile Phase: A: 20mM Potassium phosphate, pH 2.5
B: Acetonitrile
Gradient: A/B (90:10) to (20:80) in 15 min
Flow Rate: 1 mL/min
Temperature: 22 °C
Detection: UV @ 220 nm
Sample:
1. Malic acid
2. Doxylamine
3. Chlorpheniramine
4. Bromopheniramine
5. Diphenhydramine
6. Chlorphenoxamine
7. Loratadine

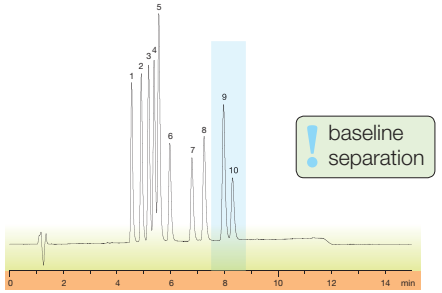


Halogens can radically increase the polarity of a compound, thus decreasing typical retention characteristics. Luna PFP(2) retains, discriminates, and separates halogens easily.

Strong attraction for halogenated compounds

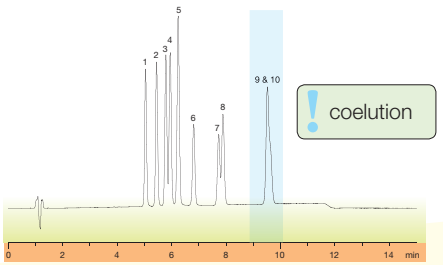
Positional Isomers of Halogenated Phenols on Luna 3 µm PFP(2) App ID 16296

Column: Luna 3 µm PFP(2)
Dimension: 150 x 4.6 mm
Part No.: 00F-4447-E0
Mobile Phase: A: 0.1 % Formic acid in Water
B: 0.1 % Formic acid in Acetonitrile
Gradient: A/B (60:40) to (50:50) in 10 min
Flow Rate: 1 mL/min
Temperature: 22 °C
Detection: UV @ 254 nm
Sample:
1. 2,3-Dimethylphenol
2. 2,5-Dimethylphenol
3. 2,6-Dimethylphenol
4. 3,4-Dimethylphenol
5. 3,5-Dimethylphenol
6. 2,5-Dichlorophenol
7. 2,6-Dichlorophenol
8. 3,4-Dichlorophenol
9. 3,5-Dichlorophenol
10. 2,4-Dibromophenol



Positional Isomers of Halogenated Phenols on Luna 3 µm C18(2) App ID 16297

Column: Luna 3 µm C18(2)
Dimension: 150 x 4.6 mm
Part No.: 00F-4251-E0
Mobile Phase: A: 0.1% Formic acid in Water
B: 0.1% Formic acid in Acetonitrile
Gradient: A/B (60:40) to (50:50) in 10 min
Flow Rate: 1 mL/min
Temperature: 22 °C
Detection: UV @ 254 nm
Sample:
1. 2,3-Dimethylphenol
2. 2,5-Dimethylphenol
3. 2,6-Dimethylphenol
4. 3,4-Dimethylphenol
5. 3,5-Dimethylphenol
6. 2,5-Dichlorophenol
7. 2,6-Dichlorophenol
8. 3,4-Dichlorophenol
9. 3,5-Dichlorophenol
10. 2,4-Dibromophenol



explore LUNA® PFP(2)

DISCOVER SELECTIVITY

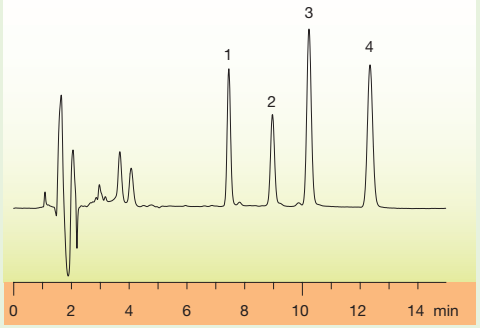
Conjugated Compounds

Compounds that may differ only in their level of conjugation are easily identified and quantified on Luna PFP(2) by electrophilic interaction.

Enchanced selectivity for compounds with double or triple bonds

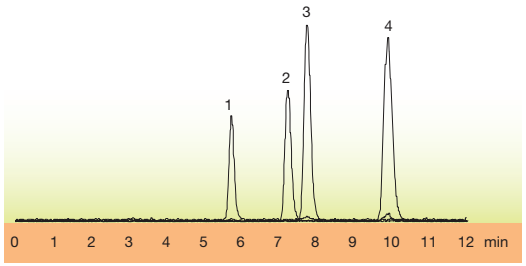
Aflatoxins on Luna 3 µm PFP(2) App ID 16356

Column:	Luna 3 µm PFP(2)
Dimension:	150 x 4.6 mm
Part No.:	00F-4447-E0
Mobile Phase:	10 mM Ammonium Acetate, pH 4.5/ Acetonitrile (70:30)
Flow Rate:	1 mL/min
Detection:	UV @ 220 nm
Sample:	1. Aflatoxin G2 2. Aflatoxin B2 3. Aflatoxin G1 4. Aflatoxin B1



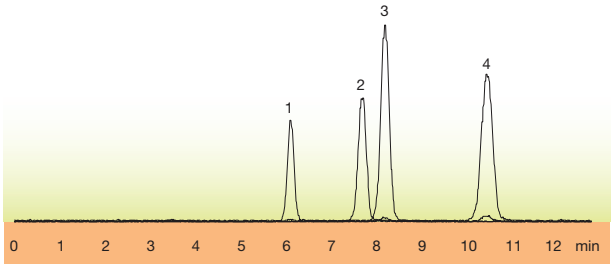
Aflatoxins on Synergi Max-RP App ID 15523

Column:	Synergi 4 µm Max-RP
Dimension:	150 x 3.0 mm
Part No.:	00F-4337-Y0
Mobile Phase:	10 mM Ammonium Acetate, pH 4.5 /Acetonitrile (70:30)
Flow Rate:	0.5 mL/min
Temperature:	22 °C
Detection:	Mass Spectrometer (MS)
Sample:	1. Aflatoxin G2 2. Aflatoxin B2 3. Aflatoxin G1 4. Aflatoxin B1



Aflatoxins on Gemini® 5 µm C18 App ID 15524

Column:	Gemini 5 µm C18
Dimension:	150 x 3.0 mm
Part No.:	00F-4435-Y0
Mobile Phase:	10 mM Ammonium Acetate, pH 4.5 /Acetonitrile (70:30)
Flow Rate:	0.5 mL/min
Detection:	Mass Spectrometer (MS)
Sample:	1. Aflatoxin G2 2. Aflatoxin B2 3. Aflatoxin G1 4. Aflatoxin B1



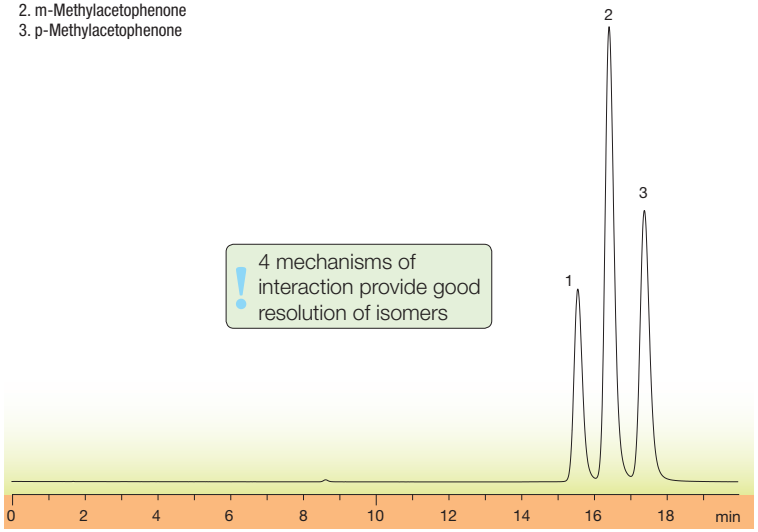
Isomeric Compounds

Positional changes on an analyte of interest may effect the compound's dipole moment. This change can be readily noticed by the highly electronegative **fluorine (F) atom** and other retention mechanisms.

Excellent choice for positional isomers due to the multiple retention characteristics of Luna PFP(2)

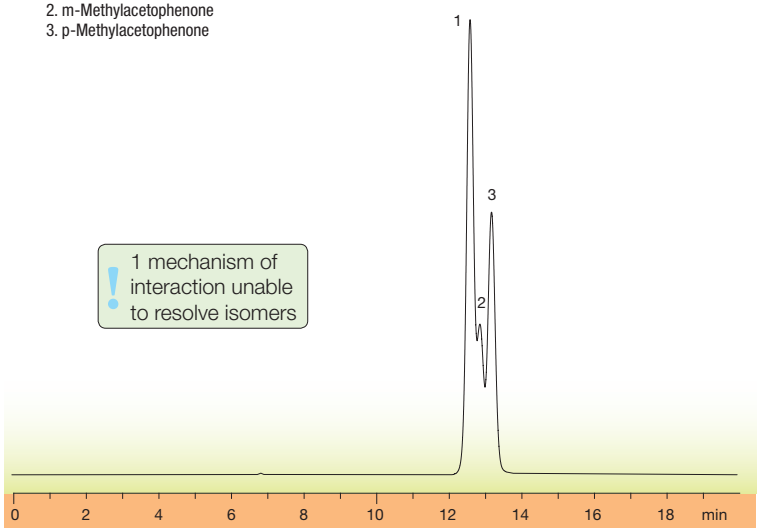
Positional Isomers of Methylacetophenone on Luna 3 µm PFP(2) App ID 16298

Column: Luna 3 µm PFP(2)
Dimension: 150 x 4.6 mm
Part No.: 00F-4447-E0
Mobile Phase: Water/ Methanol (50:50)
Flow Rate: 1 mL/min
Temperature: 22 °C
Detection: UV @ 254 nm
Sample: 1. o-Methylacetophenone
2. m-Methylacetophenone
3. p-Methylacetophenone



Positional Isomers of Methylacetophenone on Luna 3 µm C18(2) App ID 16299

Column: Luna 3 µm C18(2)
Dimension: 150 x 4.6 mm
Part No.: 00F-4251-E0
Mobile Phase: Water/ Methanol (50:50)
Flow Rate: 1 mL/min
Temperature: 22 °C
Detection: UV @ 254 nm
Column: 1. o-Methylacetophenone
2. m-Methylacetophenone
3. p-Methylacetophenone



explore LUNA® PFP(2)

DISCOVER SELECTIVITY

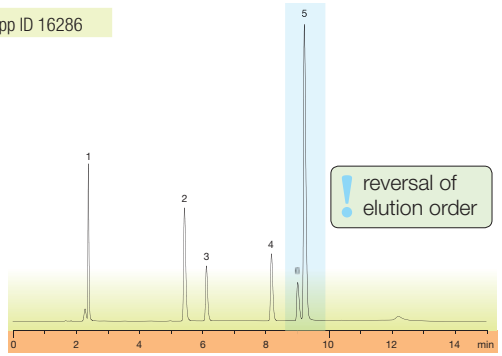
Aromatic Compounds

Aromatic compounds show unique retention characterisitics on Luna PFP(2) compared to traditional reversed phase columns.

The presence of the aromatic benzene ring in Luna PFP(2) increases the relative attraction between the stationary phase and aromatic analytes, leading to increased retention for these types of compounds

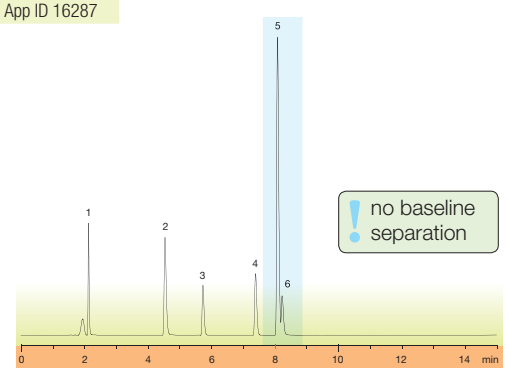
Beta-Blockers on Luna PFP(2) at Low pH App ID 16286

Column: Luna 5 µm PFP(2)
Dimension: 150 x 4.6 mm
Part No.: 00F-4448-E0
Mobile Phase: A: 20 mM Potassium phosphate, pH 2.5
B: Acetonitrile
Gradient: A/B (85:15) to (50:50) in 10 min
Flow Rate: 1 mL/min
Temperature: 22 °C
Detection: UV @ 230 nm
Sample:
1. Atenolol
2. Pindolol
3. Metoprolol
4. Labetalol
5. Propranolol
6. Alprenolol



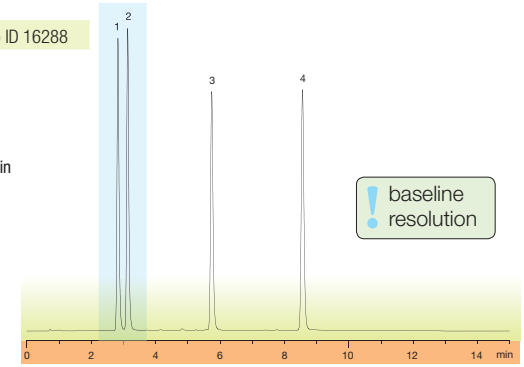
Beta-Blockers on Luna C18(2) at Low pH App ID 16287

Column: Luna 5 µm C18(2)
Dimension: 150 x 4.6 mm
Part No.: 00F-4252-E0
Mobile Phase: A: 20 mM Potassium phophate, pH 2.5
B: Acetonitrile
Gradient: A/B (85:15) to (50:50) in 10 min
Flow Rate: 1 mL/min
Temperature: 22 °C
Detection: UV @ 230 nm
Sample:
1. Atenolol
2. Pindolol
3. Metoprolol
4. Labetalol
5. Propranolol
6. Alprenolol



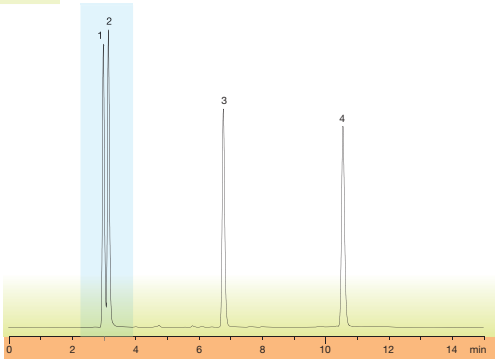
Steroid Mix on Luna PFP(2) App ID 16288

Column: Luna 5 µm PFP(2)
Dimension: 150 x 4.6 mm
Part No.: 00F-4448-E0
Mobile Phase: A: Water
B: Acetonitrile
Gradient: A/B (60:40) to (30:70) in 8 min, hold for 2 min
Flow Rate: 1 mL/min
Temperature: 22 °C
Detection: UV @ 254 nm
Sample:
1. Prednisone
2. Prednisolone
3. Hydroxyprogesterone
4. Progesterone



Steroid Mix on Luna C18(2) App ID 16289

Column: Luna 5 µm C18(2)
Dimension: 150 x 4.6 mm
Part No.: 00F-4252-E0
Mobile Phase: A: Water
B: Acetonitrile
Gradient: A/B (60:40) to (30:70) in 8 min, hold for 2 min
Flow Rate: 1 mL/min
Temperature: 22 °C
Detection: UV @ 254 nm
Sample:
1. Prednisone
2. Prednisolone
3. Hydroxyprogesterone
4. Progesterone

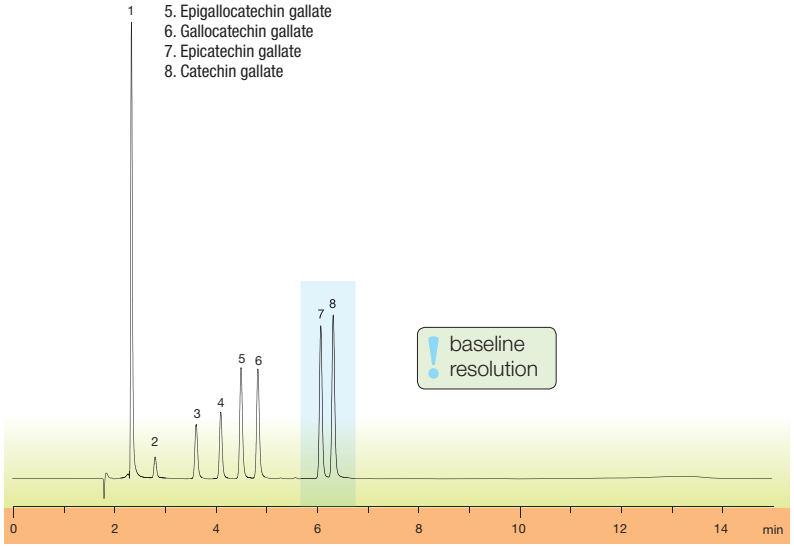


Aromatic Compounds (con't)

Closely related polyphenolic compounds are readily separated with Luna PFP(2)

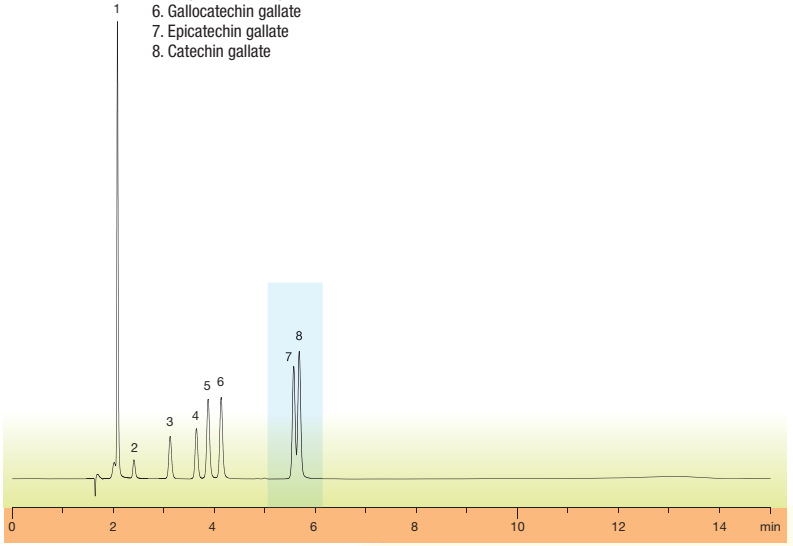
Catechins on Luna 3 µm PFP(2) App ID 16294

Column:	Luna 3 µm PFP(2)
Dimension:	150 x 4.6 mm
Part No.:	00F-4447-E0
Mobile Phase:	A: 0.1 % Formic acid in Water B: 0.1 % Formic acid in Acetonitrile
Gradient:	A/B (80:20) to (55:45) in 10 min
Flow Rate:	1 mL/min
Temperature:	22 °C
Detection:	UV @ 280 nm
Sample:	1. Gallic acid 2. Epigallo catechin 3. Catechin 4. Epicatechin 5. Epigallocatechin gallate 6. Gallocatechin gallate 7. Epicatechin gallate 8. Catechin gallate



Catechins on Luna 3 µm C18(2) App ID 16295

Column:	Luna 3 µm C18(2)
Dimension:	150 x 4.6 mm
Part No.:	00F-4251-E0
Mobile Phase:	A: 0.1 % Formic acid in Water B: 0.1 % Formic acid in Acetonitrile
Gradient:	A/B (80:20) to (55:45) in 10 min
Flow Rate:	1 mL/min
Detection:	UV @ 280 nm
Sample:	1. Gallic acid 2. Epigallo catechin 3. Catechin 4. Epicatechin 5. Epigallocatechin gallate 6. Gallocatechin gallate 7. Epicatechin gallate 8. Catechin gallate



explore LUNA® PFP(2)

DISCOVER SELECTIVITY

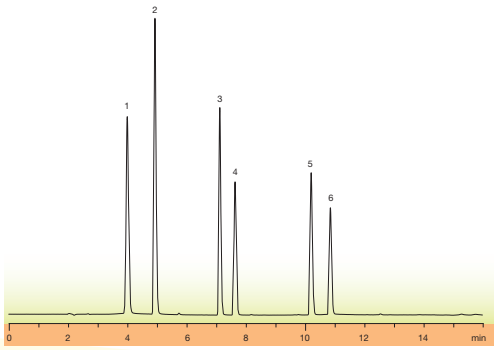
A Wide Variety of Compounds

Minor functional group changes near pi electrons can be readily exploited with Luna PFP(2).

Aromatic acids, aromatic antibiotics, aromatic sulfurs, phenoxy herbicides, structural isomers

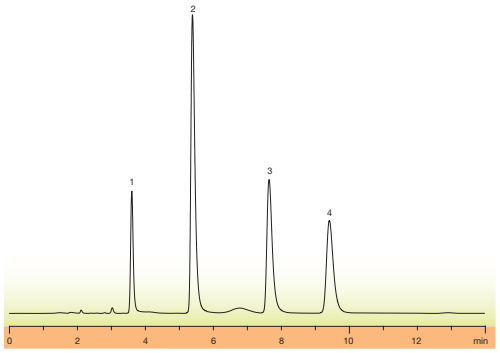
Sulfa Drugs on Luna PFP(2) at low pH App ID 16285

Column:	Luna 5 µm PFP(2)
Dimension:	150 x 4.6 mm
Part No.:	00F-4448-E0
Mobile Phase:	A: 0.1 % Formic acid in Water B: 0.1 % Formic acid in Acetonitrile
Gradient:	A/B (95:5) to (20:80) in 15 min
Flow Rate:	1 mL/min
Temperature:	22 °C
Detection:	UV @ 254 nm
Sample:	1. Sulfaguanidine 2. Sulfanilamide 3. Sulfathiazole 4. Sulfamerazine 5. Sulfamethoxazole 6. Sulfaquinoxaline



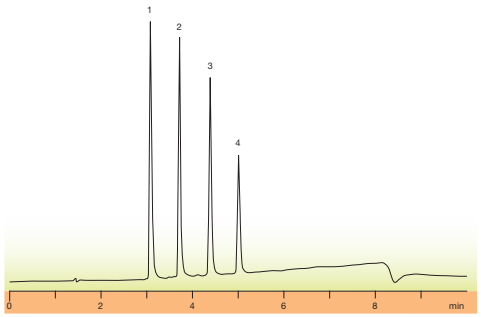
Analgesics on Luna 5 µm PFP(2) App ID 16303

Column:	Luna 5 µm PFP(2)
Dimension:	150 x 4.6 mm
Part No.:	00F-4448-E0
Mobile Phase:	20 mM Potassium phosphate, pH 2.5/ Acetonitrile (50:50)
Flow Rate:	1 mL/min
Temperature:	22 °C
Detection:	UV @ 230 nm
Sample:	1. Ethyl paraben 2. Naproxen 3. Indomethacin 4. Ibuprofen



Herbicides on Luna 3 µm PFP(2) App ID 16305

Column:	Luna 3 µm PFP(2)
Dimension:	150 x 4.6 mm
Part No.:	00F-4447-E0
Mobile Phase:	A: 0.1 % Formic acid in Water B: 0.1 % Formic acid in Acetonitrile
Gradient:	A/B (45:55) to (25:75) in 6 min
Flow Rate:	1 mL/min
Temperature:	22 °C
Detection:	UV @ 280 nm
Sample:	1. 4-Chlorophenoxyacetic acid 2. 2,4-Dichlorophenoxyacetic acid 3. 2,4,5-Trichlorophenoxyacetic acid 4. 2 (2,4,5-Trichlorophenoxy) propionic acid

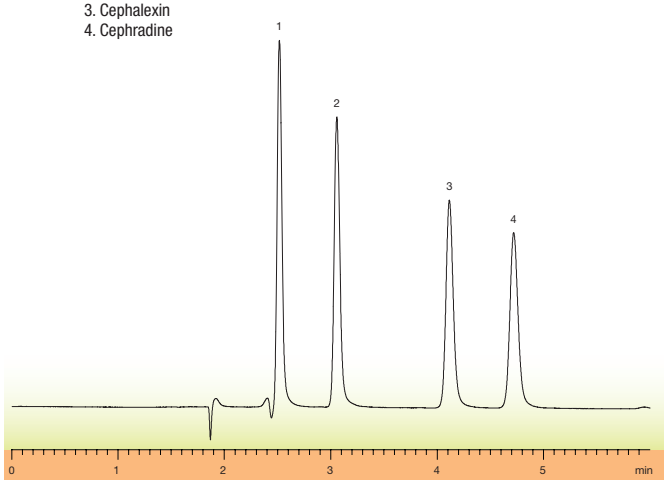


A Wide Variety of Compounds (con't)

The unique retention mechanisms associated with Luna PFP(2) make it an ideal column to place on all column screens

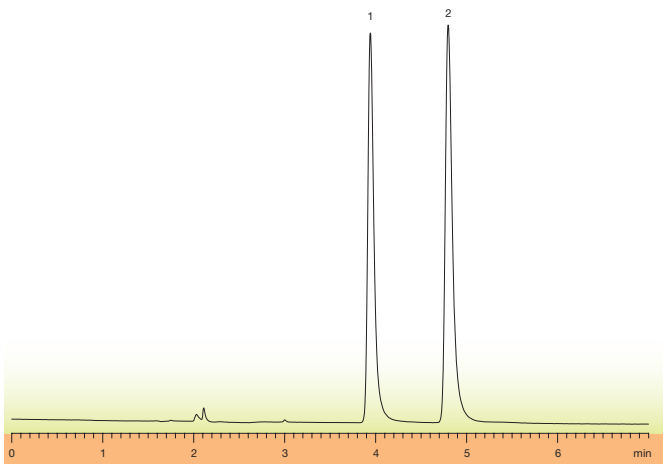
Cephalosporins on Luna 3 µm PFP(2) App ID 16304

Column:	Luna 3 µm PFP(2)
Dimension:	150 x 4.6 mm
Part No.:	00F-4447-E0
Mobile Phase:	20 mM Potassium phosphate, pH 2.5/ Acetonitrile (85:15)
Flow Rate:	1 mL/min
Temperature:	22 °C
Detection:	UV @ 254 nm
Sample:	1. Cefadroxil 2. Cefaclor 3. Cephalexin 4. Cephradine



Geometric Isomers of Maleic Acid and Fumaric Acid on Luna 3 µm PFP(2) App ID 16302

Column:	Luna 3 µm PFP(2)
Dimension:	150 x 4.6 mm
Part No.:	00F-4447-E0
Mobile Phase:	20 mM Potassium phosphate, pH 2.5/ Acetonitrile (97:3)
Flow Rate:	1 mL/min
Temperature:	22 °C
Detection:	UV @ 210 nm
Sample:	1. Maleic acid 2. Fumaric acid



The Luna Legacy

The Luna PFP(2) Advantage

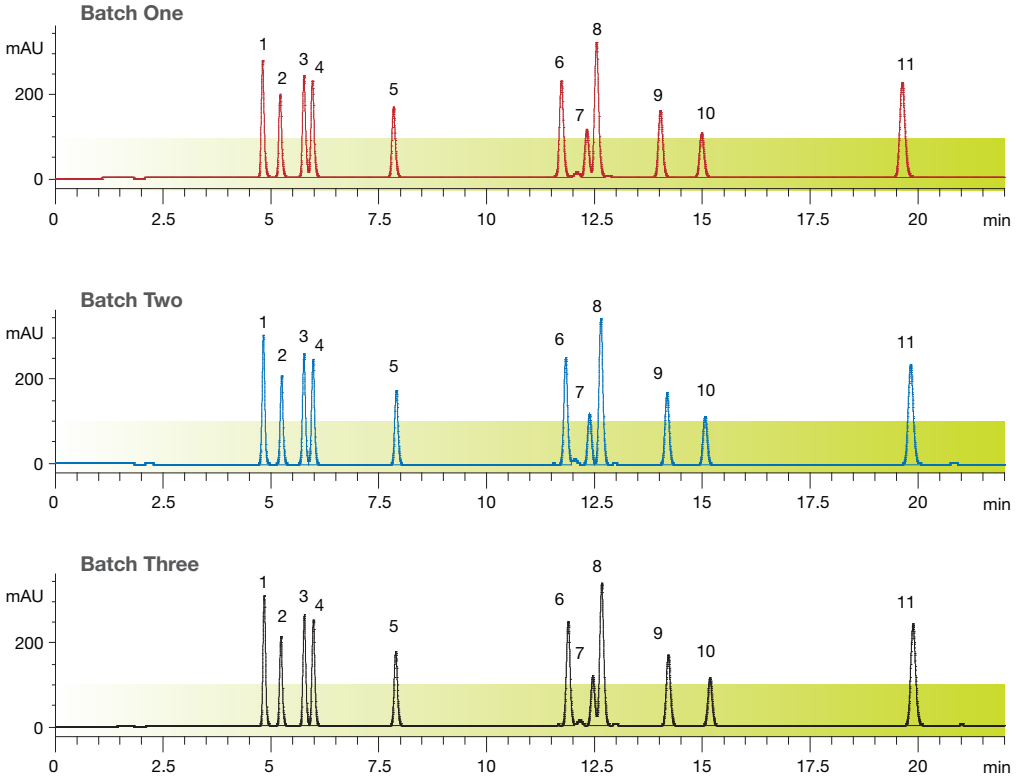
Luna PFP(2) lives up to the exacting standards of quality and customer satisfaction that has been exemplified in the 10 years of the Luna brand.

- Ultra-pure metal free (99.99 % purity) Luna silica supplies a new level of performance and reproducibility
- Proprietary silica treatment and bonding ensures a robust column
- Chemistry bound to this base sorbent is as stable and reproducible as alkyl phases

Steroids App ID 16290

Column:	Luna 3 µm PFP(2)
Dimension:	150 x 4.6 mm
Part No.:	00F-4447-E0
Mobile Phase:	A: Water B: Acetonitrile
Gradient:	A/B (70:30) to (35:65) in 25 min
Flow Rate:	1.0 mL/min
Injection:	2 µL
Detection:	UV @ 220 nm
Sample:	1. Estriol 2. Hydrocortisone 3. Prednisone 4. Cortisone 5. Corticosterone 6. Estradiol 7. Cortisone acetate 8. 2,1-Hydroxyprogesterone 9. 17-Hydroxyprogesterone 10. Estrone 11. Progesterone

Batch-to-Batch Reproducibility



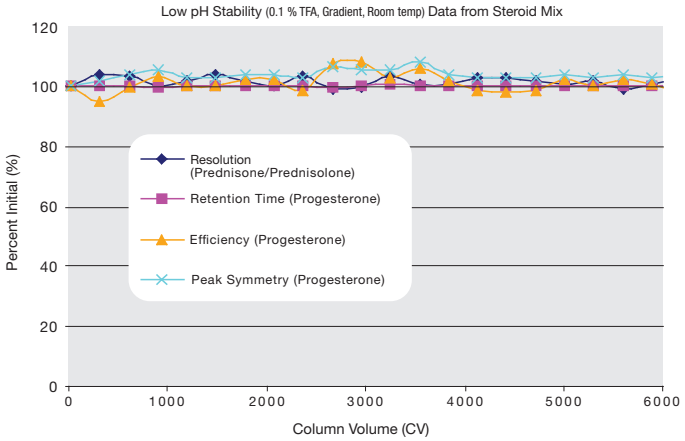
The Trouble with other Fluorinated Columns

Traditional PFP phases have failed to maximize user confidence by not generating high accuracy of data, precision, reproducibility, and ruggedness of phase.

- Inconsistencies in the base silica can be amplified in the resence of the sensitive PFP stationary phase!
- Residual metal ions in the silica can increase the activity of residual silanols, effecting the characteristics of the bonded fluorine groups.

The Luna Legacy (con't)

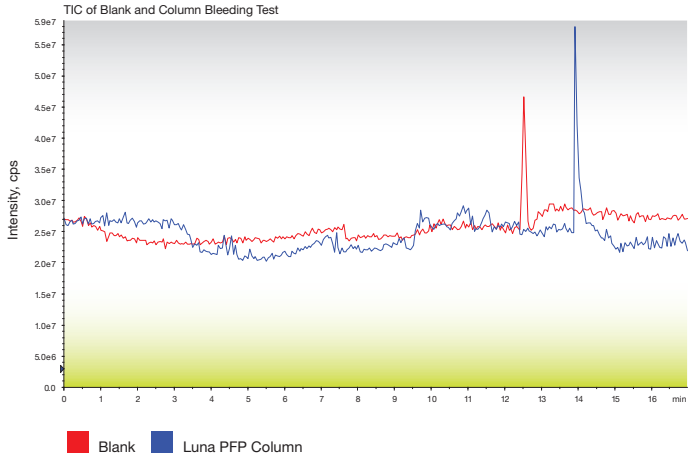
The ideal Luna surface and quality control ensure robustness and stability even when exposed to harsh TFA conditions of pH 2.0 that, in many other fluorinated phases, may result in considerable loss of stationary phase.



pH Stability

Column: Luna 5 µm PFP(2)
Dimension: 150 x 4.6 mm
Part No.: 00F-4448-E0
Mobile Phase: A: 0.1 % TFA in Water, pH 2.0
B: 0.1 % TFA in Acetonitrile
Gradient: 5 % B to 95 % B in 10 min
Re-equilibrate at 5 % B for 5 min
Flow Rate: 1.0 mL/min
Temperature: Room temperature
Detection: UV @ 254 nm
Sample: Reversed Phase 2 Test Mix (Uracil, Acetophenone, Benzene, Toluene, Naphthalene)

Challenge Tests: Every cycle of 12 flushes
Mobile Phases: A: Water
B: Acetonitrile
Gradient: 40 % to 70 % B in 8 min
Hold at 70 % B for 3 min
Flow Rate: 1.0 mL/min
Temperature: Room temperature
Detection: UV @ 254 nm
Sample: Steroid Test Mix (Prednisone, Prednisolone, Hydroprogesterone, Progesterone)



Low MS Bleed

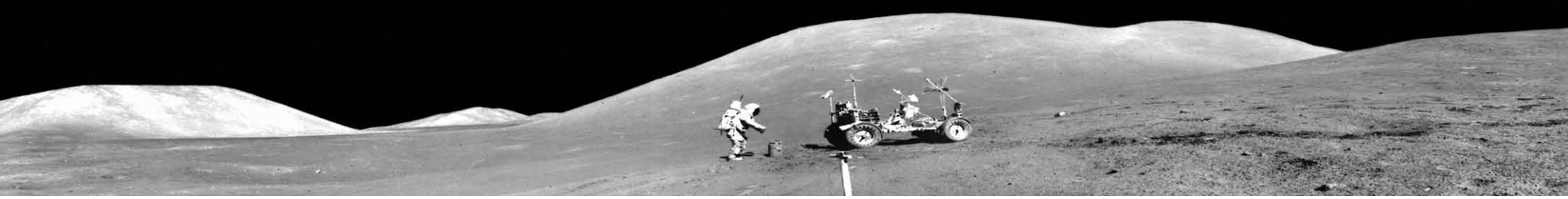
Column: Luna 5 µm PFP(2)
Dimension: 150 x 4.6 mm
Part No.: 00F-4448-E0
Mobile Phase: A: 0.1 % Formic acid in Water B: 0.1 % Formic acid in Acetonitrile
Gradient: 5 to 95 % B in 10 min, hold for 2 min, eq. for 5 min
Flow Rate: 1.0 mL/min MS splitting flow: 0.31 mL/min
Temperature: —
Detection: API 3000 MS/MS
TurbolonSpray® heater gas flow: 6000 cc/min
TurbolonSpray heater temperature: 425 ºC, ESI^+, Q1 scan

Luna PFP(2) is a Primary Method Development Tool

For development work in any industry, screening with Luna PFP(2) greatly increases the chance of quick method optimization

explore LUNA®

- Luna PFP(2) may provide enhanced selectivity for difficult-to-separate compounds and alternate elution orders
- Successful separations will be robust throughout validation
- You may avoid ion pair reagents and complex mobile phase preparations
- Complementary phase can aid in identification, proof of purity and quantitation



Luna Chemistries

LUNA PHASES	Particle Size (µm)	Pore Size (Å)	Surface Area (m^2/g)	Carbon Load (%)	Bonded Phase Coverage (µmole/m^2)	pH Stability
Silica(2)	3, 5, 10, *10-PREP*, 15	100	400	—	—	2.0 - 7.5
C5	5, 10	100	440	12.5	7.85	1.5 - 10
C8	5, 10	100	440	14.75	5.50	1.5 - 10
C8(2)	3, 5, 10, *10-PREP*, 15	100	400	13.5	5.50	1.5 - 10
C18	5, 10	100	440	19.0	3.00	1.5 - 10
C18(2)	2.5, 3, 5, 10, *10-PREP*, 15	100	400	17.5	3.00	1.5 - 10
CN	3, 5, 10	100	400	7.0	3.80	1.5 - 7.0
NH_2	3, 5, 10	100	400	9.5	5.80	1.5 - 11
Phenyl-Hexyl	3, 5, 10, *10-PREP*, 15	100	400	17.5	4.00	1.5 - 10
SCX	5, 10	100	400	Binding Capacity: 0.15 meq/g		2.0 - 7.0
HILIC	3, 5	200	200	5.7	4.30	1.5 - 8.0
PFP(2)	3, 5	100	400	11.5	2.2	1.5 - 8.0

Description	Application
Silica(2)	
Unbonded silica	Non-Polar compounds
C5	
Reversed-phase chemistry that offers greater hydrolytic stability and an alternative selectivity over the classic C4 phase.	Highly hydrophobic compounds. Good alternative to C8 or C18 when less retention is desired.
C8	
Original C8 phase. Highly retentive; optimized for long lifetime at extremely high pH levels (pH 10).	A "workhorse" for extremely high pH applications (pH 10), or when a more retentive C8 is desired.
C8(2)	
Optimized for maximum efficiency, peak shape and resolution. Significantly improved performance over traditional C8 phases due to high surface coverage. Slightly lower carbon load than original Luna C8.	Great starting point for methods development of pharmaceuticals, nucleotides and polar compounds. Excellent for highly aqueous and LC/MS applications.
C18	
Original Luna C18 phase. Maximum retention, optimized for long lifetime at extremely high pH levels (pH 10).	A "workhorse" for extremely high pH applications (pH 10), or when maximum retention is desired.
C18(2)	
Optimized for maximum efficiency, excellent peak shape and resolution; slightly lower carbon load than original Luna C18.	A C18 phase for virtually all HPLC applications. Range of particle sizes offers amazing versatility for capillary-LC/MS, to prep and process scale applications.
CN	
One of the best performing CN phases available. Can be used in reversed- or normal-phase modes. Based on same 99.99 % pure silica as all Luna phases.	Excellent for improving the retention of polar compounds. Extremely rapid equilibration makes it ideal for rapid screening and gradient applications.

Description	Application
NH_2	
Possibly the most rugged and reproducible NH_2 phase for reversed or normal phase separations. Stable from pH 1.5 to 11.0 and under 100 % aqueous conditions.	Excellent for reversed-phase analysis of sugars, sugar alcohols and anionic compounds or for hydrogen bonding compounds under normal phase.
Phenyl-Hexyl	
Novel (patented) phenyl phase which employs a hexyl linker, as opposed to the traditional propyl chain. Stable under all conditions as well as alternative selectivity to most phenyl phases.	Unique selectivity for very polar and aromatic compounds when used in methanol containing mobile phases.
SCX	
Benzene sulfonic acid, strong cation exchange. Guaranteed to provide sharper peak shape and better resolution compared to traditional SCX columns.	Amine and polyamine containing compounds.
HILIC NEW	
Unique cross-linked diol offers polar selectivity under HILIC conditions.	Powerful retention and selectivity of polar compounds while offering increased sample throughput and higher MS sensitivity.
PFP(2) NEW	
Pentafluorophenyl with a propyl linkage provides multiple retention mechanisms unique to other reversed phase medias.	Unique selectivity for highly polar compounds, complex natural products, isomers and other closely related compounds.

explore LUNA® PFP(2)

Ordering Information

3 µm Minibore Columns (mm)

	50 x 2.0	100 x 2.0	150 x 2.0	4 x 2.0*
Phases				/10pk
PFP(2)	00B-4447-B0	00D-4447-B0	00F-4447-B0	AJ0-8326
Silica(2)	00B-4162-B0	00D-4162-B0	00F-4162-B0	AJ0-4347
C8(2)	00B-4248-B0	00D-4248-B0	00F-4248-B0	AJ0-4289
C18(2)	00B-4251-B0	00D-4251-B0	00F-4251-B0	AJ0-4286
CN	00B-4254-B0	00D-4254-B0	00F-4254-B0	AJ0-4304
Phenyl-Hexyl	00B-4256-B0	00D-4256-B0	00F-4256-B0	AJ0-4350
NH_2	00B-4377-B0	00D-4377-B0	00F-4377-B0	AJ0-4301
HILIC	00B-4449-B0	00D-4449-B0	00F-4449-B0	AJ0-8328
			SecurityGuard™Cartridges (mm)	
			for ID: 2.0-3.0 mm	

3 µm Analytical Columns (mm)

	150 x 3.0	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 2.0*	4 x 3.0*
Phases						/10pk	/10pk
PFP(2)	00F-4447-Y0	00B-4447-E0	00D-4447-E0	00F-4447-E0	00G-4447-E0	AJ0-8326	AJ0-8327
Silica(2)	00F-4162-Y0	00B-4162-E0	00D-4162-E0	00F-4162-E0	00G-4162-E0	AJ0-4347	AJ0-4348
C8(2)	00F-4248-Y0	00B-4248-E0	00D-4248-E0	00F-4248-E0	—	AJ0-4289	AJ0-4290
C18(2)	00F-4251-Y0	00B-4251-E0	00D-4251-E0	00F-4251-E0	00G-4251-E0	AJ0-4286	AJ0-4287
CN	00F-4254-Y0	00B-4254-E0	00D-4254-E0	00F-4254-E0	—	AJ0-4304	AJ0-4305
Phenyl-Hexyl	00F-4256-Y0	00B-4256-E0	00D-4256-E0	00F-4256-E0	00G-4256-E0	AJ0-4350	AJ0-4351
NH_2	00F-4377-Y0	00B-4377-E0	00D-4377-E0	00F-4377-E0	—	AJ0-4301	AJ0-4302
HILIC	00F-4449-Y0	—	00D-4449-E0	00F-4449-E0	—	AJ0-8328	AJ0-8329
					SecurityGuard™Cartridges (mm)		
					for ID: 2.0-3.0 mm	3.2-8.0 mm	

5 µm Minibore Columns (mm)

	50 x 2.0	150 x 2.0	4 x 2.0*
Phases			/10pk
PFP(2)	00B-4448-B0	00F-4448-B0	AJ0-8326
Silica(2)	00B-4274-B0	00F-4274-B0	AJ0-4347
C5	00B-4043-B0	00F-4043-B0	AJ0-4292
C8	00B-4040-B0	00F-4040-B0	AJ0-4289
C8 (2)	00B-4249-B0	00F-4249-B0	AJ0-4289
C18	00B-4041-B0	00F-4041-B0	AJ0-4286
C18 (2)	00B-4252-B0	00F-4252-B0	AJ0-4286
CN	00B-4255-B0	00F-4255-B0	AJ0-4304
Phenyl-Hexyl	00B-4257-B0	00F-4257-B0	AJ0-4350
NH_2	00B-4378-B0	00F-4378-B0	AJ0-4301
		SecurityGuard™Cartridges (mm)	
		for ID: 2.0-3.0 mm	

5 µm Analytical Columns (mm)

	150 x 3.0	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 2.0*	4 x 3.0*
Phases						/10pk	/10pk
PFP(2)	00F-4448-Y0	00B-4448-E0	00D-4448-E0	00F-4448-E0	00G-4448-E0	AJ0-8326	AJ0-8327
Silica(2)	—	00B-4274-E0	00D-4274-E0	00F-4274-E0	00G-4274-E0	AJ0-4347	AJ0-4348
C5	00F-4043-Y0	00B-4043-E0	00D-4043-E0	00F-4043-E0	00G-4043-E0	AJ0-4292	AJ0-4293
C8	00F-4040-Y0	00B-4040-E0	00D-4040-E0	00F-4040-E0	00G-4040-E0	AJ0-4289	AJ0-4290
C8(2)	00F-4249-Y0	00B-4249-E0	00D-4249-E0	00F-4249-E0	00G-4249-E0	AJ0-4289	AJ0-4290
C18	00F-4041-Y0	00B-4041-E0	00D-4041-E0	00F-4041-E0	00G-4041-E0	AJ0-4286	AJ0-4287
C18(2)	00F-4252-Y0	00B-4252-E0	00D-4252-E0	00F-4252-E0	00G-4252-E0	AJ0-4286	AJ0-4287
CN	00F-4255-Y0	00B-4255-E0	00D-4255-E0	00F-4255-E0	00G-4255-E0	AJ0-4304	AJ0-4305
Phenyl-Hexyl	00F-4257-Y0	00B-4257-E0	00D-4257-E0	00F-4257-E0	00G-4257-E0	AJ0-4350	AJ0-4351
NH_2	00F-4378-Y0	00B-4378-E0	00D-4378-E0	00F-4378-E0	00G-4378-E0	AJ0-4301	AJ0-4302
SCX	—	00B-4398-E0	00D-4398-E0	00F-4398-E0	00G-4398-E0	AJ0-4307	AJ0-4308
HILIC	00F-4450-Y0	—	00D-4450-E0	00F-4450-E0	00G-4450-E0	AJ0-8328	AJ0-8329
						SecurityGuard™Cartridges (mm)	
						for ID: 2.0-3.0 mm	3.2-8.0 mm

guarantee

If Luna does not provide at least an equivalent separation as compared to a competing column of the same particle size, similar phase and dimensions, send in your comparative data within 45 days and keep the Luna column for FREE.

5 µm AXIA Packed Preparative Columns (mm)

	150 x 21.2	250 x 21.2	50 x 30.0
Phases			
NEW PFP(2)	00F-4448-P0-AX	00G-4448-P0-AX	00B-4448-U0-AX
C18(2)	00F-4252-P0-AX	00F-4252-B0	00B-4252-U0-AX

* SecurityGuard™ Analytical Cartridges require holder, Part No.: KJ0-4282

Phenex™ Syringe Filters & Membranes

For Sample and Solvent Filtration Prior to Chromatography!

Phenex Syringe Filters

- Rapid filtration of HPLC samples prior to analysis
- Particulate, PVC, and extractable-free filters
- Consistent, reliable performance

Phenex Features

Low absorption	Low hold-up volume
Particulate-free	Certified quality
Maximum chemical compatibility	100 % integrity tested
Minimum extractables	Easy pore identification
Excellent flow rate	PVC-free
High total throughput	Bi-directional use

Tip: Try a Sample Pack!
The best way to determine if a specific Phenex membrane is suitable for your application. Request yours today by phone or visit ***www.phenomenex.com/sample***

Phenex Syringe Filters

Membrane Type/Size	4 mm Diameter for < 2 mL sample volumes			15 mm Diameter for 2 - 10 mL sample volumes			25 mm Diameter for 10 - 100 mL sample volumes		
	Part No.	Unit	Price	Part No.	Unit	Price	Part No.	Unit	Price
0.45 µm									
Phenex-RC [3] (Regenerated Cellulose)	AF0-3103-12	100/Pk		AF0-2103-12	100/Pk		AF0-8103-12 [5]	100/Pk	
	AF0-3103-52	500/Pk		AF0-2103-52	500/Pk		AF0-8103-52 [5]	500/Pk	
Phenex-PES [3] (Polyethersulfone)	—	—		AF2-5108-12 [1]	100/Pk		AF0-8108-12 [5]	100/Pk	
	—	—		—	—		AF0-8108-52 [5]	500/Pk	
Phenex-PTFE [6] (Polytetrafluoroethylene)	AF0-3102-12	100/Pk		AF0-2102-12	100/Pk		AF0-1102-12	100/Pk	
	AF0-3102-52	500/Pk		AF0-2102-52	500/Pk		AF0-1102-52	500/Pk	
Phenex-NY (Nylon)	AF3-3107-12	100/Pk		AF2-5107-12 [1]	100/Pk		AF0-1107-12	100/Pk	
	AF3-3107-52	500/Pk		AF2-5107-52 [1]	500/Pk		AF0-1107-52	500/Pk	
Phenex-GF/CA [2,3,4] (Glass Fiber/Cellulose Acetate)	An integrated syringe filter unit containing an inert borosilicate glass fiber prefilter and a CA membrane. Excellent for filtration of tissue culture media, general biological sample filtration and clarification.						AF0-8B09-12	100/Pk	
							AF0-8B09-52	500/Pk	
0.20 µm									
Phenex-RC [3] (Regenerated Cellulose)	AF0-3203-12	100/Pk		AF0-2203-12	100/Pk		AF0-8203-12 [5]	100/Pk	
	AF0-3203-52	500/Pk		AF0-2203-52	500/Pk		AF0-8203-52 [5]	500/Pk	
Phenex-PES [3] (Polyethersulfone)	—	—		—	—		AF0-8208-12 [5]	100/Pk	
	—	—		—	—		AF0-8208-52 [5]	500/Pk	
Phenex-PTFE [6] (Polytetrafluoroethylene)	AF0-3202-12	100/Pk		AF0-2202-12	100/Pk		AF0-1202-12	100/Pk	
	AF0-3202-52	500/Pk		AF0-2202-52	500/Pk		AF0-1202-52	500/Pk	
Phenex-NY (Nylon)	AF3-3207-12	100/Pk		AF2-5207-12 [1]	100/Pk		AF0-1207-12	100/Pk	
	AF3-3207-52	500/Pk		AF2-5207-52 [1]	500/Pk		AF0-1207-52	500/Pk	
Phenex-GF/CA [2,3,4] (Glass Fiber/Cellulose Acetate)	An integrated syringe filter unit containing an inert borosilicate glass fiber prefilter and a CA membrane. Excellent for filtration of tissue culture media, general biological sample filtration and clarification.						AF0-8A09-12	100/Pk	
							AF0-8A09-52	500/Pk	
1.20 µm									
Phenex-GF [2] (Glass Fiber)	Prefiltration of heavily contaminated or highly viscous samples. When used in-line preceding a membrane filter, clogging of the membrane filter is prevented and sample clean up is optimized.						AF0-8505-12	100/Pk	
							AF0-8505-52	500/Pk	

Above syringe filters are non-sterile. Housing is made of medical-grade polypropylene (PP).

1. *17 mm diameter.*
2. *Glass fiber filters are 26 mm diameter and made of borosilicate. They will remove 90 % of all particles >1.2 µm.*
3. *Housing material is methacrylate butadiene styrene (MBS) polymerisate. Also known as Cryolite.*
4. *Cellulose acetate is surfactant-free.*
5. *26 mm diameter.*
6. *Hydrophobic membrane. Can be made hydrophilic by pre-wetting with IPA.*
7. *Additional dimensions and membrane types are available. Please contact your local Phenomenex technical consultant or distributor for availability or assistance.*
8. *Larger quantity purchases at significant savings are available.*

guarantee

If Phenex Syringe Filters do not perform as well or better than your current syringe filter product of similar membrane, diameter and pore size, send in your comparative data within 45 days and keep the Phenex products for FREE!

explore
LUNA®
PFP(2)

www.phenomenex.com
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email:	auinfo@phenomenex.com	anfrage@phenomenex.com	info@phenomenex.com	dkinfo@phenomenex.com	franceinfo@phenomenex.com	anfrage@phenomenex.com

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