acme

Catalog # 2

Version 07-2020-1

UHPLC/HPLC Columns
Ten Powerful Phases
CHOOSE YOUR METHOD DEVELOPMENT KIT

Particle Sizes
1.9, 3, 5 & 10 µm

Technology through years of experience and innovation.

Phase
Analytical Technology LLC

phaseanalytical.net

Contents

What's New?

Phase Analytical Technology is pleased to announce two new products this year. The **ACME Biphenyl** and **ACME Xceed** columns. These columns are available in 1.9, 3 and 5 micron in all standard analytical geometries.

The **ACME Biphenyl** is an alternate selectivity phase. The phase provides chromatographic interactions that are more polar, have greater shape selectivity and employ strong pi-pi interactions relative to C18 phases and therefore the **Biphenyl** is orthogonal to C18 phases and can be used either in 2-dimensional chromatography or simply as an alternate selectivity phase.

The **ACME Xceed** is a high carbon load C18 column which is extensively endcapped. The unique bonding methodology of the **Xceed** coupled with the high surface area silica used to make this product provide for a phase that is highly retentive, yet shows excellent diffusion properties in and out of the pore and exceedingly sharp peak shape even on difficult analytes.

ACME silica is based on a new 120 Å ultra-high purity (99.999%) extra-treated porous spherical silica with a narrow particle size distribution and an extremely low metal content (< 10 ppm) to minimize silanol acidity and reduce surface metal sites available for chelation. Our ACME PLUS and PAH silica is based on a new 200 Å version of the same silica.

ACME silica is manufactured in a **GMP environment** under the most rigorously controlled conditions, ensuring lot-to-lot reproducibility, consistent particle size, pore volume and chemical purity.

Combined with our proprietary bonding technology this results in columns with optimal efficiency, asymmetry, and minimal back pressure.

ACME is available in several bonded phases covering a wide range of reversed-phase applications.

- **Available in several particle sizes for simple method transfer between HPLC and UHPLC**
- **Ultrapure porous silica particles enable high peak efficiency across all particle sizes**
- **Excellent column-to-column reproducibility**
- **Compatible with HPLC and UHPLC hardware**
- **Consistent and reproducible retention times to allow direct scale-up from the laboratory through process applications**

Specifications

	C18*	F5/C18	Cannabis	Biphenyl	XCEED
Bonded Phase	-$C_{18}H_{37}$	-$C_{18}H_{37}$ –X-PFP	-$C_{18}H_{37}$	Ph-Ph	-$C_{18}H_{37}$
Separation Mode	Reversed-Phase				
Base Material	Ultrapure Extra-Treated Porous Spherical Silica				
Purity (%)	99.999, metals < 10 ppm				
Surface Area	260 m^2/g	300 m^2/g	260 m^2/g	300 m^2/g	450 m^2/g
Particle Size (s) *	1.9 µm, 3 µm, 5 µm				
Pore Size	120 Å		100 Å	120 Å	100 Å
Carbon Load (%)	16	17	22	13	22
Endcapping	Yes proprietary				
pH Range	1.8 to 9.5			2 to 9	1.5 to 10
Temperature Limit	60 °C				
Aqueous Compatibility	≤ 90%	100%	≤ 90%	98%	≤ 90%
USP Listing	L1	L1/L43	L1	L11	L1

* ACME C18, C8 and PLUS 10 µm available for Prep columns

	PLUS*	PAH	C8*	Ph	CN**
Bonded Phase	-$C_{18}H_{37}$	-$(C_{18}H_{37})_x$	-C_8H_{17}	-R-C_6H_5	-R-CN
Separation Mode	Reversed-Phase				
Base Material	Ultrapure Extra-Treated Porous Spherical Silica				
Purity (%)	99.999, metals < 10 ppm				
Surface Area	200 m^2/g			300 m^2/g	
Particle Size (s) *	1.9 µm, 3 µm, 5 µm				
Pore Size	200 Å		120 Å		
Carbon Load (%)	12	17	10	10	7
Endcapping	Yes proprietary	No	Yes proprietary	Yes proprietary	Yes proprietary
pH Range	1.8 to 9.5	1.8 to 9.5	1.8 to 9.5	1.8 to 9.5	2 to 7.5
Temperature Limit	60 °C	60 °C	60 °C	60 °C	50 °C
Aqueous Compatibility	100%	N/A	≤ 98%	100%	100%
USP Listing	L1	L1	L7	L11	L10

ACME CN** - Separation mode also Normal Phase
* ACME C18, C8 and PLUS 10 µm available for Prep columns

ACME Column Selection Guide

1st Choice

ACME C18

High Retention → **ACME XCEED**

Alternate Selectivity

Speed / Higher MW

ACME Ph
- Aromatic analytes
- pi-Acidic analytes
- Low Hydrophobicity

ACME CN
- HILIC
- Low Hydrophobicity

ACME C8
- Higher selectivity with polar analytes using low organic mobile phase

ACME F5/C18
- Nitrogen containing analytes
- Geometric Isomers
- π-donor (Lewis base) analytes

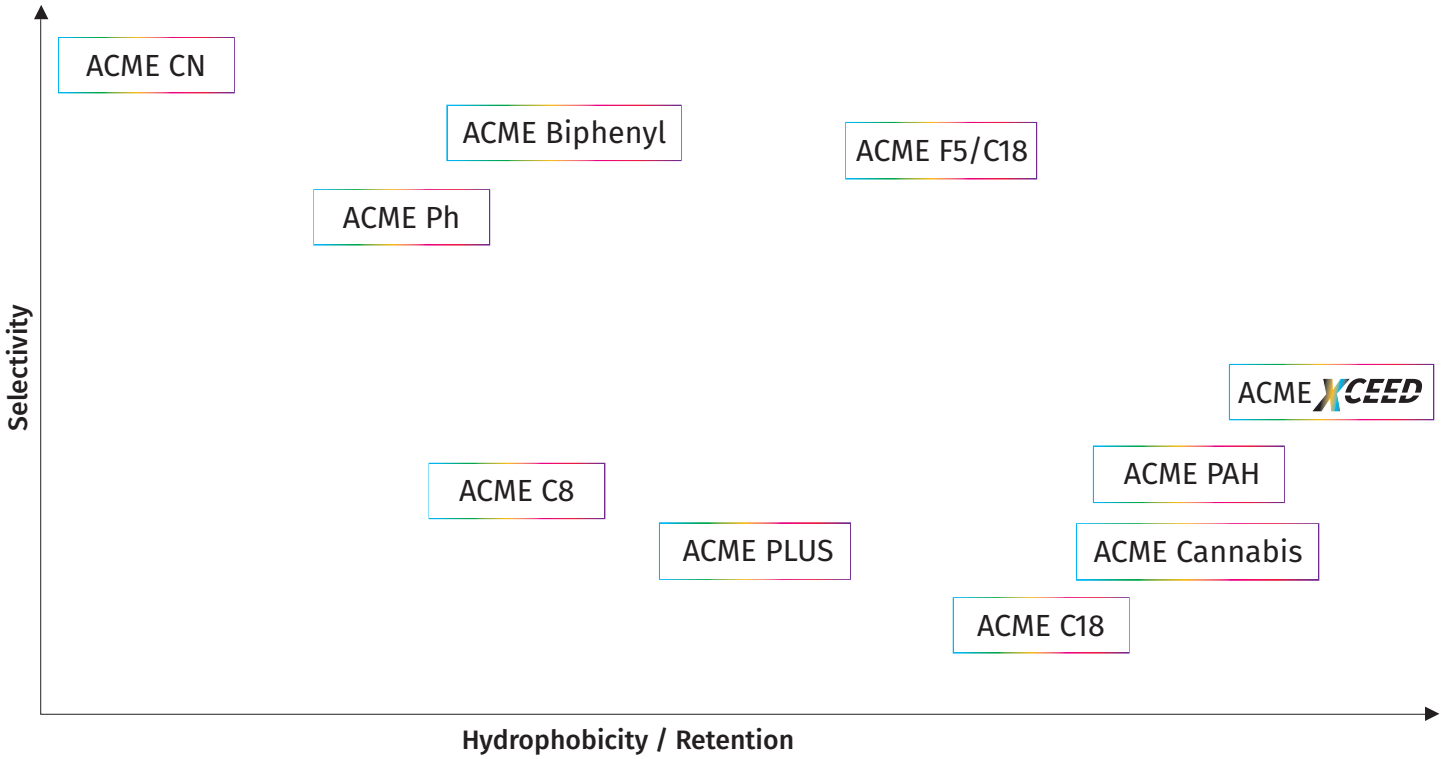
ACME Biphenyl
- Drugs of Abuse

Aromatic / Olefinic Isomers

ACME PAH
- PAHs
- Structural isomers, e.g., Carotenoids

ACME Cannabis
- Cannabinoids
- Cannabis related compounds

ACME PLUS
- Fast C18 Applications
- MWs too large for ACME C18



Applications

Application	Phase	Particle Size	Column Length	Column ID	Page #
Benzodiazepines	C18	3	100	2.1	18
	F5/C18	3	100	4.6	24
	Biphenyl	3	100	2.1	32
Beta Blockers	C18	1.9	100	2.1	12
Caffeine Metabolites	C8, C18	3	100	4.6	33
Cannabinoids	Cannabis	3	150	4.6	19
	PLUS	3	50	2.1	40
Clinical - VMA, HVA & 5-HIAA	F5/C18	1.9	100	2.1	30
Cortisones	C18	3	50	4.6	17
Diazepam Metabolites	C18	1.9	100	2.1	14
Drugs of Abuse	XCEED	1.9	150	2.1	20
Explosives	F5/C18	3	100	4.6	27, 28
Fluoxetine Metabolites	CN	3	100	4.6	37
Hydrophobic Retention	F5/C18	3	100	4.6	22
Methoxy Isomers	F5/C18	3	100	4.6	23
NSAIDS / Diuretics	C18	1.9	50	4.6	13
Nucleosides / Nucleotides	F5/C18	3	100	4.6	26
Opioids	Biphenyl	3	100	2.1	31
Paracetamol / Aspirin Mix	C18	1.9	50	2.1	15
Phenols	C18	5	150	4.6	9
	Ph	3	100	4.6	38
	F5/C18	3	100	4.6	25
Polycyclic Aromatic Hydrocarbons	PAH	3	100	4.6	54
QA Test Mix	F5/C18	3	100	4.6	22
Selectivity Analytes	Ph	3	100	4.6	38
Stimulants	XCEED	1.9	100	2.1	21
THC Metabolites / Isocratic	C8	3	100	4.6	35
Tricyclic Antidepressants	C18, C8, CN, Ph	3	100	4.6	11, 34, 36, 39
Water Soluble Vitamins	C18	3	100	4.6	10
	PLUS	3	100	4.6	41
Xanthines	C18	3	50	4.6	16

Technology through years of experience and innovation - Dr. William Campbell

William Campbell received his Ph.D. in Chemistry at Montana State University under the direction of Dr. Wynn Jennings. Research included:

1. Transition metal catalysis mechanisms of Group VIII transition metals
2. Metabolism of toxic Furano-sesquiterpenes

During his graduate work, Dr. Campbell gained a great deal of expertise in NMR, IR, Mass Spectroscopy and Chromatography.

Dr. Campbell received a Post-Doctoral Fellowship at the University of Minnesota and continued working on organo-metallic mechanisms of Zirconocenes and Titanocenes, and organic and inorganic synthesis under the direction of Professor Paul Gassman.

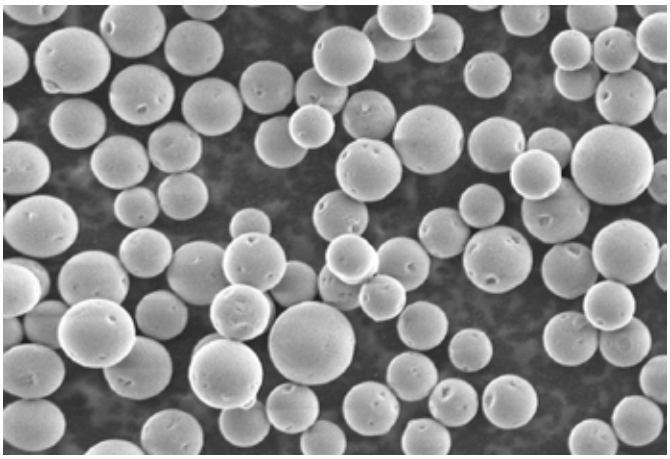
Dr. Campbell entered industry as a research chemist in Central Research at the Dow Corning Corporation. Through several years at Dow Corning he gained expertise in surface science and silicone and organo-silane chemistry. His love for chromatography coupled with his experience in silane chemistry lead to a career path in the development of HPLC stationary phases and applications. Early collaborations included: the Mayo Clinic, The University of Michigan Blood Chemistry Laboratory, WARS Analytical in Wisconsin and others.

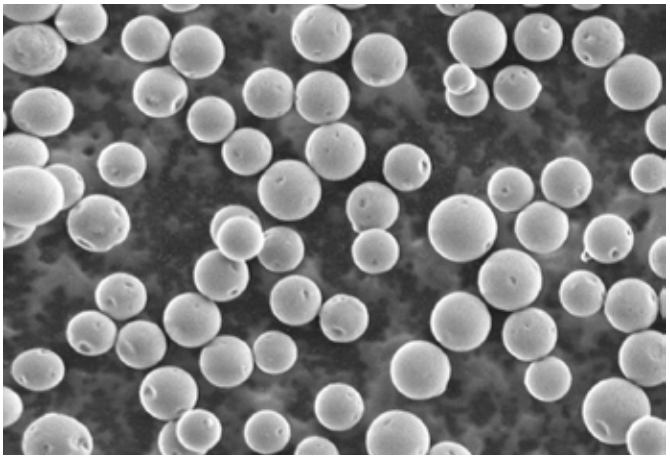
Dr. Campbell moved to "Vydac" the Separations Group, where he further refined his skills in surface science, silica synthesis and evaluation, protein and peptide chromatographic techniques and development of preparative column technology.

After a brief time at a startup company in Michigan, Dr. Campbell took a position at Supelco/Sigma-Aldrich as a Sr. Research Scientist and quickly moved to the position of HPLC R&D Manager. In that role he developed many new HPLC phase chemistries, presented seminars worldwide and worked closely with leading scientists in major pharmaceutical companies.

Dr. Campbell is currently Adjunct Faculty for the Forensic Sciences Department and the Chemistry Department at Penn State University and the leading force behind Phase Analytical Technology.

ACME silica is manufactured in a **GMP environment** under the most rigorously controlled conditions, ensuring lot-to-lot reproducibility, consistent particle size, pore volume and chemical purity.



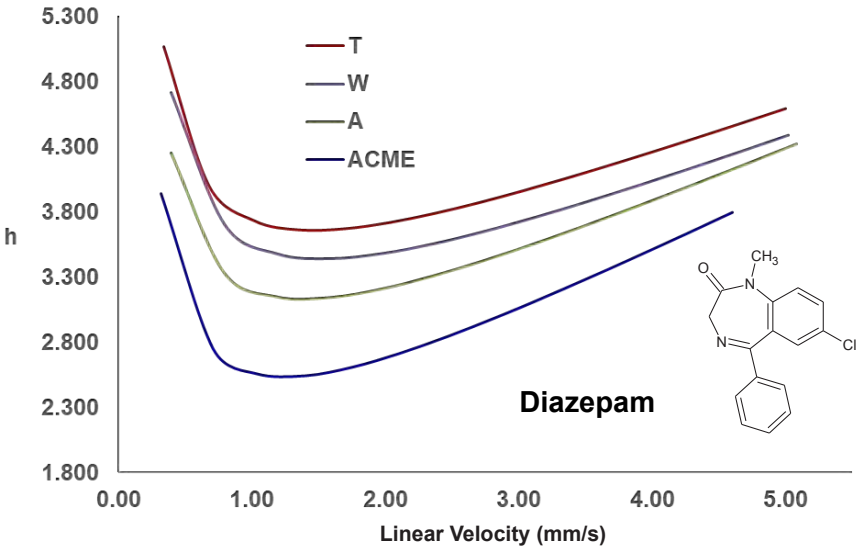


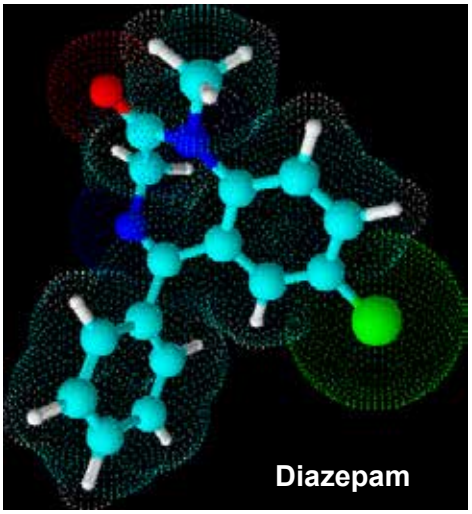
2.000 x 5.00 µm WD: 9.5mm 3kV 2017/10/04

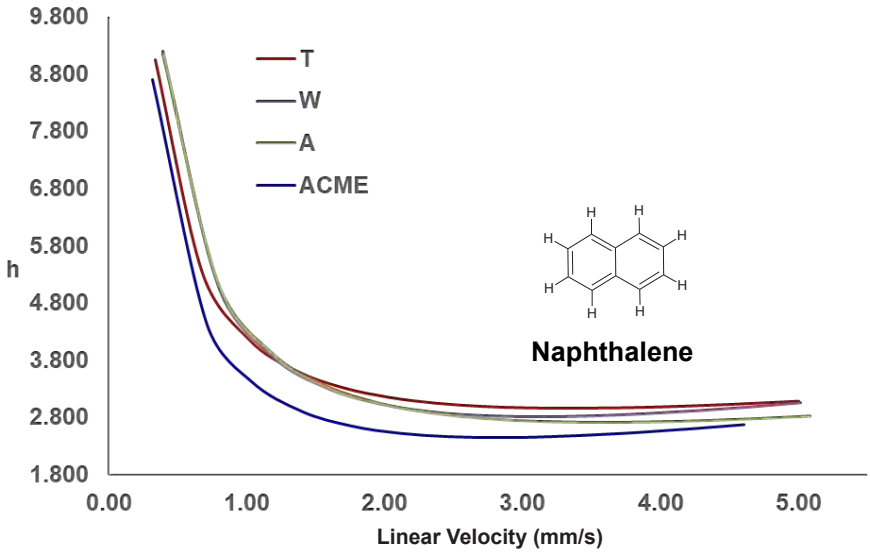
Van Deemter Analysis

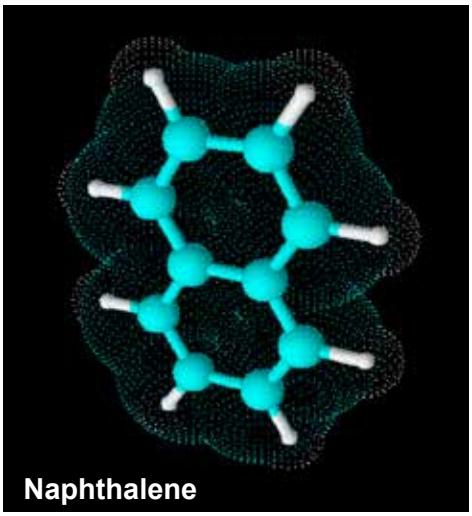
Van Deemter Analysis on a Pharmaceutical Compound. ACME Silica Pore Structure shows dramatically improved performance on real analytes.

$$H = A + \frac{B}{u} + Cu$$









Stability Data - QC Standard

Retention time reproducibility and column stability are shown on the ACME column in the figure below.

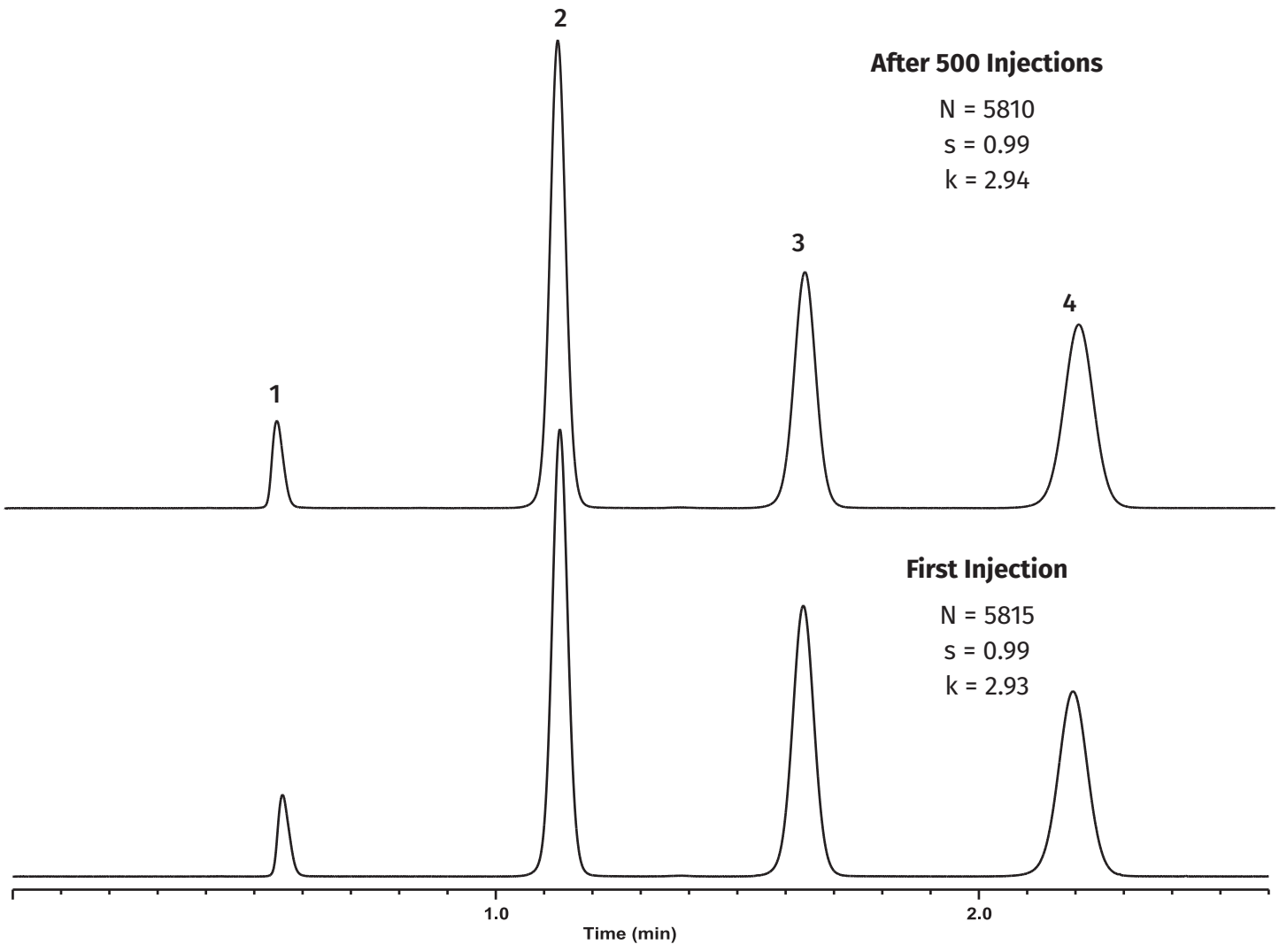
The figure compares the chromatograms shown from the 1st injection compared to the 500th injection on the ACME column. The efficiency and retention factors (k) for all four test compounds are the same, a characteristic essential for long and stable column lifetimes.

ACME C18
5 µm, 50 x 4.6 mm

Isocratic Mobile Phase:
Methanol:water, 80:20, (v/v)

Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV@265 nm
Injection Vol.: 3 µL

Sample:
1. Uracil
2. Benzophenone
3. Naphthalene
4. Biphenyl



ACME C18

Pore Size: 120 Å
Carbon Content: 16%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME C18
5 µm, 150 x 4.6 mm

Mobile Phase:
A: 0.1% formic acid in water, (v/v)
B: 0.1% formic acid in acetonitrile, (v/v)

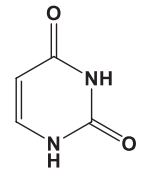
Gradient:

Time (min)	Profile	
	A	B
0	75	25
10	30	70

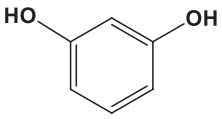
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV@270 nm
Injection Vol.: 3 µL

Sample:
1. Uracil
2. Resorcinol
3. 4-Hydroxybenzaldehyde
4. Phenol
5. Methylparaben
6. p-Nitrophenol
7. p-Cresol
8. 3,4-Dimethylphenol
9. 2,6-Dimethylphenol

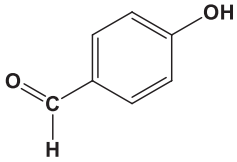
Phenols



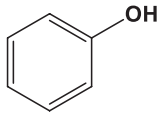
1. Uracil



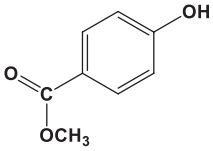
2. Resorcinol



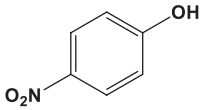
3. 4-Hydroxybenzaldehyde



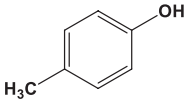
4. Phenol



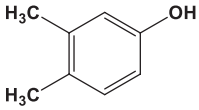
5. Methylparaben



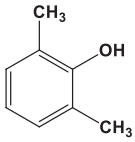
6. p-Nitrophenol



7. p-Cresol



8. 3,4-Dimethylphenol



9. 2,6-Dimethylphenol

ACME C18

Pore Size: 120 Å
Carbon Content: 16%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

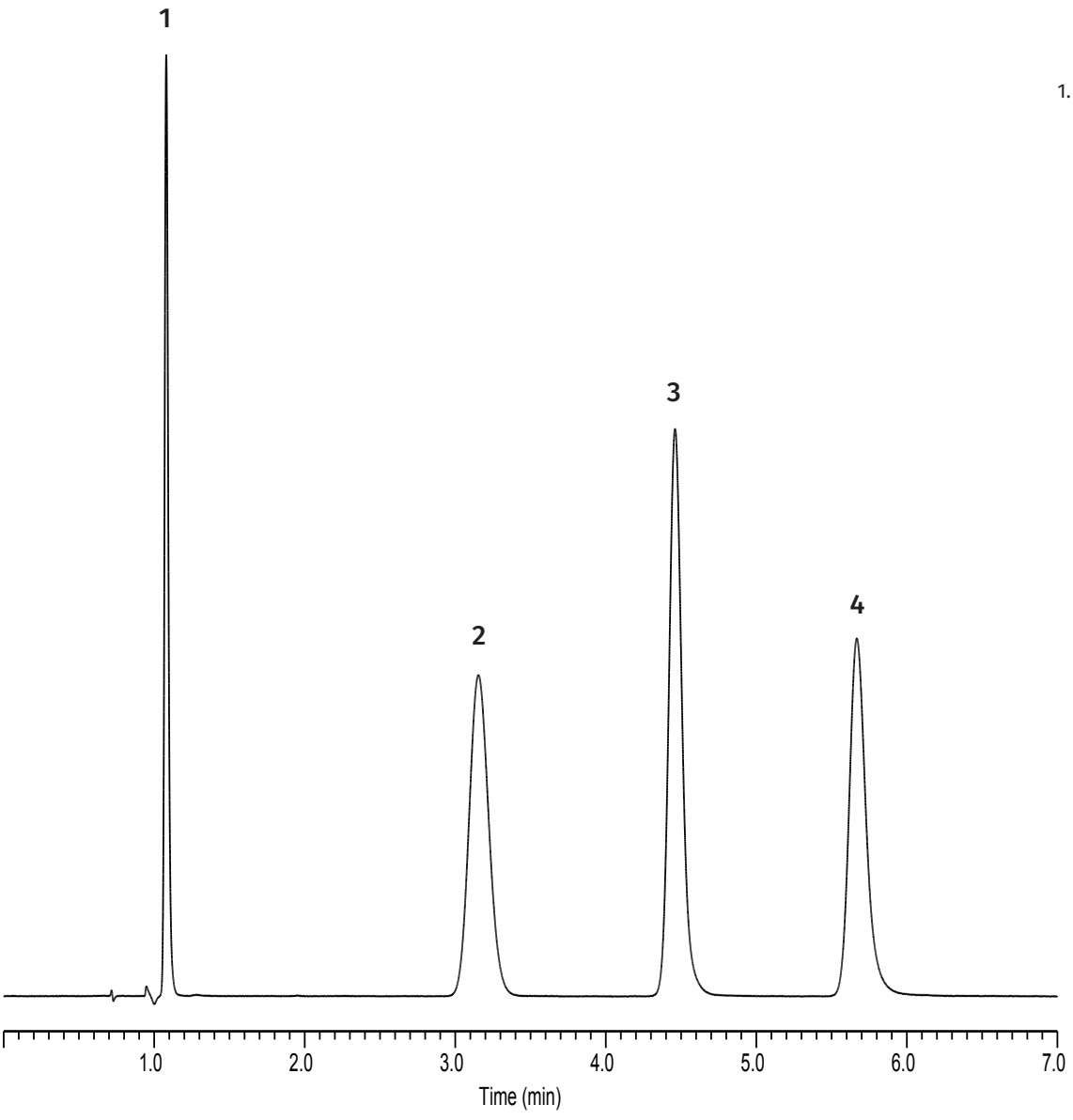
ACME C18
3 µm, 100 x 4.6 mm

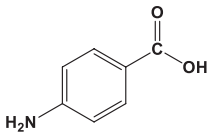
Isocratic Mobile Phase:
A: 20 mM ammonium phosphate in water
B: Methanol
A:B, (98:2, v/v)

Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV@225 nm
Injection Vol.: 5 µL

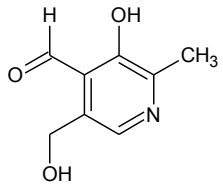
Sample:
1. p-Aminobenzoic acid (PABA)
2. Pyridoxal
3. Pyridoxine (Vitamin B6)
4. Niacinamide (Nicotinamide, Vitamin B3)

Water Soluble Vitamins

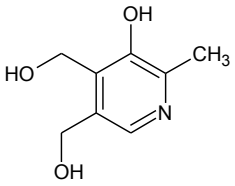




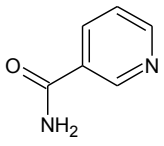
1. p-Aminobenzoic acid (PABA)



2. Pyridoxal



3. Pyridoxine



4. Niacinamide

ACME C18

Pore Size: 120 Å
Carbon Content: 16%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

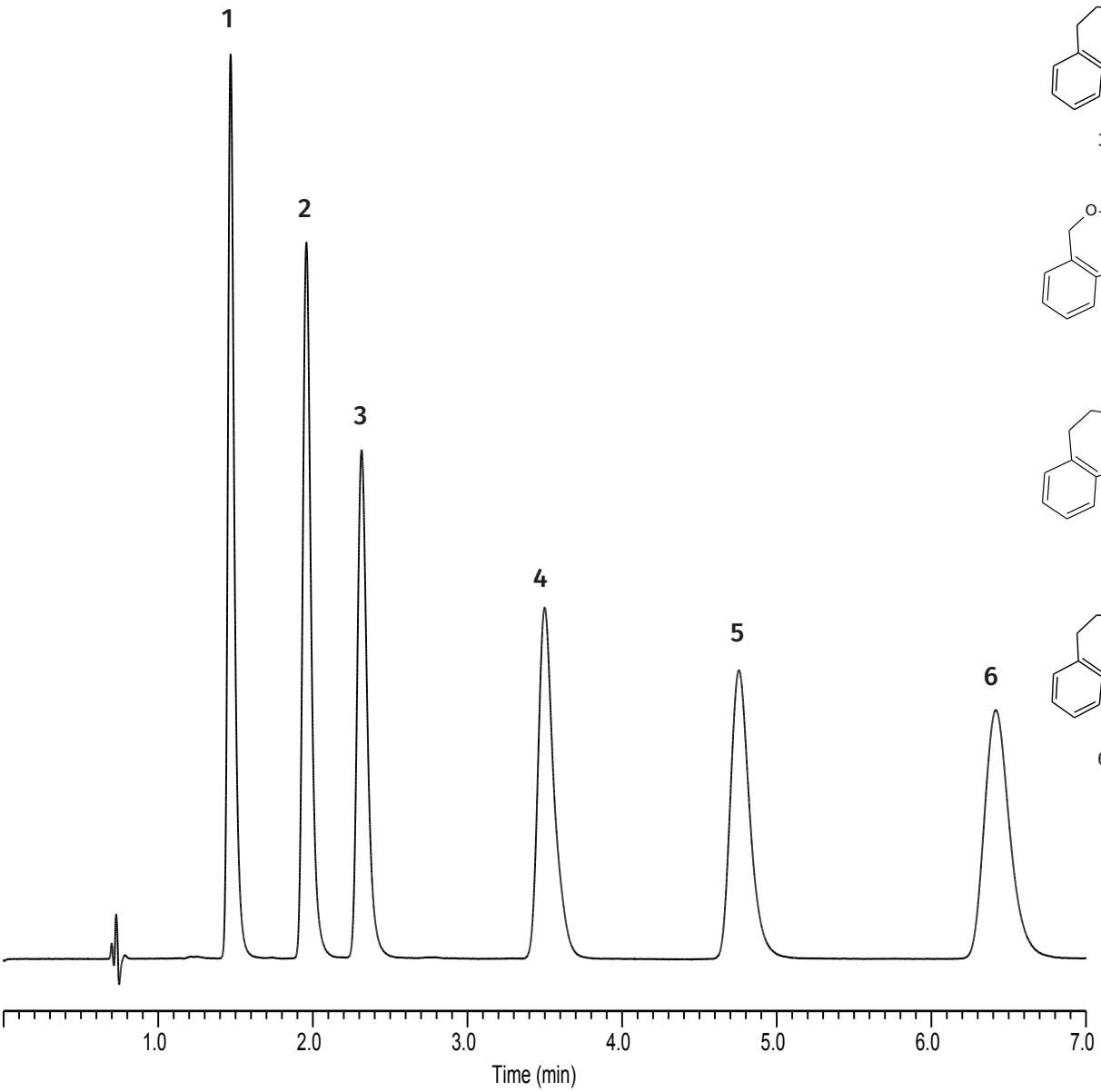
ACME C18
3 µm, 100 x 4.6 mm

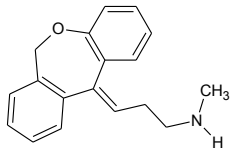
Isocratic Mobile Phase:
A: 25 mM ammonium phosphate buffer (pH 7.0)
B: Methanol
A:B, (30:70, v/v)

Flow rate: 1.5 mL/min
Temperature: 35 °C
Detection: UV@254 nm
Injection Vol.: 5 µL

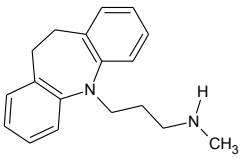
Sample:
1. Nordoxepin
2. Desipramine
3. Nortriptyline
4. Doxepin
5. Imipramine
6. Amitriptyline

Tricyclic Antidepressants

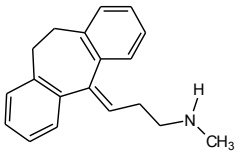




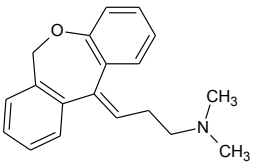
1. Nordoxepin



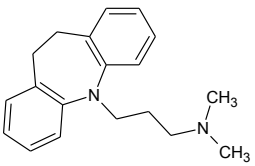
2. Desipramine



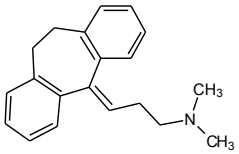
3. Nortriptyline



4. Doxepin



5. Imipramine



6. Amitriptyline

ACME C18

Pore Size: 120 Å
Carbon Content: 16%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME C18
1.9 µm, 100 x 2.1 mm

A. Water:25 mM ammonium phosphate (pH 7.0)
B: Methanol

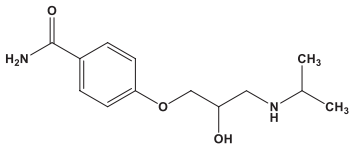
Gradient:

Time (min)	Profile	
	A	B
0	75	25
5	30	70
9	30	70

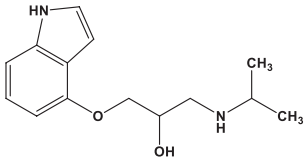
Flow rate: 0.5 mL/min
Temperature: 35 °C
Detection: UV@225 nm
Injection Vol.: 5 µL

Sample:
1. Atenolol
2. Pindolol
3. Acebutolol
4. Metaprolol
5. Propranolol

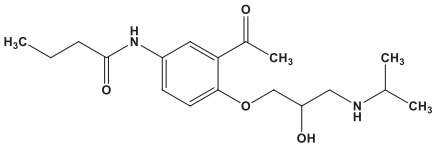
Beta Blockers



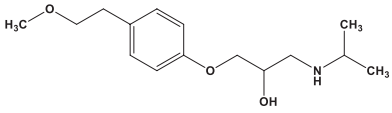
1. Atenolol



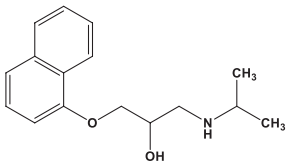
2. Pindolol



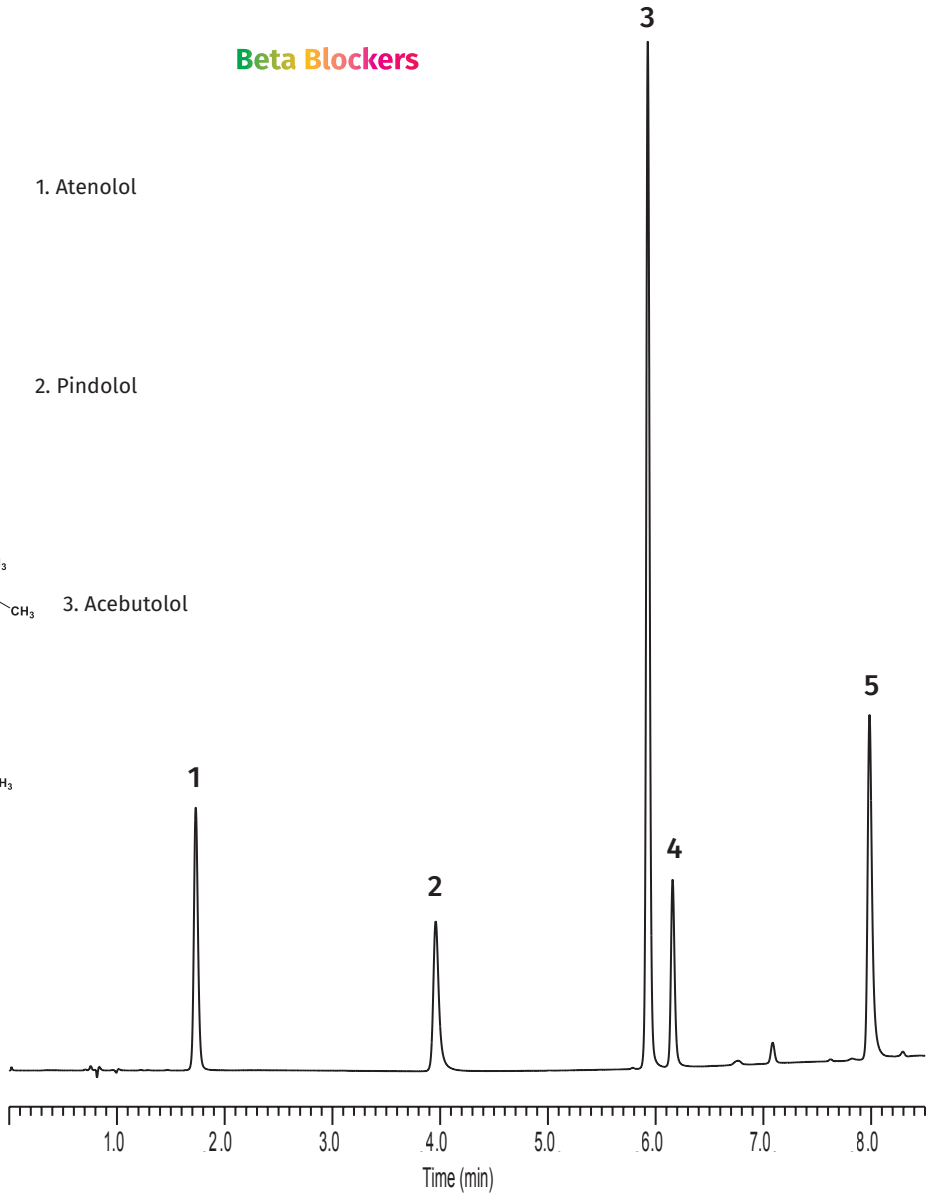
3. Acebutolol



4. Metaprolol



5. Propanolol



ACME C18

Pore Size: 120 Å
Carbon Content: 16%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME C18
1.9 µm, 50 x 4.6 mm

Mobile Phase:
A: 0.1% formic acid in water, (v/v)
B: 0.1% formic acid in acetonitrile, (v/v)

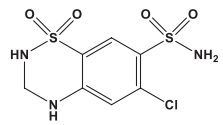
Gradient:

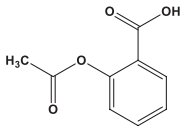
Time (min)	Profile	
	A	B
0	85	15
5	10	90

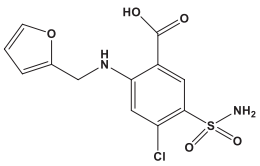
Flow rate: 1 mL/min
Temperature: 30 °C
Detection: UV@230 nm
Injection Vol.: 5 µL

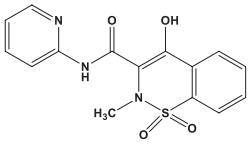
Sample:
1. Hydrochlorothiazide
2. Acetylsalicylic Acid (ASA, Aspirin)
3. Furosemide
4. Piroxicam
5. Ketoprofen
6. Naproxen (Aleve)
7. Diflunisal
8. Indomethacin
9. Ibuprofen (Advil)

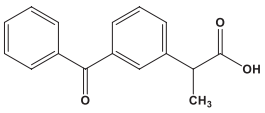
NSAIDS/Diuretics

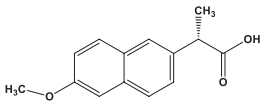

1. Hydrochlorothiazide

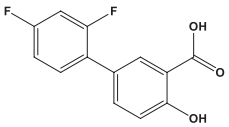

2. Acetylsalicylic Acid

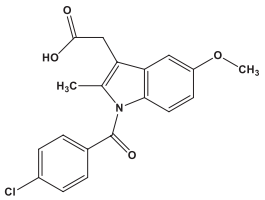

3. Furosemide

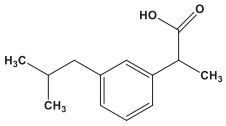

4. Piroxicam


5. Ketoprofen


6. Naproxen


7. Diflunisal


8. Indomethacin


9. Ibuprofen

ACME C18

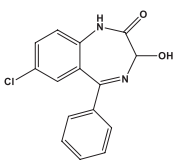
Pore Size: 120 Å
Carbon Content: 16%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME C18
1.9 µm, 100 x 2.1 mm

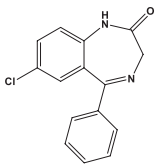
Isocratic Mobile Phase:
A: 0.1% formic acid in water
B: 0.1% formic acid in acetonitrile
A:B, (60:40, v/v)

Flow rate: 0.3 mL/min
Temperature: 25 °C
Detection: UV@254 nm
Injection Vol.: 1 µL

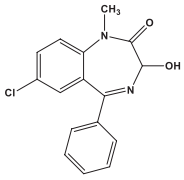
Sample:
1. Oxazepam
2. Nordiazepam
3. Temazepam
4. Diazepam



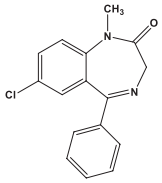
1. Oxazepam



2. Nordiazepam



3. Temazepam



4. Diazepam

Diazepam Metabolites

ACME C18

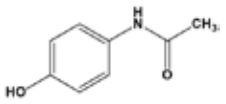
Pore Size: 120 Å
Carbon Content: 16%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME C18
1.9 µm, 50 x 2.1 mm

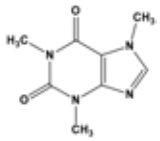
Isocratic Mobile Phase:
A: 0.1% formic acid in water
B: Methanol
A:B, (65:35, v/v)

Flow rate: 0.25 mL/min
Temperature: 22 °C
Detection: UV@240 nm
Injection Vol.: 2 µL

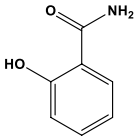
Sample:
1. Acetaminophen (Paracetamol, Tylenol)
2. Caffeine (1,3,7-Trimethylxanthine)
3. Salicylamide (o-Hydroxybenzamide)
4. Acetylsalicylic Acid (ASA, Aspirin)
5. Benzoic Acid
6. Salicylic Acid



1. Acetaminophen

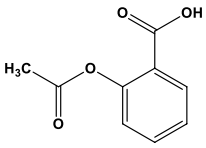


2. Caffeine

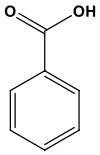


3. Salicylamide

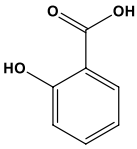
Paracetamol / Aspirin Mix



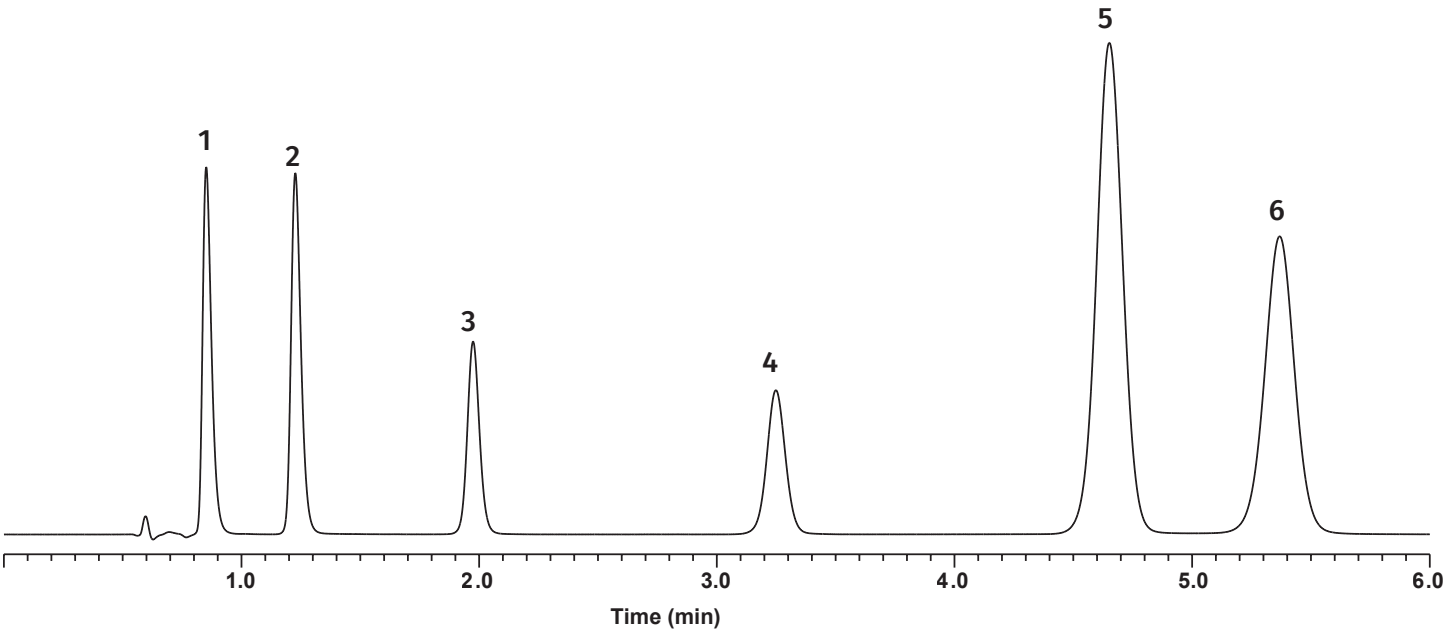
4. Acetylsalicylic Acid



5. Benzoic Acid



6. Salicylic Acid



ACME C18

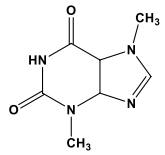
Pore Size: 120 Å
Carbon Content: 16%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME C18
3 µm, 50 x 4.6 mm

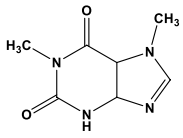
Isocratic Mobile Phase:
A: 1% formic acid in water
B: Methanol
A:B, (85:15, v/v)

Flow rate: 1.0 mL/min
Temperature: 30 °C
Detection: UV@270 nm
Injection Vol.: 2 µL

Sample:
1. Theobromine (3,7-Dimethylxanthine)
2. Paraxanthine (1,7-dimethylxanthine)
3. Theophylline (1,3-Dimethylxanthine)
4. 1,3-dimethyl-7-(2-hydroxyethyl)-xanthine
5. Caffeine (1,3,7-Trimethylxanthine)

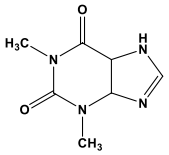


1. Theobromine

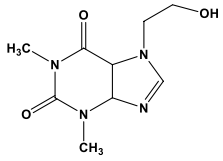


2. Paraxanthine

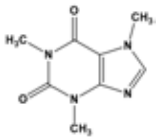
Xanthines



3. Theophylline



4. 1,3-dimethyl-7-(2-hydroxyethyl)xanthine



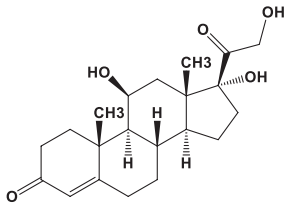
5. Caffeine

ACME C18

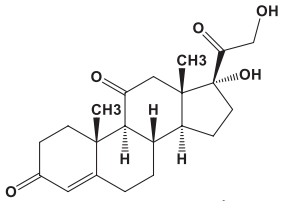
Pore Size: 120 Å
Carbon Content: 16%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME C18
3 µm, 50 x 4.6 mm

Sample:
1. Hydrocortisone
2. Cortisone
3. Corticosterone



1. Hydrocortisone

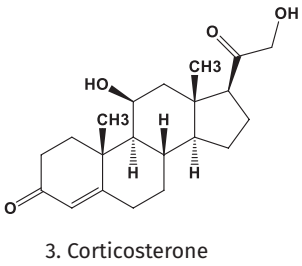


2. Cortisone

Cortisones

Isocratic Mobile Phase:
Acetonitrile: Water
(30:70, v/v)

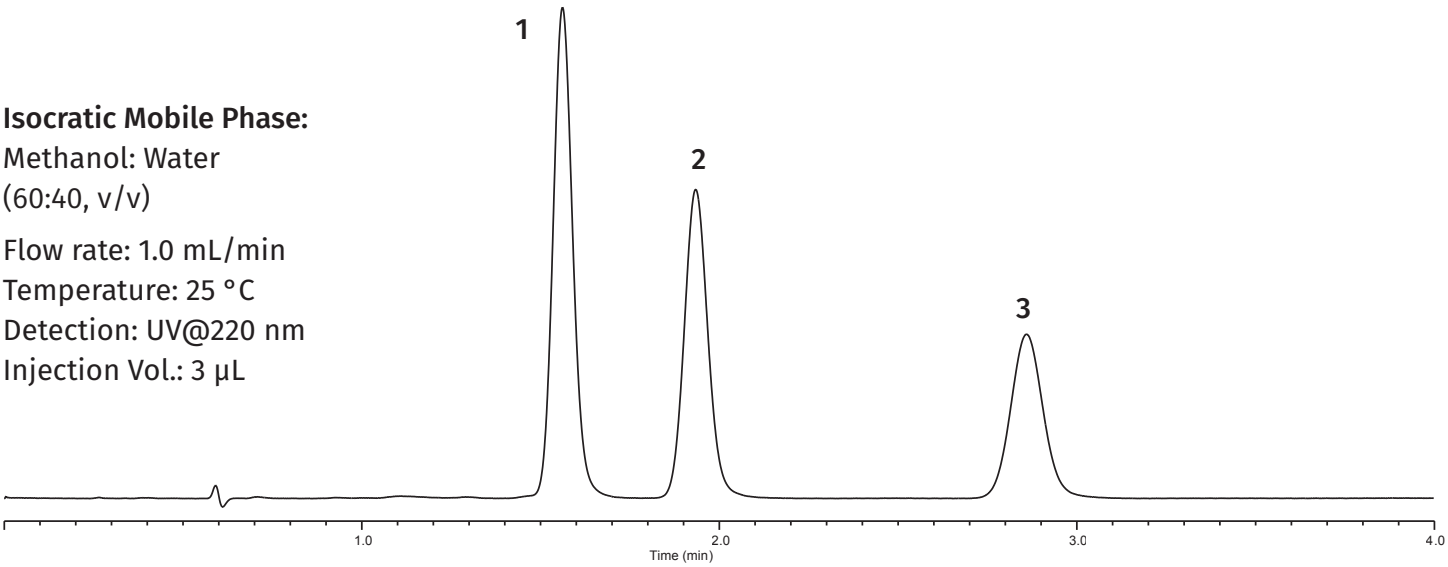
Flow rate: 1.5 mL/min
Temperature: 25 °C
Detection: UV@220 nm
Injection Vol.: 3 µL



3. Corticosterone

Isocratic Mobile Phase:
Methanol: Water
(60:40, v/v)

Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV@220 nm
Injection Vol.: 3 µL



ACME C18

Pore Size: 120 Å
Carbon Content: 16%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME C18
3 µm, 100 x 2.1 mm

Mobile Phase:
A: 0.1% formic acid in water, (v/v)
B: 0.1% formic acid in acetonitrile, (v/v)

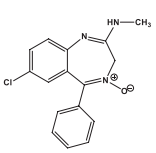
Gradient:

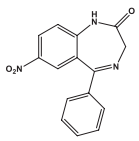
Time (min)	Profile	
	A	B
0	75	25
10	25	75

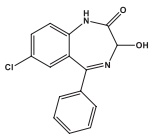
Flow rate: 0.3 mL/min
Temperature: 25 °C
Detection: UV@254 nm
Injection Vol.: 1.5 µL

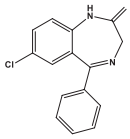
Sample:
1. Chlordiazepoxide
2. Nitrazepam
3. Oxazepam
4. Nordiazepam
5. Flunitrazepam
6. Temazepam
7. Diazepam
8. Prazepam

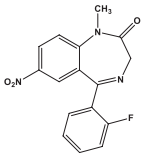
Benzodiazepines

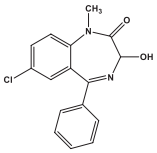

1. Chlordiazepoxide

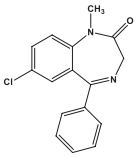

2. Nitrazepam

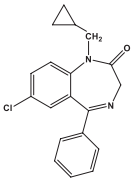

3. Oxazepam


4. Nordiazepam


5. Flunitrazepam


6. Temazepam


7. Diazepam


8. Prazepam

ACME Cannabis

Pore Size: 100 Å
Carbon Content: 22%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME Cannabis
3 µm, 150 x 4.6 mm

A: 0.1% Formic Acid in Water, (v/v)
B: 0.095% Formic Acid in Acetonitrile, (v/v)

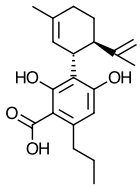
Gradient:

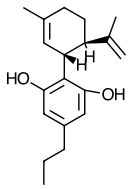
Time (min)	Profile	
	A	B
0	30	70
10	10	90
15	10	90

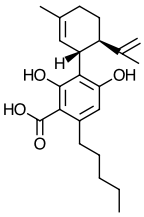
Flow rate: 1.5 mL/min
Temperature: 25 °C
Detection: UV@225 nm
Injection Vol.: 2 µL

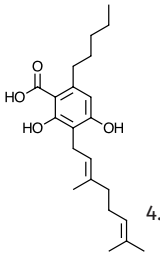
Sample:
1. Cannabidivarinic Acid (CBDVA)
2. Cannabidivarin (CBDV)
3. Cannabidiolic Acid (CBDA)
4. Cannabigerolic Acid (CBGA)
5. Cannabigerol (CBG)
6. Cannabidiol (CBD)
7. Tetrahydrocannabivarin (THCV)
8. Cannabinol (CBN)
9. Δ9-tetrahydrocannabinol (THC Δ9)
10. Δ8-tetrahydrocannabinol (THC Δ8)
11. Cannabichromene (CBC)

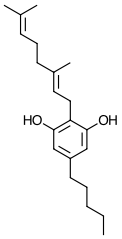
Cannabinoids

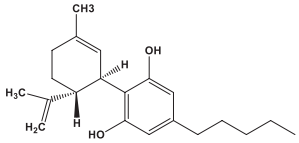

1. CBDVA

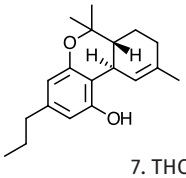

2. CBDV

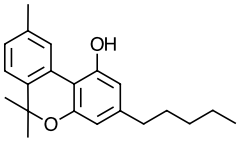

3. CBDA

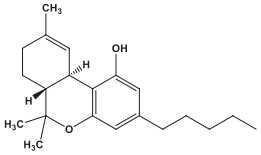

4. CBGA

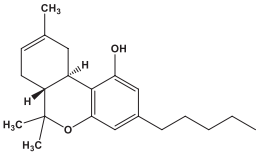

5. CBG

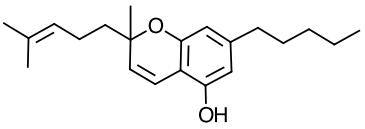

6. CBD


7. THCV


8. CBN


9. THC Δ9


10. THC Δ8


11. CBC

Pore Size: 100 Å
Carbon Content: 22%
Usable pH Range: 1.5 to 10
USP Listing: L1

ACME Xceed
1.9 µm, 150 x 2.1 mm

Mobile Phase:
A: 0.1% trifluoroacetic acid in water, (v/v)
B: 0.09% trifluoroacetic acid in acetonitrile, (v/v)

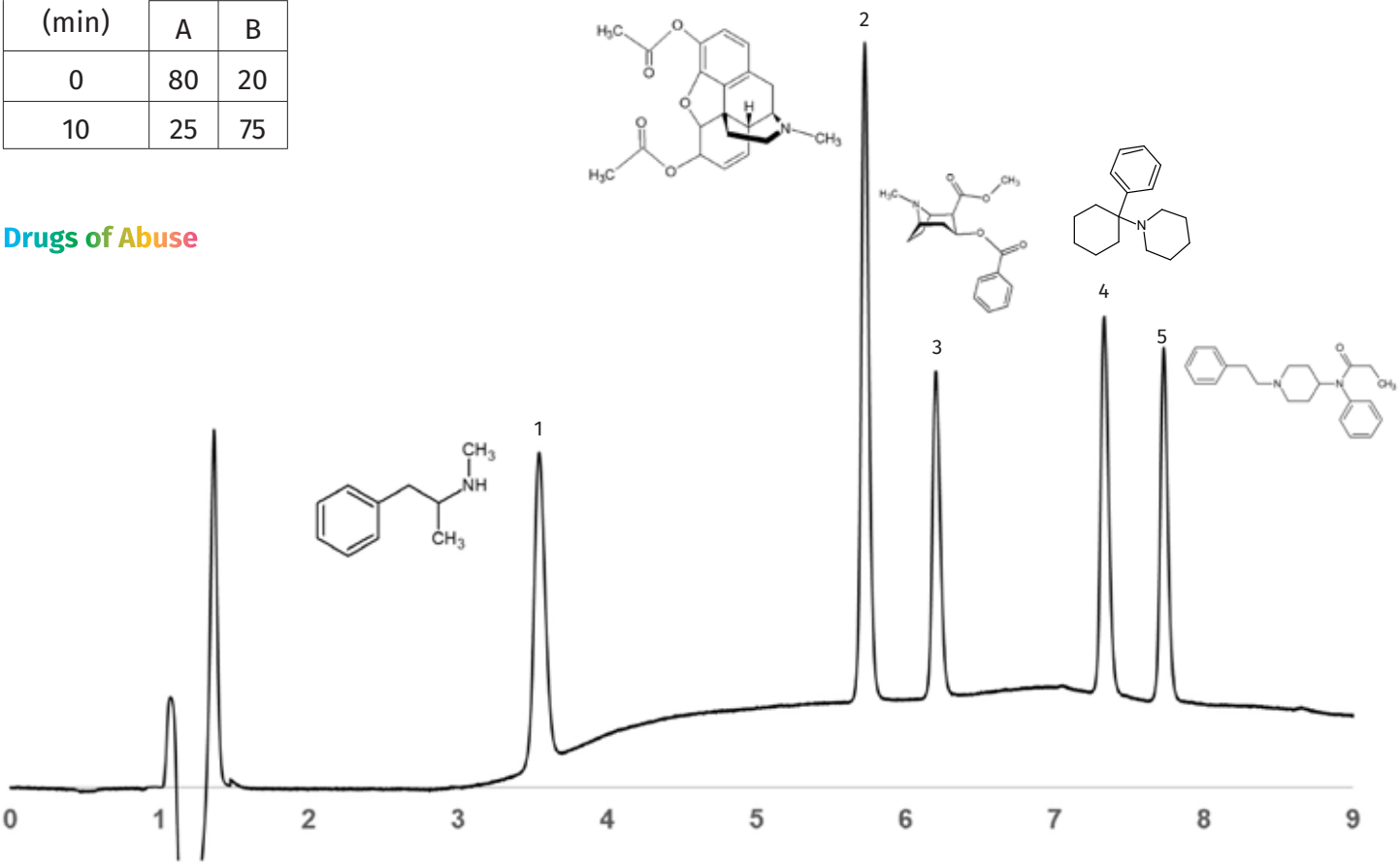
Gradient:

Time (min)	Profile	
	A	B
0	80	20
10	25	75

Flow rate: 0.3 mL/min
Temperature: 25 °C
Detection: UV@210 nm
Injection Vol.: 2 µL

Sample:
1. Methamphetamine
2. Heroin
3. Cocaine
4. Phencyclidine
5. Fentanyl

Drugs of Abuse



Pore Size: 100 Å
Carbon Content: 22%
Usable pH Range: 1.5 to 10
USP Listing: L1

ACME Xceed
1.9 µm, 100 x 2.1 mm

Mobile Phase:
A: 0.1% trifluoroacetic acid in water, (v/v)
B: 0.09% trifluoroacetic acid in acetonitrile, (v/v)

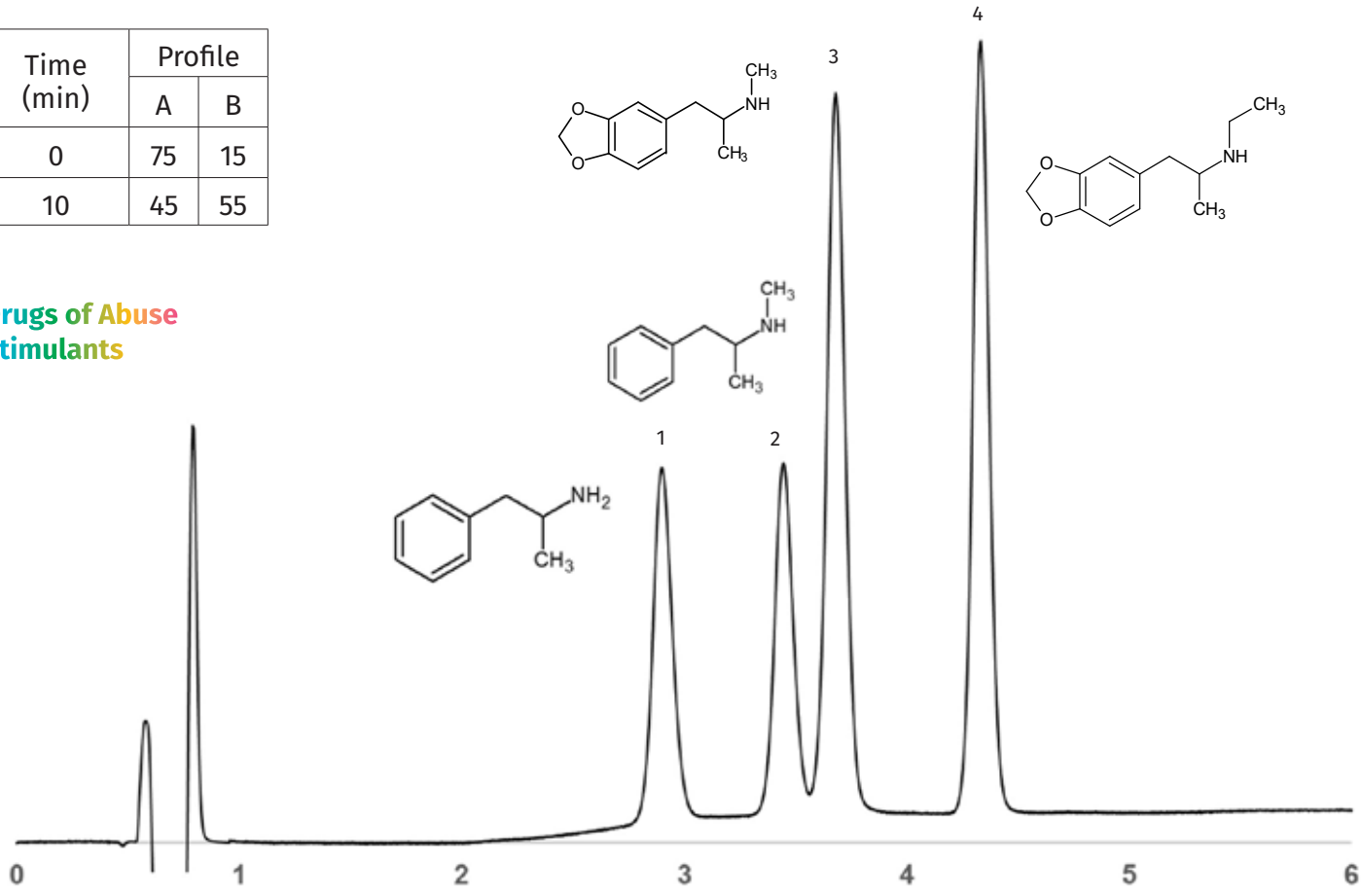
Flow rate: 0.4 mL/min
Temperature: 25 °C
Detection: UV@210 nm
Injection Vol.: 2 µL

Sample:
1. Amphetamine
2. Methamphetamine
3. MDMA
4. MDEA

Gradient:

Time (min)	Profile	
	A	B
0	75	15
10	45	55

Drugs of Abuse
Stimulants



ACME F5/C18

Pore Size: 120 Å
Carbon Content: 17%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

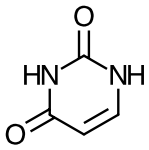
Bimodal phase combines C18 and PFP functional groups to increase selectivity in the separation of complex mixtures when compared to standard C18 phases alone.

- Hydrophobic retention similar to C18
- PFP functionality provides alternate selectivity required for challenging applications
- F5/C18 can operate in 100% aqueous conditions and shows improved retention of polar compounds.
- Ultra-high purity (99.999%) extra-treated porous spherical silica, for excellent peak shape and reproducibility
- Ultra-low bleed phase is suitable for use with UV and MS detection

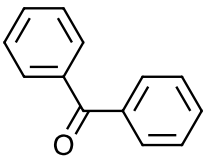
ACME F5/C18
ACME F5/C18, 3 µm, 100 x 4.6 mm
ACME C18, 3 µm, 100 x 4.6 mm

Isocratic Mobile Phase:
Acetonitrile:Water, (70:30, v/v)
Flow rate: 1.5 mL/min
Temperature: 25 °C
Detection: UV@265 nm
Injection Vol.: 3 µL

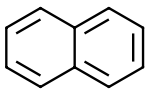
Sample:
1. Uracil
2. Benzophenone
3. Naphthalene
4. Biphenyl



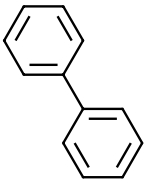
1. Uracil



2. Benzophenone

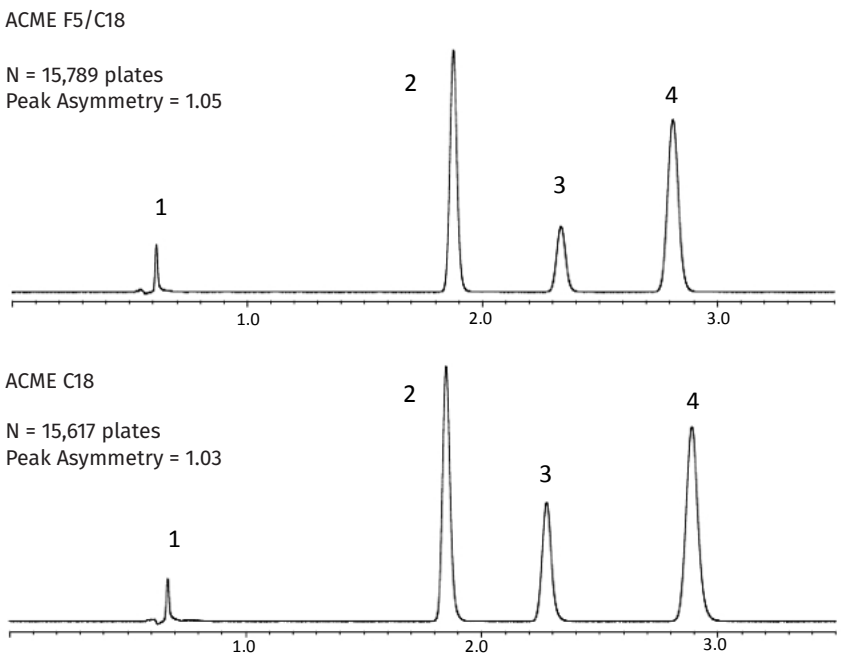


3. Naphthalene



4. Biphenyl

Hydrophobic Retention ACME F5/C18 vs. ACME C18
QA Test Mix



ACME F5/C18

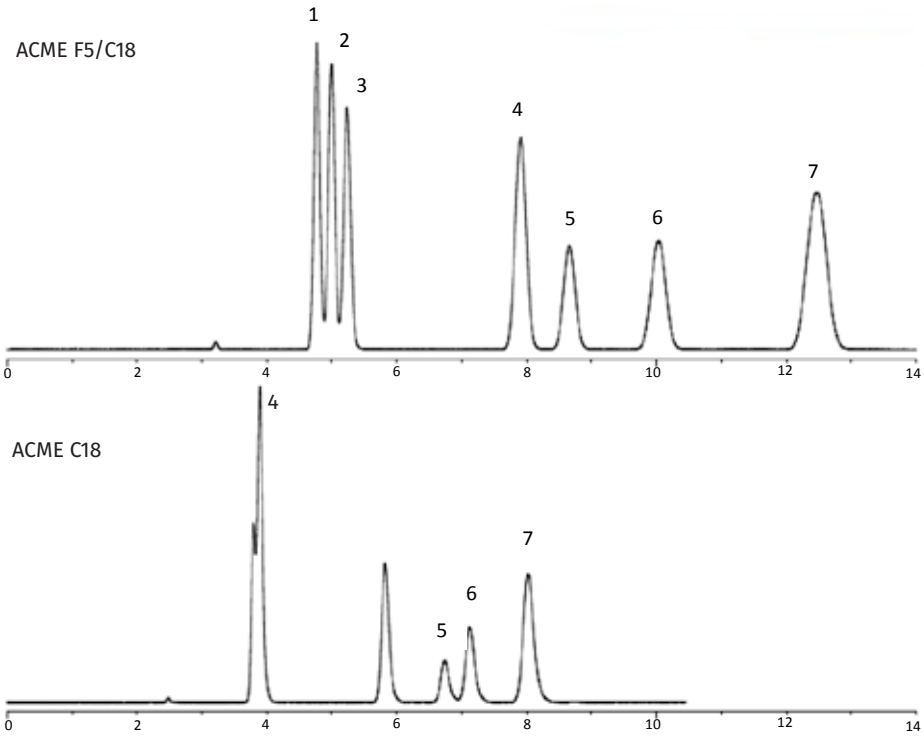
Pore Size: 120 Å
Carbon Content: 17%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

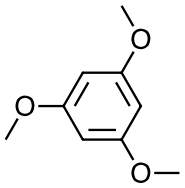
ACME F5/C18
ACME F5/C18, 3 µm, 100 x 4.6 mm
ACME C18, 3 µm, 100 x 4.6 mm

Isocratic Mobile Phase:
Methanol:Water, (52:48, v/v)
Flow rate: 1.0 mL/min
Temperature: 17 °C
Detection: UV@254 nm
Injection Vol.: 3 µL

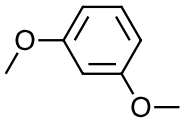
Sample:
1. 1,2,4-Trimethoxybenzene
2. 1,2-Dimethoxybenzene
3. 1,2,3-Trimethoxybenzene
4. 1,4-Dimethoxybenzene
5. Methoxybenzene
6. 1,3-Dimethoxybenzene
7. 1,3,5-Trimethoxybenzene

Methoxy Isomers ACME F5/C18 vs. ACME C18

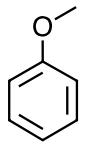




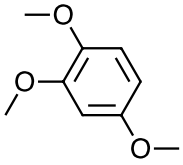
7. 1,3,5-Trimethoxybenzene



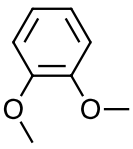
6. 1,3-Dimethoxybenzene



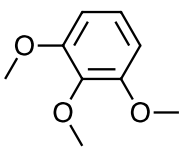
5. Methoxybenzene



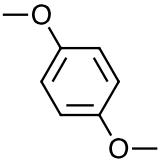
1. 1,2,4-Trimethoxybenzene



2. 1,2-Dimethoxybenzene



3. 1,2,3-Trimethoxybenzene



4. 1,4-Dimethoxybenzene

ACME F5/C18

Pore Size: 120 Å
Carbon Content: 17%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME F5/C18
3 µm, 100 x 4.6 mm

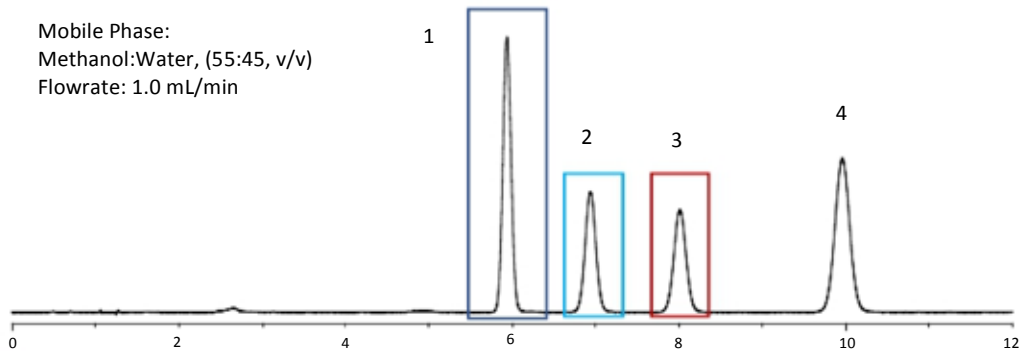
HPLC Conditions 1:
Isocratic Mobile Phase:
Methanol:Water, (55:45, v/v)
Flow rate 1: 1.0 mL/min

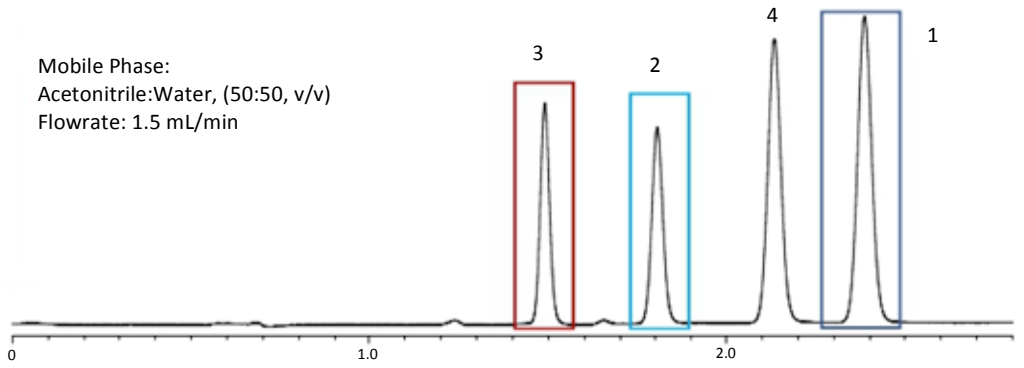
HPLC Conditions 2:
Isocratic Mobile Phase:
Acetonitrile:Water, (50:50, v/v)
Flow rate 2: 1.5 mL/min

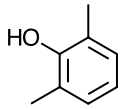
Temperature: 25 °C
Detection: UV@230 nm
Injection Vol.: 3 µL

Sample: (elution order as per methanol conditions)
1. 2,6-Dimethylphenol
2. Clonazepam
3. Oxazepam
4. Temazepam

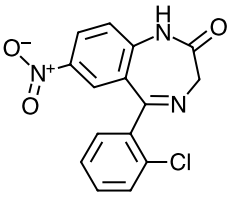
Retention of Benzodiazepines – Methanol vs. Acetonitrile



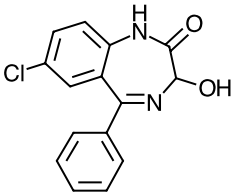




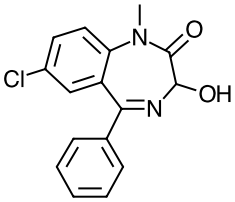
1. 2,6-Dimethylphenol



2. Clonazepam



3. Oxazepam



4. Temazepam

ACME F5/C18

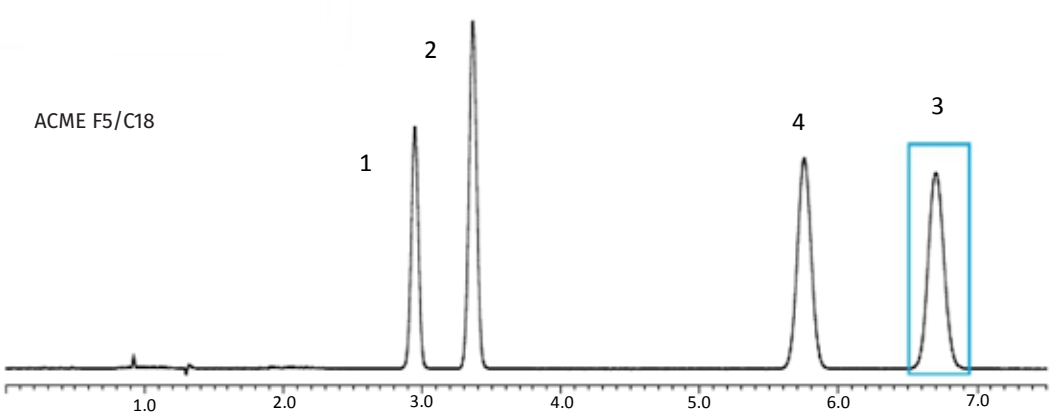
Pore Size: 120 Å
Carbon Content: 17%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

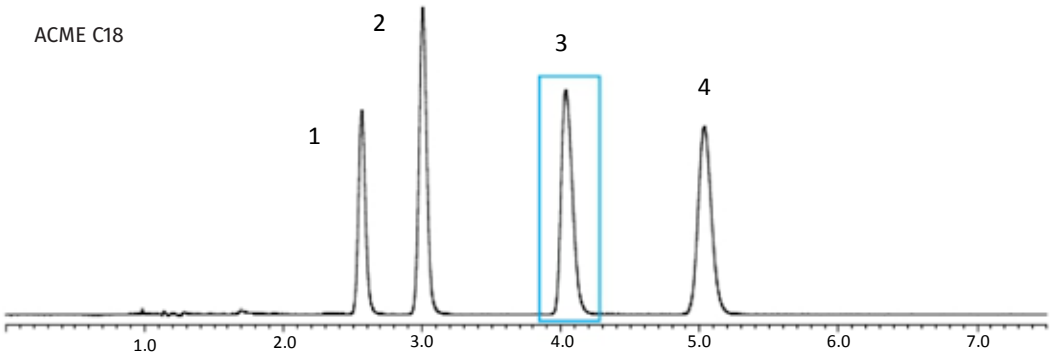
ACME F5/C18
ACME F5/C18, 3 µm, 100 x 4.6 mm
ACME C18, 3 µm, 100 x 4.6 mm

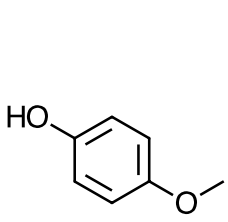
Isocratic Mobile Phase:
Methanol:Water, (45:55, v/v)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV@254 nm
Injection Vol.: 3 µL

Sample: (elution order as per ACME C18)
1. 4-Methoxyphenol
2. Phenol
3. 4-Nitrophenol
4. 4-Methylphenol

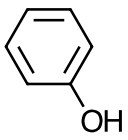
Retention of Polar Compounds (Phenols) ACME F5/C18 vs. ACME C18



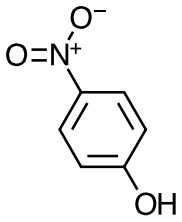




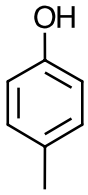
1. 4-Methoxyphenol



2. Phenol



2. 4-Nitrophenol



2. 4-Methylphenol

ACME F5/C18

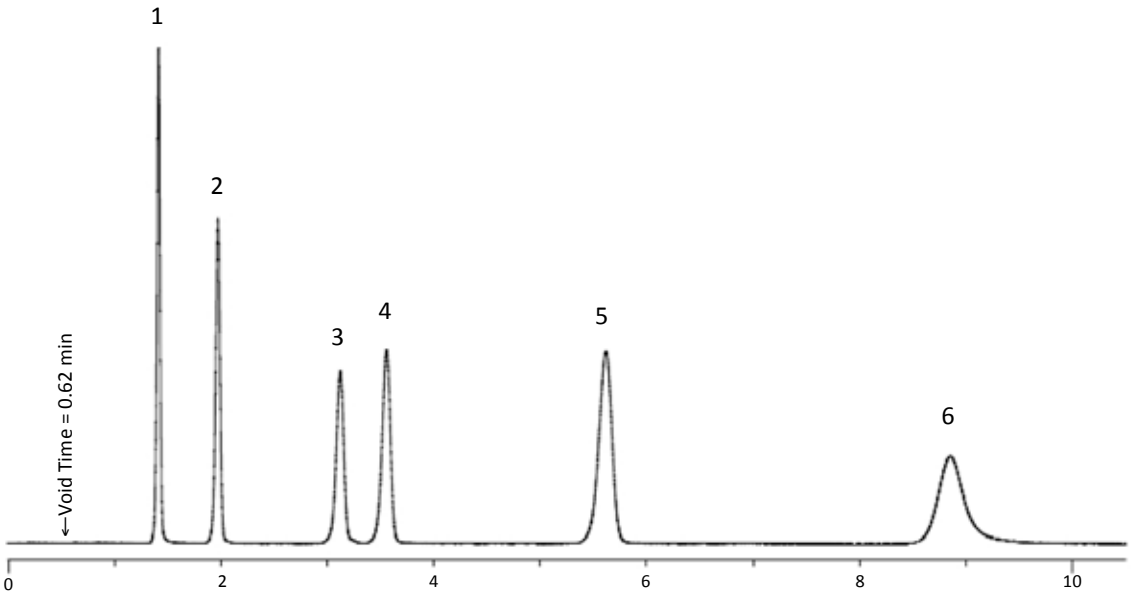
Pore Size: 120 Å
Carbon Content: 17%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

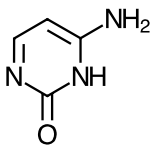
ACME F5/C18
3 µm, 100 x 4.6 mm

Isocratic Mobile Phase:
Buffer:25 mM Ammonium Acetate (pH 7.0)
Flow rate: 1.5 mL/min
Temperature: 25 °C
Detection: UV@254 nm
Injection Vol.: 3 µL

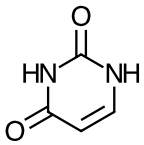
Sample:
1. Cytosine
2. Uracil
3. Cytidine
4. Hypoxanthine
5. Thymine
6. Adenine

100% Aqueous Conditions
Nucleosides & Nucleotides

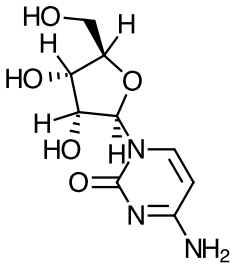




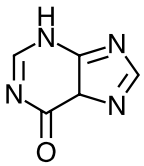
1. Cytosine



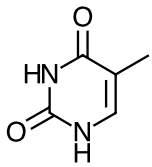
2. Uracil



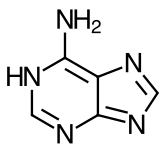
3. Cytidine



4. Hypoxanthine



5. Thymine



6. Adenine

ACME F5/C18

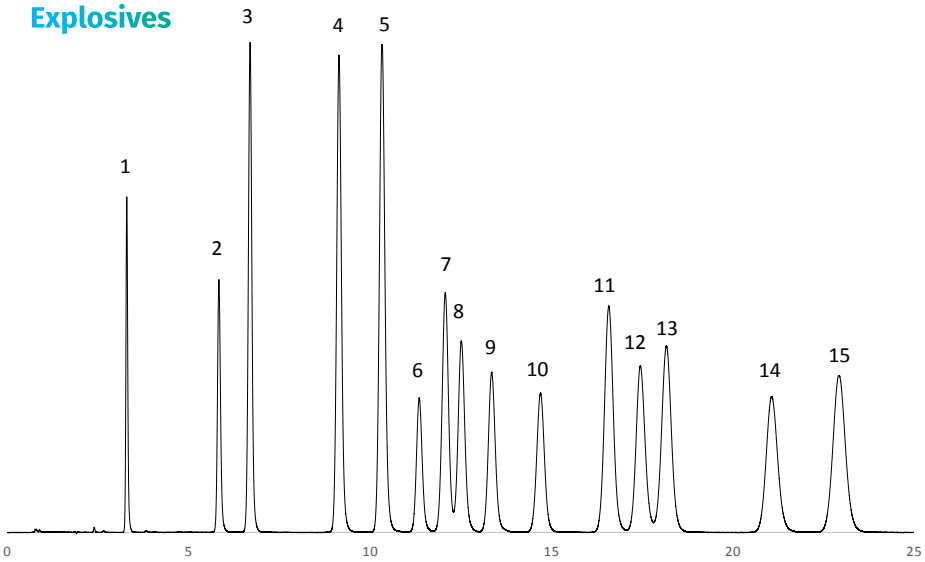
Pore Size: 120 Å
Carbon Content: 17%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

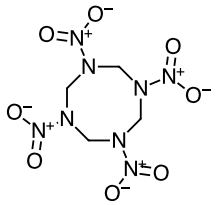
ACME F5/C18
3 µm, 100 x 4.6 mm

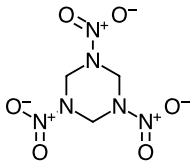
Isocratic Mobile Phase:
Methanol:Water, (50:50, v/v)
Flow rate: 1.0 mL/min
Temperature: 30 °C
Detection: UV@254 nm
Injection Vol.: 3 µL

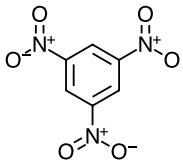
Sample:
1. HMX
2. RDX
3. 1,3,5-Trinitrobenzene
4. 1,4-Dinitrobenzene
5. 1,3-Dinitrobenzene
6. Tetryl
7. Nitrobenzene
8. 3,5-Dinitroaniline
9. 2-Amino-4,6-Dinitrotoluene
10. 4-Amino-2,6-Dinitrotoluene
11. 2,4-Dinitrotoluene
12. 2-Nitrotoluene
13. 2,6-Ditrotoluene
14. 4-Nitrobenzene
15. 3-Nitrotoluene

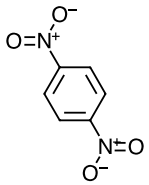
Explosives

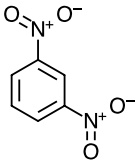


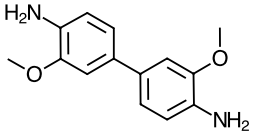

1. HMX

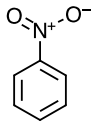

2. RDX

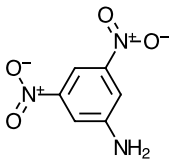

3. 1,3,5-Trinitrobenzene

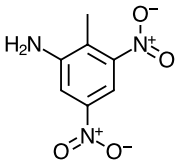

4. 1,4-Dinitrobenzene

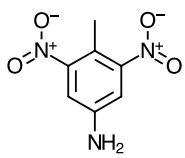

5. 1,3-Dinitrobenzene

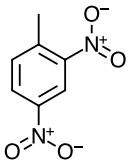

6. Tetryl

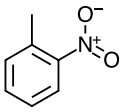

7. Nitrobenzene

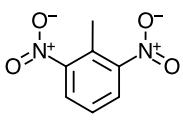

8. 3,5-Dinitroaniline

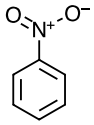

9. 2-Amino-4,6-Dinitrotoluene

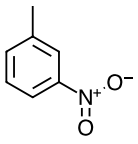

10. 4-Amino-2,6-Dinitrotoluene


11. 2,4-Dinitrotoluene


12. 2-Nitrotoluene


13. 2,6-Ditrotoluene


14. 4-Nitrobenzene


15. 3-Nitrotoluene

ACME F5/C18

Pore Size: 120 Å
Carbon Content: 17%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME F5/C18
3 µm, 100 x 4.6 mm

Mobile Phase:
A:Water,
B:Methanol

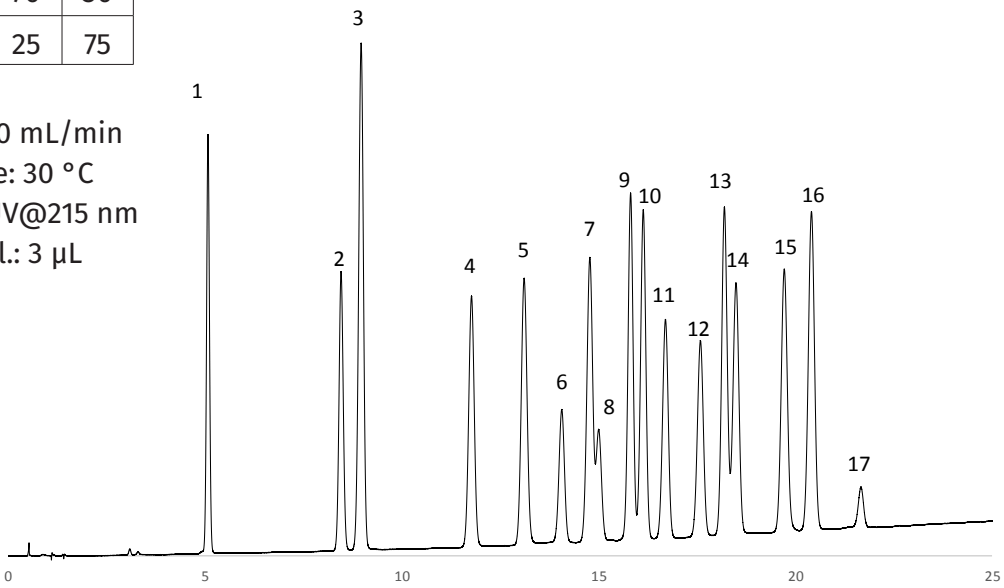
Gradient:

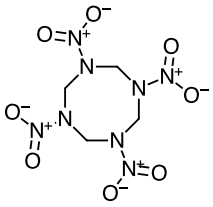
Time (min)	Profile	
	A	B
0	70	30
30	25	75

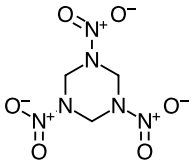
Flow rate: 1.0 mL/min
Temperature: 30 °C
Detection: UV@215 nm
Injection Vol.: 3 µL

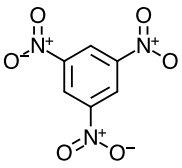
Sample:
1. HMX
2. RDX
3. 1,3,5-Trinitrobenzene
4. 1,4-Dinitrobenzene
5. 1,3-Dinitrobenzene
6. Tetryl
7. Nitrobenzene
8. Nitroglycerin
9. 3,5-Dinitroaniline
10. 2-Amino-4,6-Dinitrotoluene
11. 4-Amino-2,6-Dinitrotoluene
12. 2,4-Dinitrotoluene
13. 2-Nitrotoluene
14. 2,6-Ditrotoluene
15. 4-Nitrobenzene
16. 3-Nitrotoluene
17. PETN

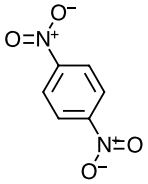
Explosives

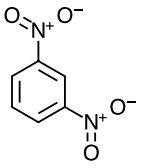


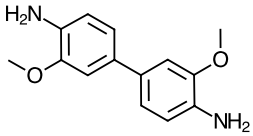

1. HMX

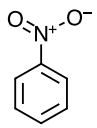

2. RDX

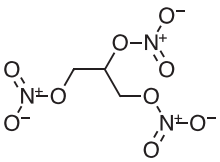

3. 1,3,5-Trinitrobenzene

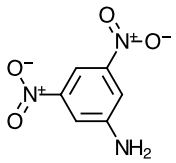

4. 1,4-Dinitrobenzene

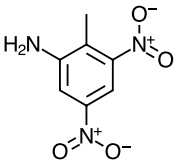

5. 1,3-Dinitrobenzene

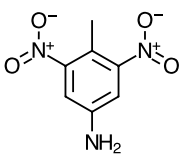

6. Tetryl

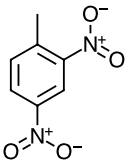

7. Nitrobenzene

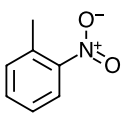

8. Nitroglycerin

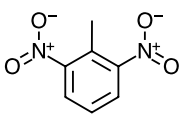

9. 3,5-Dinitroaniline

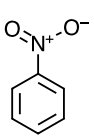

10. 2-Amino-4,6-Dinitrotoluene

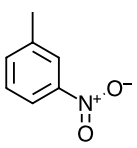

11. 4-Amino-2,6-Dinitrotoluene

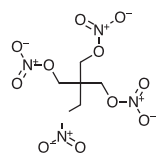

12. 2,4-Dinitrotoluene


13. 2-Nitrotoluene


14. 2,6-Ditrotoluene


15. 4-Nitrobenzene


16. 3-Nitrotoluene


17. PETN

ACME F5/C18

Pore Size: 120 Å
Carbon Content: 17%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME F5/C18
ACME F5/C18, 3 µm, 100 x 4.6 mm
ACME PLUS, 3 µm, 100 x 4.6 mm

Mobile Phase:
A: 25 mM Ammonium Formate in water
B: Acetonitrile

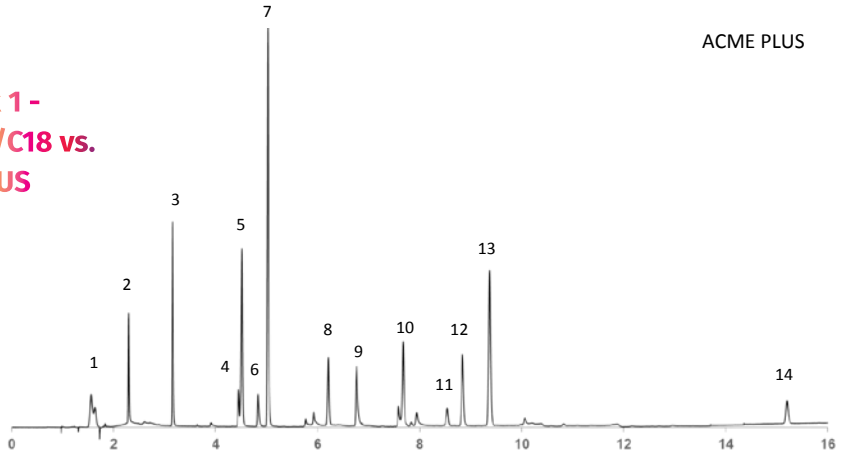
Gradient:

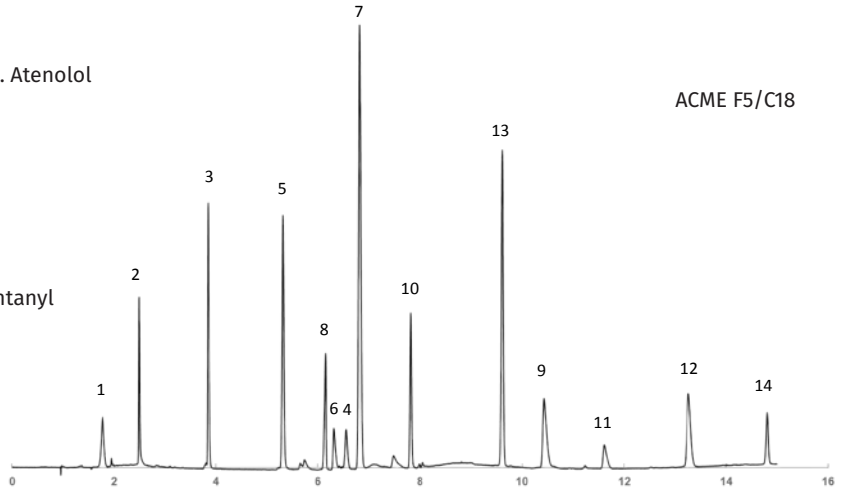
Time (min)	Profile	
	A	B
0	100	0
10	35	65
11	10	90
15	10	90

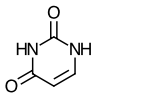
Flow rate: 1.5 mL/min
Temperature: 25 °C
Detection: UV@245 nm
Injection Vol.: 3 µL

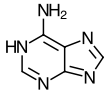
Sample:
1. Uracil
2. Adenine
3. Atenolol
4. Pindolol
5. Codeine
6. Norfentanyl
7. Acebutolol
8. Verapamil
9. Propranolol
10. Oxazepam
11. Fentanyl
12. Tolbutamide
13. Diazepam
14. Δ9-Tetrahydrocannabinol

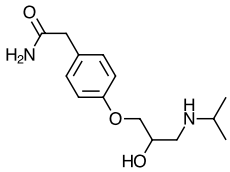
Drug Mix 1 - ACME F5/C18 vs. ACME PLUS

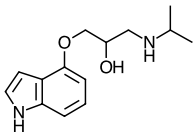


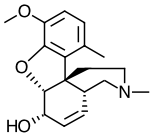


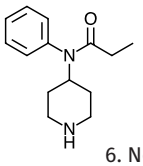

1. Uracil

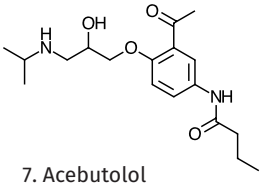

2. Adenine

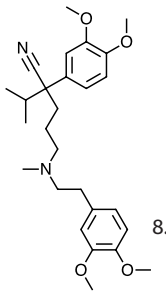

3. Atenolol

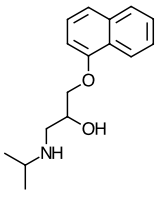

4. Pindolol

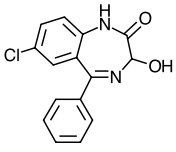

5. Codeine

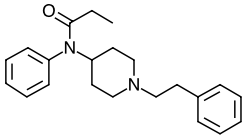

6. Norfentanyl

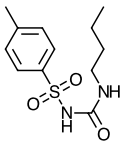

7. Acebutolol

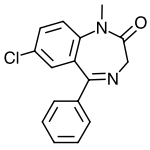

8. Verapamil

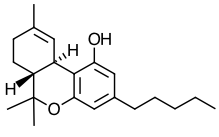

9. Propranolol


10. Oxazepam


11. Fentanyl


12. Tolbutamide


13. Diazepam


14. Δ9-Tetrahydrocannabinol

ACME F5/C18

Pore Size: 120 Å
Carbon Content: 17%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME F5/C18
1 .9 µm, 100 x 2.1 mm

Mobile Phase:
Mobile Phase A: 0.1% formic acid in water, (v/v)

Mobile Phase B: 0.1% formic acid in acetonitrile, (v/v)

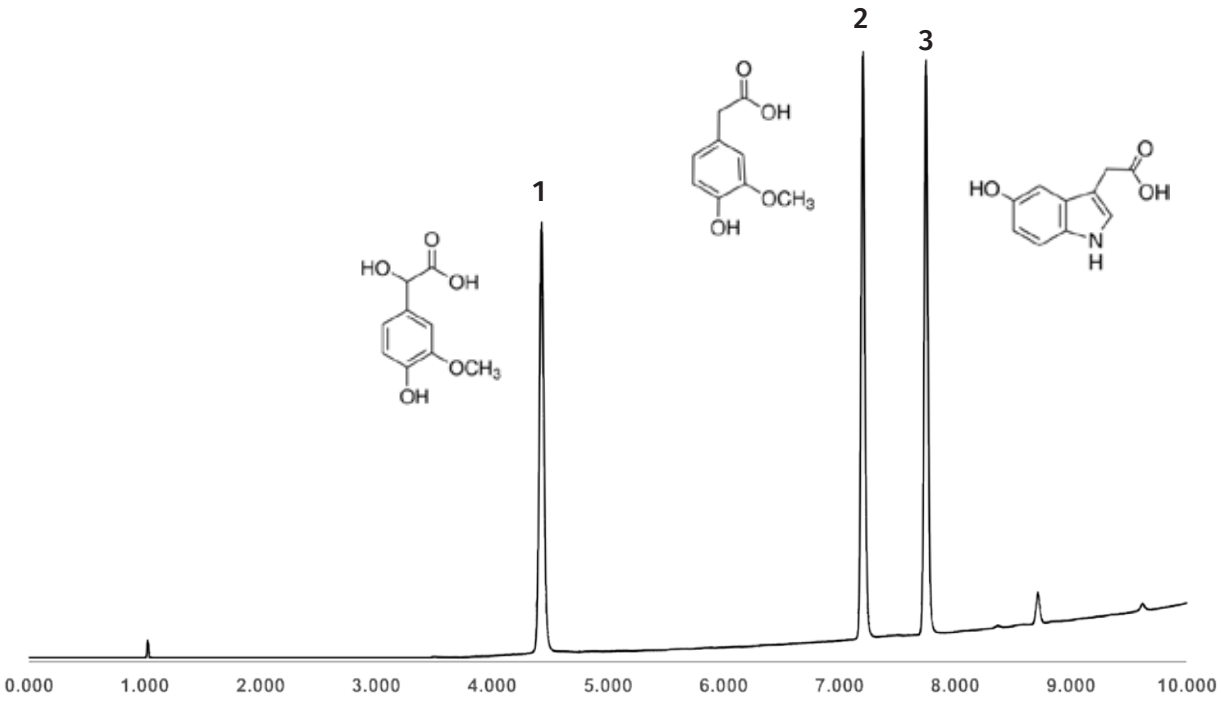
Flow rate: 0.3 mL/min
Temperature: 25 °C
Detection: UV@245 nm
Injection Vol.: 0.5 µL

Gradient:

Time (min)	Profile	
	A	B
0	100	0
10.0	60	40

Sample:
1. Vanillylmandelic Acid (VMA)
2. Homovanillic Acid (HVA)
3. 5-Hydroxyindoleacetic Acid (5-HIAA)

Clinical Application
Vanillylmandelic acid (VMA) and Homovanillic acid (HVA) and Hydroxyindoleacetic acid (5-HIAA)



ACME Biphenyl

Pore Size: 120 Å
Carbon Content: 13%
Usable pH Range: 2 to 9
USP Listing: L11

ACME Biphenyl
3 µm, 100 x 2.1 mm

Mobile Phase:
A: 0.1% Formic Acid in Water, (v/v)
B: 0.09% Formic Acid in Acetonitrile, (v/v)

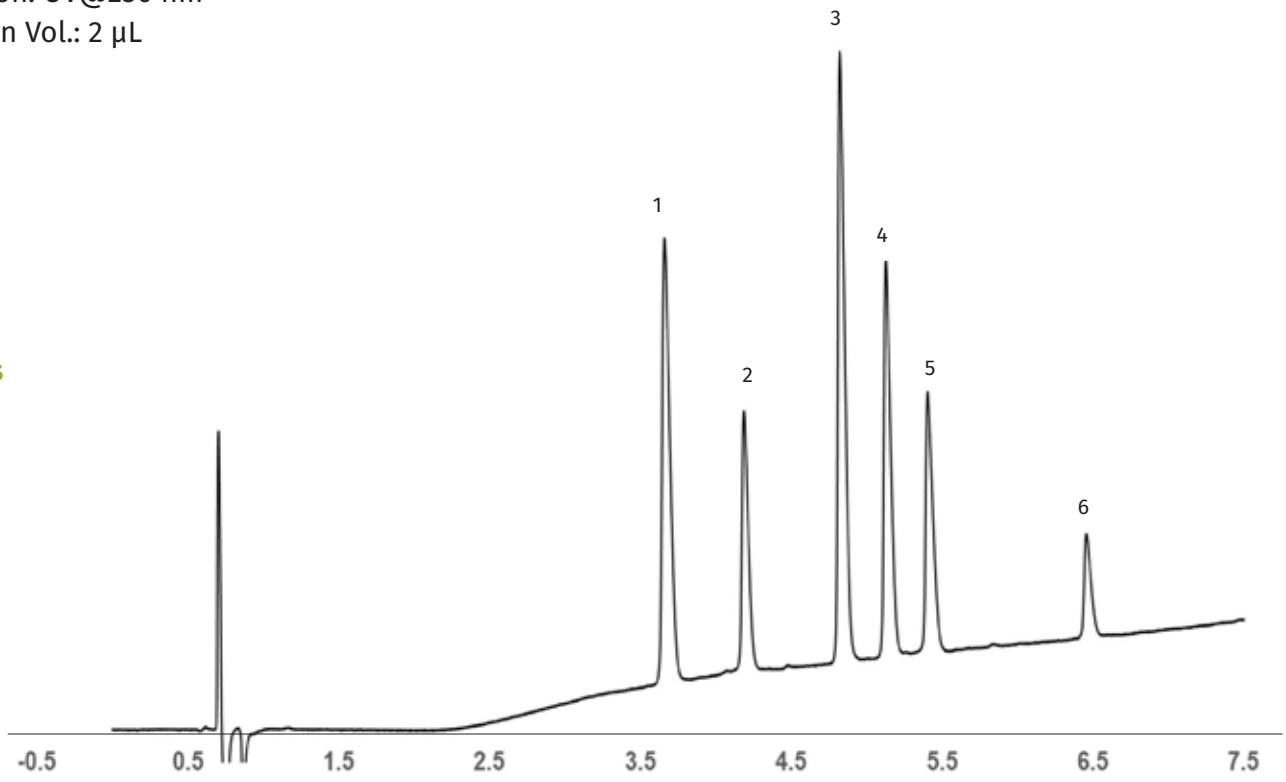
Gradient:

Time (min)	Profile	
	A	B
0	95	5
8	25	75

Flow rate: 0.4 mL/min
Temperature: 25 °C
Detection: UV@230 nm
Injection Vol.: 2 µL

Sample:
1. Morphine
2. Hydromorphone
3. Codeine
4. 6-Acetylmorphine
5. Hydrocodone
6. Heroin

Opioids



ACME Biphenyl

Pore Size: 120 Å
Carbon Content: 13%
Usable pH Range: 2 to 9
USP Listing: L11

ACME Biphenyl
3 µm, 100 x 2.1 mm

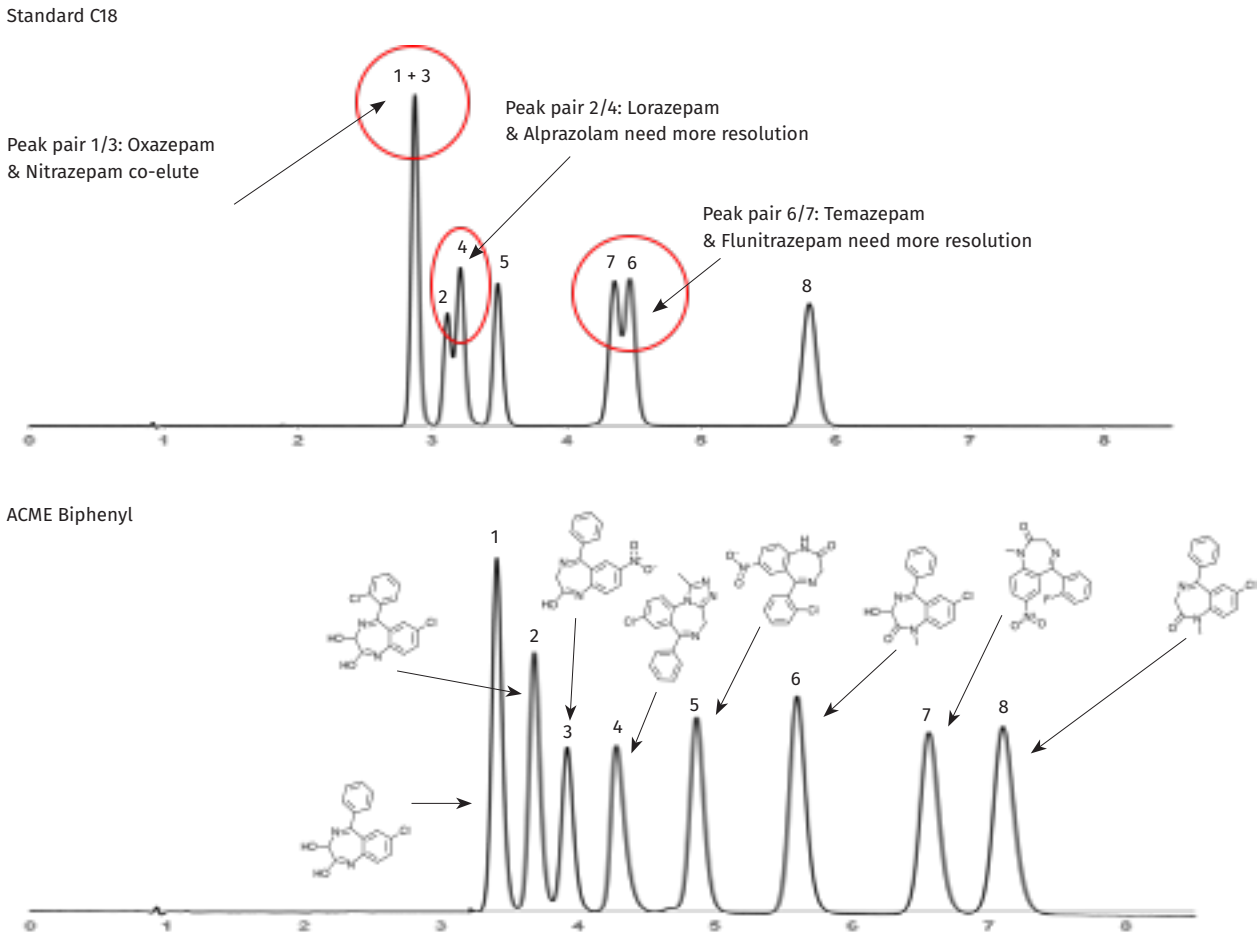
Isocratic Mobile Phase:
Acetonitrile:Water:Formic Acid,
(37:63:0.1, v/v/v)

Flow rate: 0.3 mL/min
Temperature: 25 °C
Detection: UV@254 nm
Injection Vol.: 1 µL

Sample:
1. Oxazepam
2. Lorazepam
3. Nitrazepam
4. Alprazolam
5. Clonazepam
6. Temazepam
7. Flunitrazepam
8. Diazepam

Selectivity Comparison Example of ACME Biphenyl vs. Standard C18

Benzodiazepines



ACME C8

Pore Size: 120 Å
Carbon Content: 10%
Usable pH Range: 1.8 to 9.5
USP Listing: L7

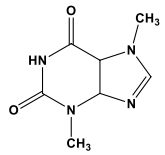
ACME C8
3 µm, 100 x 4.6 mm

Isocratic Mobile Phase:
A: 0.1% formic acid in water
B: Methanol
A:B, (80:20, v/v)

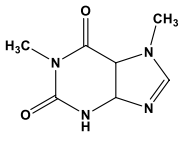
Flow rate: 1.0 mL/min
Temperature: 30 °C
Detection: UV@270 nm
Injection Vol.: 2 µL

Sample:
1. Theobromine (3,7-Dimethylxanthine)
2. Paraxanthine (1,7-Dimethylxanthine)
3. Theophylline (1,3-Dimethylxanthine)
4. 1,3-Dimethyl-7-(2-hydroxyethyl)xanthine
5. Caffeine (1,3,7-Trimethylxanthine)

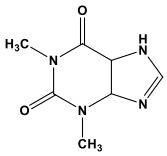
Caffeine Metabolites



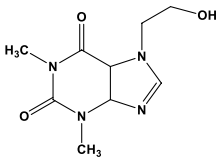
1. Theobromine



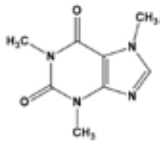
2. Paraxanthine



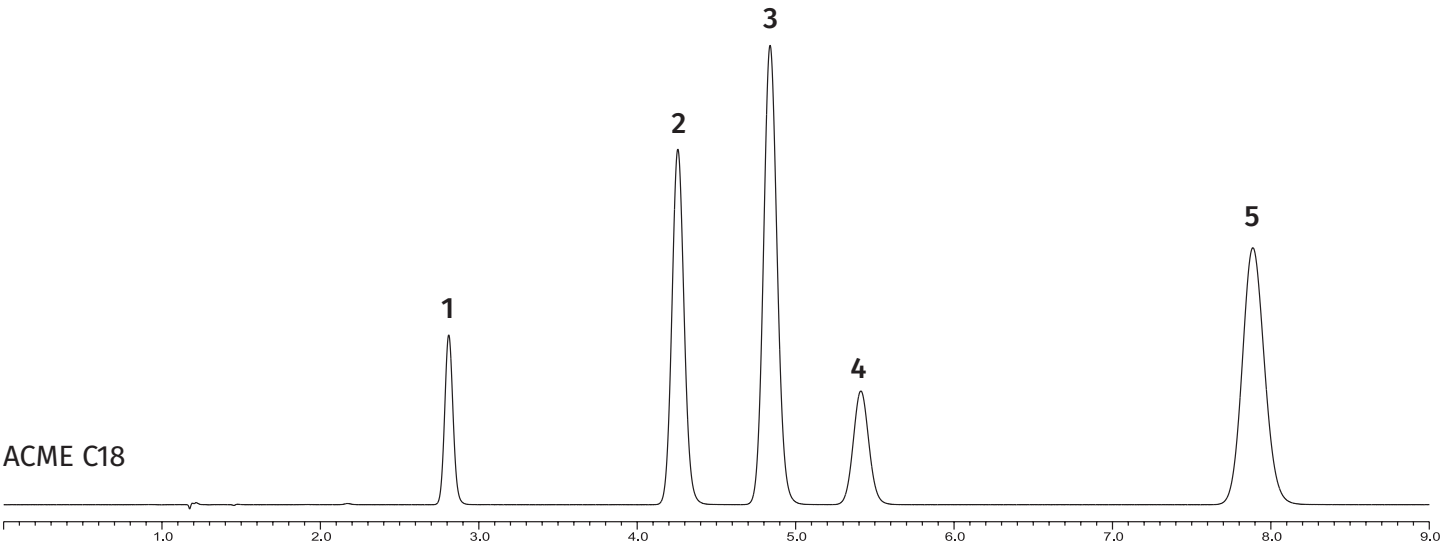
3. Theophylline



4. 1,3-dimethyl-7-(2-hydroxyethyl)xanthine



5. Caffeine



ACME C8

Pore Size: 120 Å
Carbon Content: 10%
Usable pH Range: 1.8 to 9.5
USP Listing: L7

ACME C8
3 µm, 100 x 4.6 mm

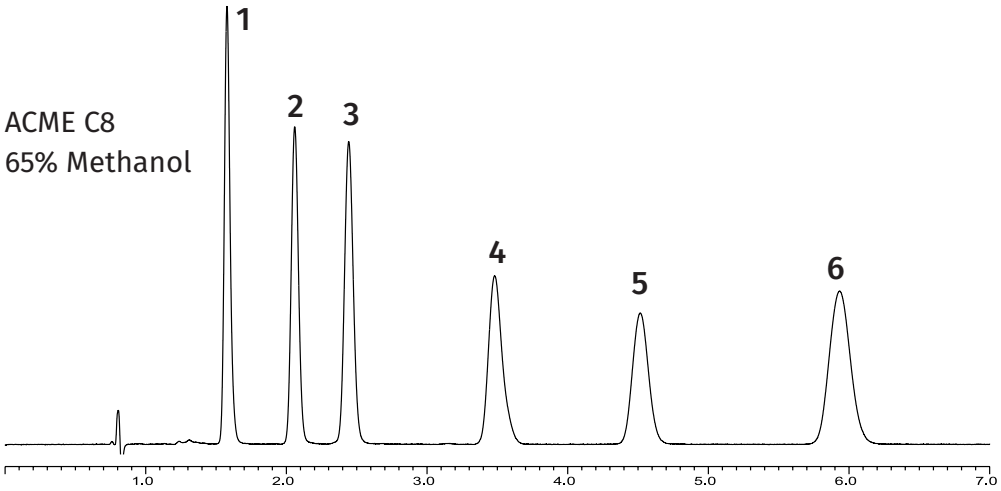
Isocratic Mobile Phase:
A: 25 mM ammonium phosphate buffer (pH 7.0)
B: Methanol
A:B, (35:65, v/v)

Flow rate: 1.5 mL/min
Temperature: 35 °C
Detection: UV@254 nm
Injection Vol.: 2 µL

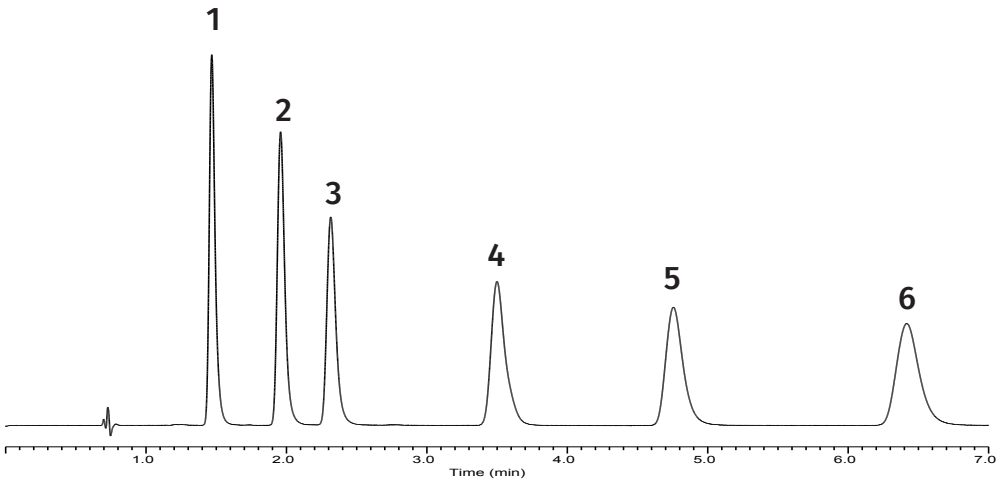
Sample:
1. Nordoxepin
2. Desipramine
3. Nortriptyline
4. Doxepin
5. Imipramine
6. Amitriptyline

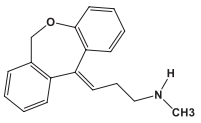
Tricyclic Antidepressants

ACME C8
65% Methanol

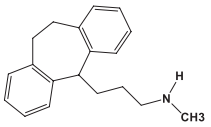


ACME C18
70% Methanol

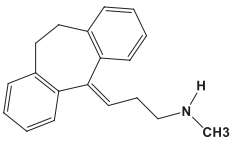




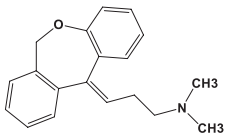
1. Nordoxepin



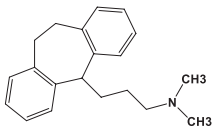
2. Desipramine



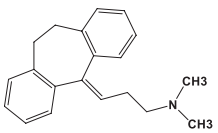
3. Nortriptyline



4. Doxepin



5. Imipramine



6. Amitriptyline

ACME C8

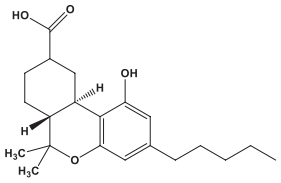
Pore Size: 120 Å
Carbon Content: 10%
Usable pH Range: 1.8 to 9.5
USP Listing: L7

ACME C8
3 µm, 100 x 4.6 mm

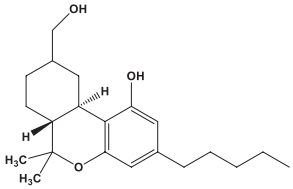
Isocratic Mobile Phase:
A: 0.1% formic acid in water, (v/v)
B: 0.1% formic acid in methanol, (v/v)
A:B, (20:80, v/v)

Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV@220 nm
Injection Vol.: 2 µL

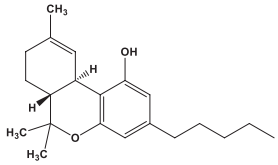
Sample:
1. 11-Nor-9-carboxy-Δ9-tetrahydrocannabinol (11-COOH-THC, THC-COOH)
2. 11-Hydroxy-Δ9-tetrahydrocannabinol (11-Hydroxy-THC , 11-OH-THC)
3. Δ9-Tetrahydrocannabinol (THC)



1. 11-COOH-THC



2. 11-Hydroxy-THC

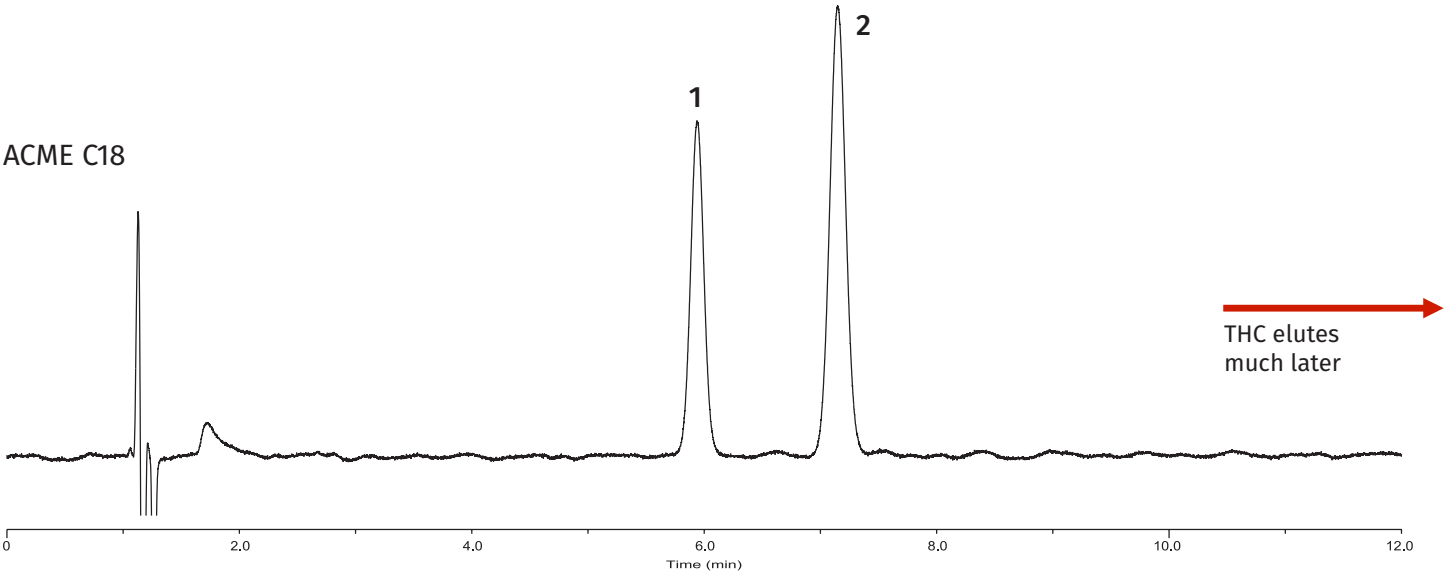


3. Δ9-Tetrahydrocannabinol (THC)

THC Metabolites / Isocratic

ACME C8

ACME C18



ACME CN (Cyano)

Pore Size: 120 Å
Carbon Content: 7%
Usable pH Range: 2 to 7.5
USP Listing: L10

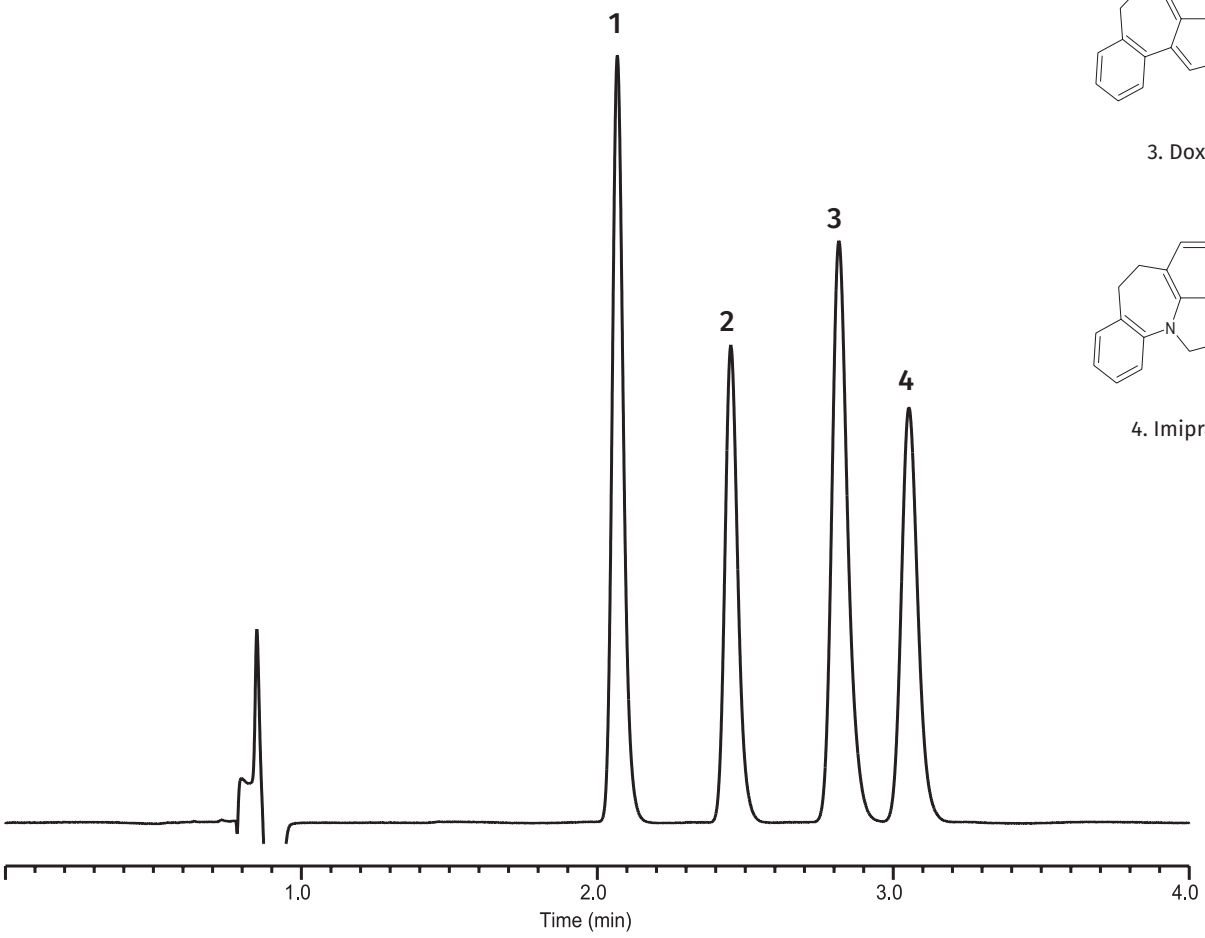
ACME CN
3 µm, 100 x 4.6 mm

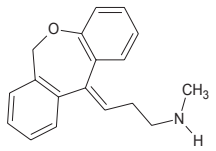
Isocratic Mobile Phase:
A: 100 mM ammonium acetate in water
B: Acetonitrile
A:B, (10:90, v/v)

Flow rate: 1.5 mL/min
Temperature: 30 °C
Detection: UV@245 nm
Injection Vol.: 5 µL

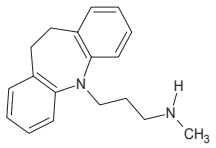
Sample:
1. Nordoxepin
2. Desipramine
3. Doxepin
4. Imipramine

Tricyclic Antidepressants under HILIC conditions

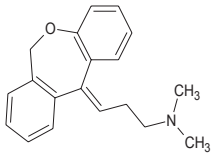




1. Nordoxepin



2. Desipramine



3. Doxepin

4. Imipramine

ACME CN (Cyano)

Pore Size: 120 Å
Carbon Content: 7%
Usable pH Range: 2 to 7.5
USP Listing: L10

ACME CN
3 µm, 100 x 4.6 mm

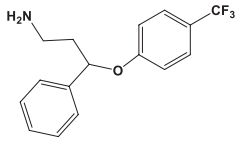
Isocratic Mobile Phase
Flow rate: 1.5 mL/min
Temperature: 30 °C
Detection: UV@230 nm
Injection Vol.: 2 µL

Sample:
1. Norfluoxetine
2. Fluoxetine

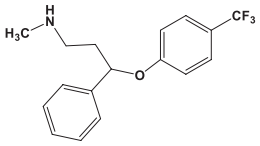
Fluoxetine and Metabolite

Reversed Phase Mode:
Acetonitrile:25 mM ammonium phosphate in water, (45:55, v/v)

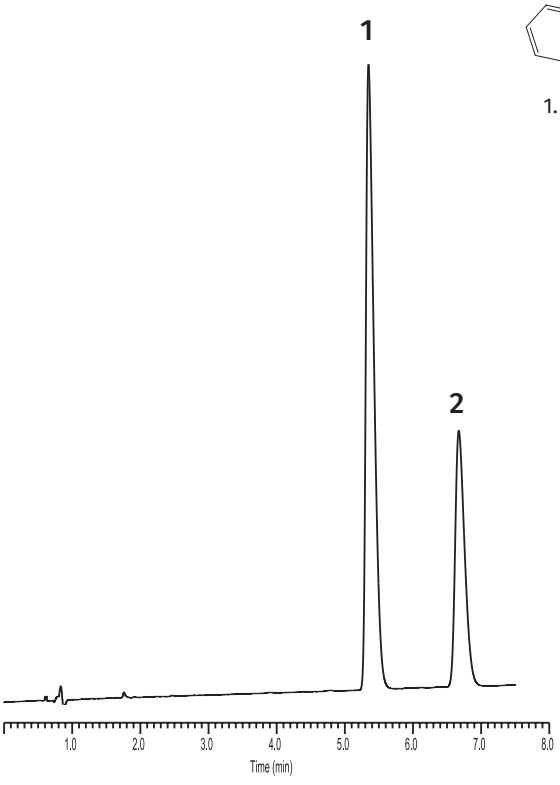
HILIC Mode:
Acetonitrile:100 mM ammonium acetate in water, (90:10, v/v)



1. Norfluoxetine



2. Fluoxetine



ACME Ph (Phenyl)

Pore Size: 120 Å
Carbon Content: 10%
Usable pH Range: 1.8 to 9.5
USP Listing: L11

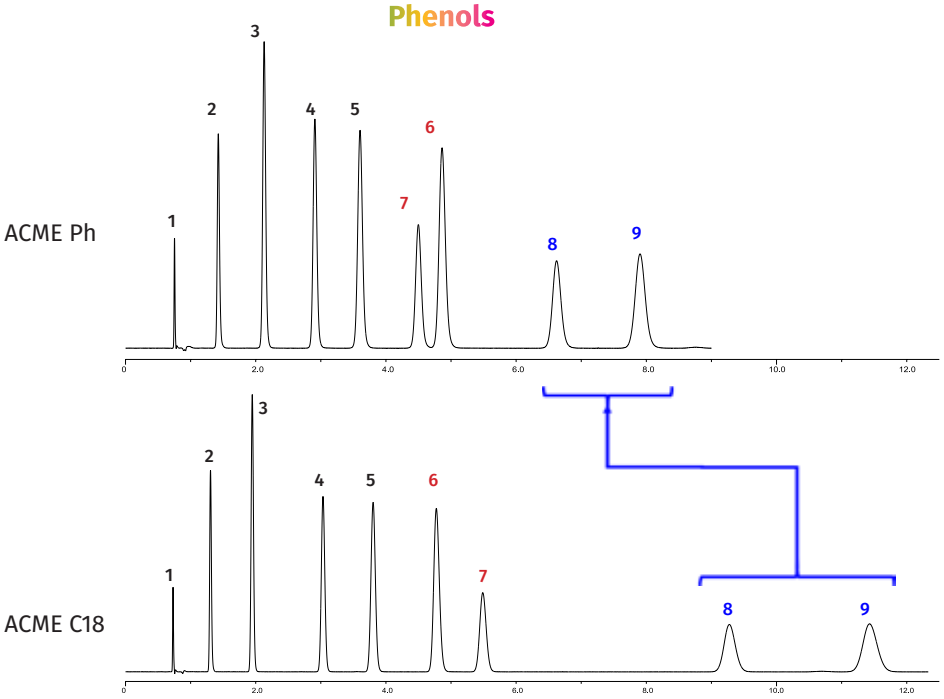
ACME Ph
3 µm, 100 x 4.6 mm

Isocratic Mobile Phase:
A: 0.1% formic acid in water, (v/v)
B: 0.1% formic acid in methanol, (v/v)
A:B, (75:25, v/v)

Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV@270 nm
Injection Vol.: 3 µL

Sample:
1. Uracil
2. Resorcinol
3. 4-Hydroxybenzaldehyde
4. Phenol
5. Methylparaben
6. p-Nitrophenol
7. p-Cresol
8. 3,4-Dimethylphenol
9. 2,6-Dimethylphenol

Phenols



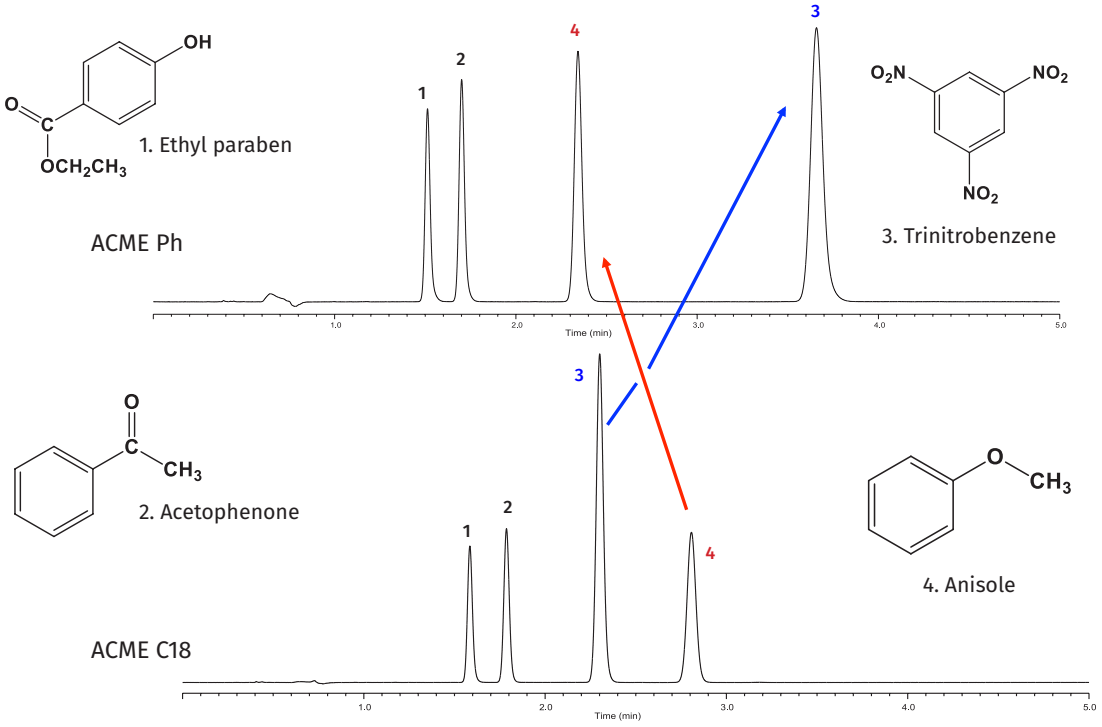
ACME Ph
3 µm, 100 x 4.6 mm

Isocratic Mobile Phase:
A: Water
B: Acetonitrile
A:B, (50:50, v/v)

Flow rate: 1.5 mL/min
Temperature: 25 °C
Detection: UV@220 nm
Injection Vol.: 5 µL

Sample:
1. Ethylparaben
2. Acetophenone
3. Trinitrobenzene
4. Anisole

Selectivity Analytes



ACME Ph (Phenyl)

Pore Size: 120 Å
Carbon Content: 10%
Usable pH Range: 1.8 to 9.5
USP Listing: L11

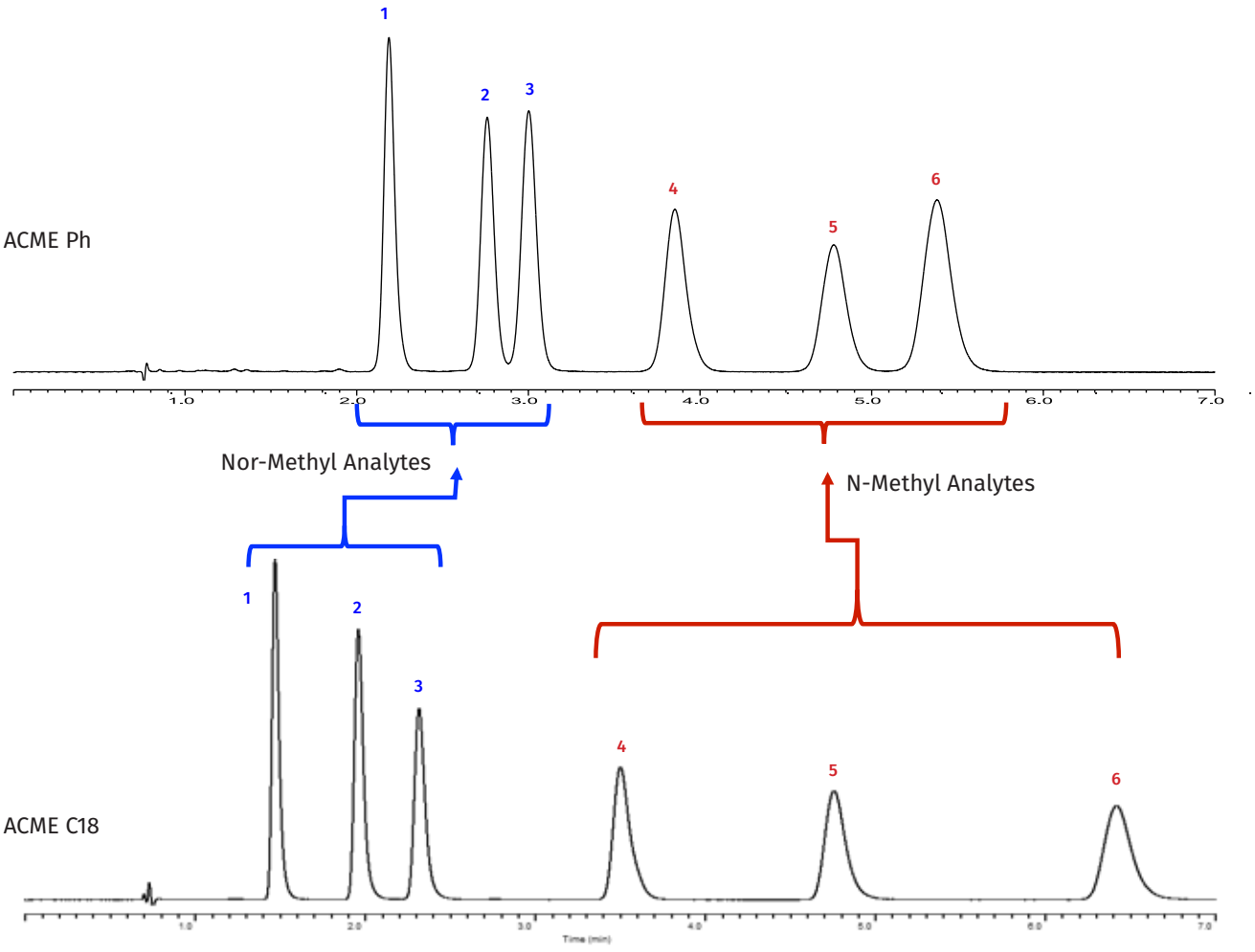
ACME Ph
3 µm, 100 x 4.6 mm

Isocratic Mobile Phase:
A: 25 mM ammonium phosphate buffer (pH 7.0)
B: Methanol
A:B, (30:70, v/v)

Flow rate: 1.5 mL/min
Temperature: 35 °C
Detection: UV@254 nm
Injection Vol.: 2 µL

Sample:
1. Nordoxepin
2. Desipramine
3. Nortriptyline
4. Doxepin
5. Imipramine
6. Amitriptyline

Tricyclic Antidepressants



The more polar analytes show enhanced retention on the ACME Phenyl while the less polar analytes show decreased retention. This has the advantage of bringing separations of mixed analyte systems into a smaller separation window.

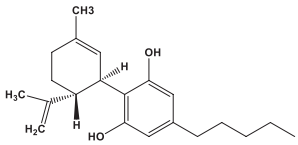
ACME PLUS

Pore Size: 200 Å
Carbon Content: 12%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

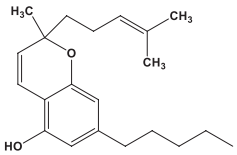
ACME PLUS
3 µm, 50 x 2.1 mm

Isocratic Mobile Phase:
Methanol: Water, (83:17, v/v)
Flow rate: 0.5 mL/min
Temperature: 25 °C
Detection: UV@215 nm
Injection Vol.: 0.5 µL

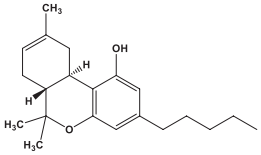
Sample:
1. Cannabidiol (CBD)
2. Cannabichromene (CBC)
3. Δ8-Tetrahydrocannabinol (THC-Δ8)
4. Δ9-Tetrahydrocannabinol (THC-Δ9)
5. Cannabinol (CBN)



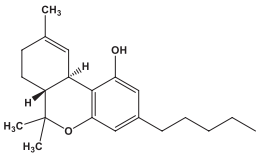
1. CBD



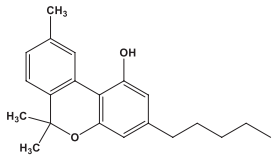
2. CBC



3. THC Δ8



4. THC Δ9



5. CBN

Fast Cannabinoids

ACME PLUS

Pore Size: 200 Å
Carbon Content: 12%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME PLUS
3 µm, 100 x 4.6 mm

A: 50 mM KH_2PO_4 buffer (pH 3.0)
B: Methanol

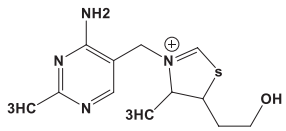
Gradient:

Time (min)	Profile	
	A	B
0	98	2
10	50	50

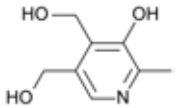
Flow rate: 1.0 mL/min
Temperature: 30 °C
Detection: UV@270 nm
Injection Vol.: 10 µL

Sample:
1. Thiamine (Vitamin B1)
2. Pyridoxine (Vitamin B6)
3. Niacinamide (Nicotinamide, Vitamin B3)
4. Folic Acid (Vitamin B9)
5. Cyanocobalamin (Vitamin B12)
6. Riboflavin (Vitamin B2)

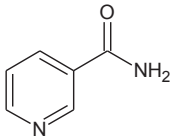
Water Soluble Vitamins



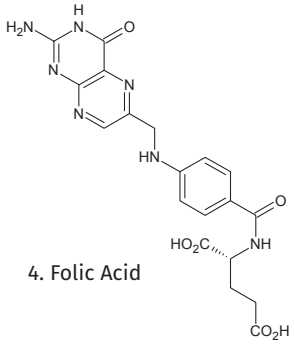
1. Thiamine



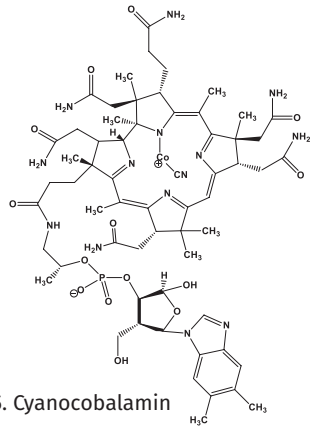
2. Pyridoxine



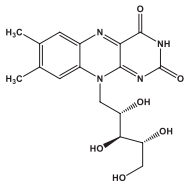
3. Niacinamide



4. Folic Acid



5. Cyanocobalamin



6. Riboflavin

ACME PAH

Pore Size: 200 Å
Carbon Content: 17%
Usable pH Range: 1.8 to 9.5
USP Listing: L1

ACME PAH
3 µm, 100 x 4.6 mm

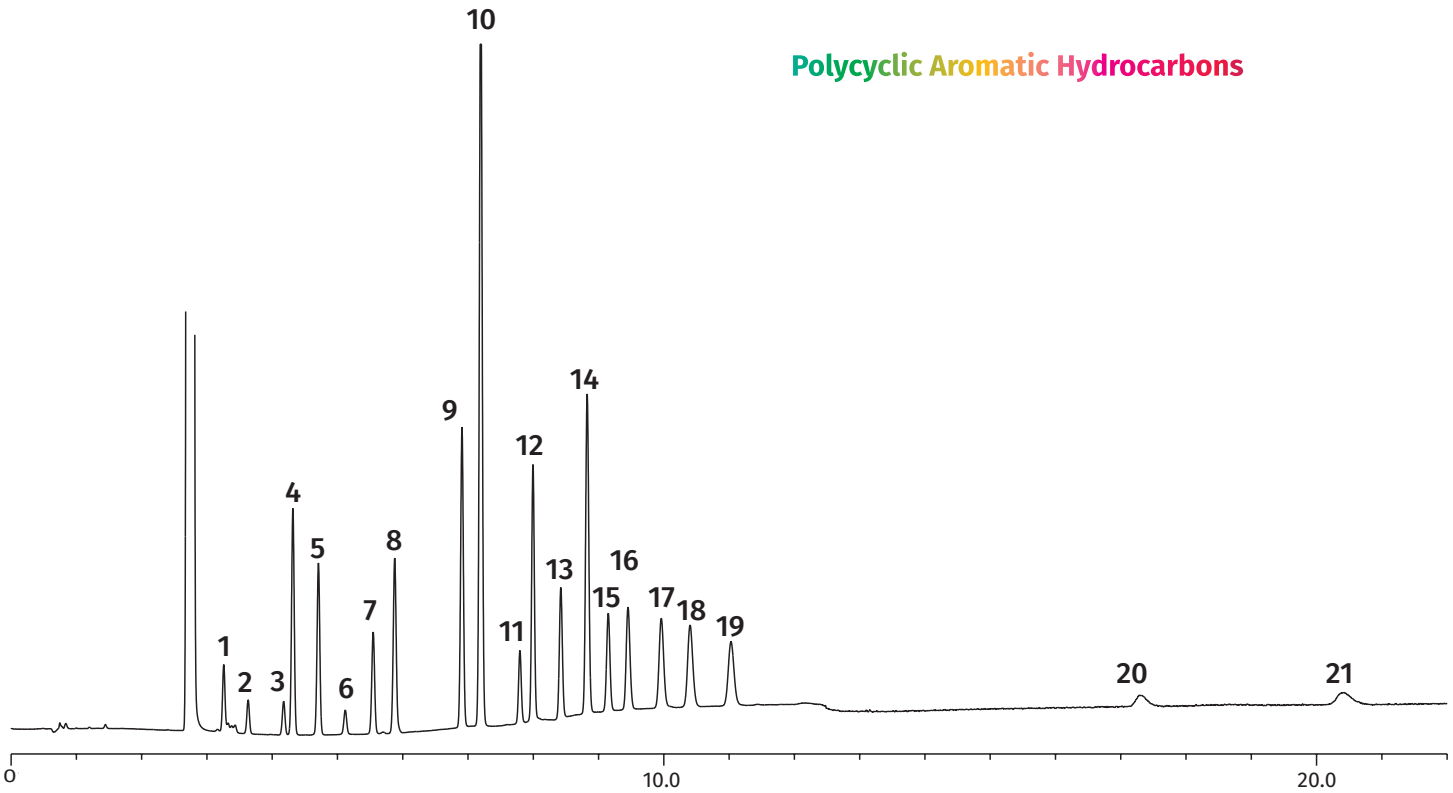
Mobile Phase:
A: Water
B: Acetonitrile

Gradient:

Time (min)	Profile		Flow (mL/min)
	A	B	
0	50	50	1.5
1	50	50	1.5
8	10	90	1.5
9	0	100	1.5
10.5	0	100	2.0
22	0	100	2.0

Flow rate: See gradient table
Temperature: 30 °C
Detection: UV@263 nm
Injection Vol.: 4 µL

Sample:
1. Naphthalene
2. Acenaphthylene
3. Acenaphthene
4. Fluorene
5. Phenanthrene
6. Anthracene
7. Fluoranthene
8. Pyrene
9. Benzo(a)anthracene
10. Chrysene
11. Benzo(j)fluoranthene
12. Benzo(b)fluoranthene
13. Benzo(k)fluoranthene
14. Benzo(a)pyrene
15. Dibenzo(a,h)anthracene
16. Dibenzo(a,l)pyrene
17. Benzo(ghi)perylene
18. Indeno(1,2,3-cd)pyrene
19. Dibenzo(a,e)pyrene
20. Dibenzo(a,i)pyrene
21. Dibenzo(a,h)pyrene



ACME Preparative Columns

- Available in 5 µm and 10 µm particles
- Up to 30 mm ID available
- Wide variety of stationary phases
- High Loading Capacity
- Optimized Packing Efficiency
- Narrow Peak Profile, High Efficiency & Resolution

Successful scale-up in Preparative HPLC requires that the Preparative HPLC method be consistent with the Analytical HPLC method, in particular, the phase material, column dimensions and method conditions. Phase Analytical provides a variety of HPLC stationary phases for your preparative HPLC when scaling up for isolation and purification methods.

ACME Optimized Packed Bed (OPB) process ensures excellent peak shape and efficiency and at the same time increasing column lifetime.

ACME Prep columns are designed for high sample loading, high throughput applications using silica-based packing materials for pharmaceutical and biopharmaceutical chromatographic purifications

- High mass loading and excellent resolution
- Excellent durability with acidic and alkaline resistance
- Analytical columns available for screening and method development of isolation and purification methods prior to scale-up

ACME Prep Columns – Dimensions and Chemistries

ACME columns are available in various dimensions:

- Length: 50 mm, 100 mm, 150 mm and 250 mm length
- Diameter: 10 mm, 21.2 mm and 30 mm ID

Phase Analytical ACME Brand Preparative Packing Characteristics

Packing Material	Particle Size	Pore Size	Carbon Load	End Capped
ACME C18	5 µm, 10 µm	120 Å	16	Yes
ACME PLUS	5 µm, 10 µm	200 Å	12	Yes
ACME C8	5 µm, 10 µm	120 Å	10	Yes

Choosing Preparative Columns

The large-scale separation will be based on the analytical column and method conditions used for the small-scale (lab) separation. Ideally, they should be identical.

Step 1: Optimize analytical separation

Step 2: Determine loading capacity of the analytical column and the chosen packing material.

Step 3: Determine how much analyte mass you need to purify or isolate

Step 4: Determine the required Prep column size for isolation or purification. See equations below.

If preparative columns are packed with the identical media to their analytical counterpart then the theoretical calculations for scale-up will be accurate. The scale-up factor is related to the column length and diameter:

Scale-Up Factor Calculation

$$\text{Scale-Up Factor} = \frac{(\text{Diameter, Preparative Column})^2 \times (\text{Length, Preparative Column})}{(\text{Diameter, Analytical Column})^2 \times (\text{Length, Analytical Column})}$$

Scale-Up Example:

For a 150 mm x 4.6 mm ID Analytical Column to 150 mm x 10 mm ID Preparative Column

$$\text{Scale-Up Factor} = \frac{(10\text{ mm})^2 \times (150\text{ mm})}{(4.6\text{ mm})^2 \times (150\text{ mm})} = 4.73 \text{ or approximate 5-fold scale-up}$$

Flow Rate Calculation

$$\text{Flow Rate (Prep.)} = \text{Flowrate (Anal.)} \times \frac{(\text{Diameter, Prep.})^2}{(\text{Diameter, Anal.})^2}$$

Flow Rate Example:

For a 150 mm x 4.6 mm ID, 5 µm Analytical Column at 1.0 ml/min to 150 mm x 10 mm ID, 5 µm Preparative Column

$$\text{Flow Rate (Prep.)} = 1.0\text{ mL/min.} \times \frac{(10\text{ mm})^2}{(4.6\text{ mm})^2} = 4.72\text{ mL/min}$$

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

Ordering Information Method Development Kits/Guard Columns

Design your own Method Development Kit

Speed of Analysis Kit

ACME C18
ACME PLUS

Drug Development Kit

ACME C18 ACME Ph
ACME CN

Method Development Kit: Speed of Analysis					
Dimensions Length (mm) x ID			1.9 µm	3 µm	5 µm
50	x	2.1	MDK19SA5021	MDK3SA5021	MDK5SA5021
50	x	4.6	MDK19SA5046	MDK3SA5046	MDK5SA5046
100	x	2.1	MDK19SA10021	MDK3SA10021	MDK5SA10021
100	x	4.6	MDK19SA10046	MDK3SA10046	MDK5SA10046

Method Development Kit: Drug Development					
Dimensions Length (mm) x ID			1.9 µm	3 µm	5 µm
50	x	2.1	MDK19DD5021	MDK3DD5021	MDK5DD5021
50	x	4.6	MDK19DD5046	MDK3DD5046	MDK5DD5046
100	x	2.1	MDK19DD10021	MDK3DD10021	MDK5DD10021
100	x	4.6	MDK19DD10046	MDK3DD10046	MDK5DD10046
150	x	4.6	-	MDK3DD15046	MDK5DD15046

HPLC Guard Cartridges / 5pk				
Dimensions Length (mm) x ID			3 µm	5 µm
5	x	2.1	GC3LC521XX	GC5LC521XX
5	x	4.6	GC3LC546XX	GC5LC546XX
10	x	2.1	GC3LC1021XX	GC5LC1021XX
10	x	4.6	GC3LC1046XX	GC5LC1046XX

XX = C18, F5/C18, C8, PHENYL, CYANO and PLUS

UHPLC Guard Cartridges / 5pk			
Dimensions Length (mm) x ID			1.9 µm
5	x	2.1	GC19UC521XX
5	x	4.6	GC19UC546XX
10	x	2.1	GC19UC1021XX
10	x	4.6	GC19UC1046XX

XX = C18, C8, PHENYL, CYANO and PLUS

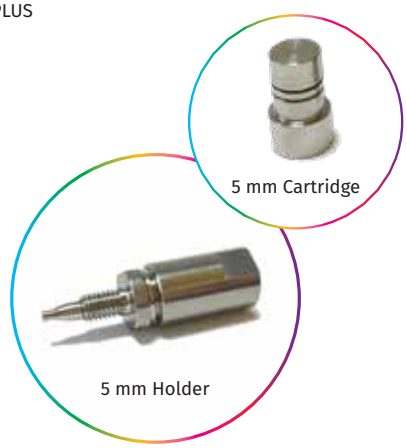
Guard cartridges and guard holders also applicable for columns on pages 56, 57 & 58

Guard Column Holder[1] (Peek Ferrules)	
Dimensions	Holders
5 mm for 2.1 & 4.6 ID	ACHOL-P5021/46
10 mm for 2.1 & 4.6 ID	ACHOL-P10021/46

[1] For HPLC

Guard Column Holder[2] (Stainless Steel Ferrules)	
Dimensions	Holders
5 mm for 2.1 & 4.6 ID	ACHOLS-5021/46
10 mm for 2.1 & 4.6 ID	ACHOLS-10021/46

[2] For High pressure UHPLC



Ordering Information

For guard cartridges and holders please see page 45

ACME C18 - 120 Å

Dimensions Length (mm) x ID			1.9 µm	3 µm	5 µm
30	x	2.1	ACMC18-1.9-03021	ACMC18-3-03021	ACMC18-5-03021
	x	4.6	ACMC18-1.9-03046	ACMC18-3-03046	ACMC18-5-03046
50	x	2.1	ACMC18-1.9-05021	ACMC18-3-05021	ACMC18-5-05021
	x	3.0	ACMC18-1.9-05030	ACMC18-3-05030	ACMC18-5-05030
	x	4.6	ACMC18-1.9-05046	ACMC18-3-05046	ACMC18-5-05046
100	x	2.1	ACMC18-1.9-10021	ACMC18-3-10021	ACMC18-5-10021
	x	3.0	ACMC18-1.9-10030	ACMC18-3-10030	ACMC18-5-10030
	x	4.6	ACMC18-1.9-10046	ACMC18-3-10046	ACMC18-5-10046
150	x	2.1	ACMC18-1.9-15021	ACMC18-3-15021	ACMC18-5-15021
	x	3.0	-	ACMC18-3-15030	ACMC18-5-15030
	x	4.6	-	ACMC18-3-15046	ACMC18-5-15046
250	x	4.6	-	-	ACMC18-5-25046

ACME F5/C18 - 120 Å

Dimensions Length (mm) x ID			1.9 µm	3 µm	5 µm
30	x	2.1	ACMF5C18-1.9-03021	ACMF5C18-3-03021	ACMF5C18-5-03021
	x	4.6	ACMF5C18-1.9-03046	ACMF5C18-3-03046	ACMF5C18-5-03046
50	x	2.1	ACMF5C18-1.9-05021	ACMF5C18-3-05021	ACMF5C18-5-05021
	x	3.0	ACMF5C18-1.9-05030	ACMF5C18-3-05030	ACMF5C18-5-05030
	x	4.6	ACMF5C18-1.9-05046	ACMF5C18-3-05046	ACMF5C18-5-05046
100	x	2.1	ACMF5C18-1.9-10021	ACMF5C18-3-10021	ACMF5C18-5-10021
	x	3.0	ACMF5C18-1.9-10030	ACMF5C18-3-10030	ACMF5C18-5-10030
	x	4.6	ACMF5C18-1.9-10046	ACMF5C18-3-10046	ACMF5C18-5-10046
150	x	2.1	ACMF5C18-1.9-15021	ACMF5C18-3-15021	ACMF5C18-5-15021
	x	3.0	-	ACMF5C18-3-15030	ACMF5C18-5-15030
	x	4.6	-	ACMF5C18-3-15046	ACMF5C18-5-15046
250	x	4.6	-	-	ACMF5C18-5-25046

ACME C8 - 120 Å

Dimensions Length (mm) x ID			1.9 µm	3 µm	5 µm
30	x	2.1	ACMC8-1.9-03021	ACMC8-3-03021	ACMC8-5-03021
	x	4.6	ACMC8-1.9-03046	ACMC8-3-03046	ACMC8-5-03046
50	x	2.1	ACMC8-1.9-05021	ACMC8-3-05021	ACMC8-5-05021
	x	3.0	ACMC8-1.9-05030	ACMC8-3-05030	ACMC8-5-05030
	x	4.6	ACMC8-1.9-05046	ACMC8-3-05046	ACMC8-5-05046
100	x	2.1	ACMC8-1.9-10021	ACMC8-3-10021	ACMC8-5-10021
	x	3.0	ACMC8-1.9-10030	ACMC8-3-10030	ACMC8-5-10030
	x	4.6	ACMC8-1.9-10046	ACMC8-3-10046	ACMC8-5-10046
150	x	2.1	ACMC8-1.9-15021	ACMC8-3-15021	ACMC8-5-15021
	x	3.0	-	ACMC8-3-15030	ACMC8-5-15030
	x	4.6	-	ACMC8-3-15046	ACMC8-5-15046
250	x	4.6	-	-	ACMC8-5-25046

Ordering Information

For guard cartridges and holders please see page 45

ACME Ph - 120 Å					
Dimensions Length (mm) x ID			1.9 µm	3 µm	5 µm
30	x	2.1	ACMPH-1.9-03021	ACMPH-3-03021	ACMPH-5-03021
	x	4.6	ACMPH-1.9-03046	ACMPH-3-03046	ACMPH-5-03046
50	x	2.1	ACMPH-1.9-05021	ACMPH-3-05021	ACMPH-5-05021
	x	3.0	ACMPH-1.9-05030	ACMPH-3-05030	ACMPH-5-05030
	x	4.6	ACMPH-1.9-05046	ACMPH-3-05046	ACMPH-5-05046
100	x	2.1	ACMPH-1.9-10021	ACMPH-3-10021	ACMPH-5-10021
	x	3.0	ACMPH-1.9-10030	ACMPH-3-10030	ACMPH-5-10030
	x	4.6	ACMPH-1.9-10046	ACMPH-3-10046	ACMPH-5-10046
150	x	2.1	ACMPH-1.9-15021	ACMPH-3-15021	ACMPH-5-15021
	x	3.0	-	ACMPH-3-15030	ACMPH-5-15030
	x	4.6	-	ACMPH-3-15046	ACMPH-5-15046
250	x	4.6	-	-	ACMPH-5-25046

ACME Cannabis - 120 Å					
Dimensions Length (mm) x ID			1.9 µm	3 µm	5 µm
30	x	2.1	ACMCB-1.9-03021	ACMCB-3-03021	ACMCB-5-03021
	x	4.6	ACMCB-1.9-03046	ACMCB-3-03046	ACMCB-5-03046
50	x	2.1	ACMCB-1.9-05021	ACMCB-3-05021	ACMCB-5-05021
	x	3.0	ACMCB-1.9-05030	ACMCB-3-05030	ACMCB-5-05030
	x	4.6	ACMCB-1.9-05046	ACMCB-3-05046	ACMCB-5-05046
100	x	2.1	ACMCB-1.9-10021	ACMCB-3-10021	ACMCB-5-10021
	x	3.0	ACMCB-1.9-10030	ACMCB-3-10030	ACMCB-5-10030
	x	4.6	ACMCB-1.9-10046	ACMCB-3-10046	ACMCB-5-10046
150	x	2.1	ACMCB-1.9-15021	ACMCB-3-15021	ACMCB-5-15021
	x	3.0	-	ACMCB-3-15030	ACMCB-5-15030
	x	4.6	-	ACMCB-3-15046	ACMCB-5-15046
250	x	4.6	-	-	ACMCB-5-25046

ACME CN - 120 Å					
Dimensions Length (mm) x ID			1.9 µm	3 µm	5 µm
30	x	2.1	ACMCN-1.9-03021	ACMCN-3-03021	ACMCN-5-03021
	x	4.6	ACMCN-1.9-03046	ACMCN-3-03046	ACMCN-5-03046
50	x	2.1	ACMCN-1.9-05021	ACMCN-3-05021	ACMCN-5-05021
	x	3.0	ACMCN-1.9-05030	ACMCN-3-05030	ACMCN-5-05030
	x	4.6	ACMCN-1.9-05046	ACMCN-3-05046	ACMCN-5-05046
100	x	2.1	ACMCN-1.9-10021	ACMCN-3-10021	ACMCN-5-10021
	x	3.0	ACMCN-1.9-10030	ACMCN-3-10030	ACMCN-5-10030
	x	4.6	ACMCN-1.9-10046	ACMCN-3-10046	ACMCN-5-10046
150	x	2.1	ACMCN-1.9-15021	ACMCN-3-15021	ACMCN-5-15021
	x	3.0	-	ACMCN-3-15030	ACMCN-5-15030
	x	4.6	-	ACMCN-3-15046	ACMCN-5-15046
250	x	4.6	-	-	ACMCN-5-25046

Ordering Information

For guard cartridges and holders please see page 45

ACME PAH - 200 Å				
Dimensions Length (mm) x ID			3 µm	5 µm
30	x	2.1	ACMPAH-3-03021	ACMPAH-3-03021
	x	4.6	ACMPAH-3-03046	ACMPAH-3-03046
50	x	2.1	ACMPAH-3-05021	ACMPAH-5-05021
	x	3.0	ACMPAH-3-05030	ACMPAH-5-05030
	x	4.6	ACMPAH-3-05046	ACMPAH-5-05046
100	x	2.1	ACMPAH-3-10021	ACMPAH-5-10021
	x	3.0	ACMPAH-3-10030	ACMPAH-5-10030
	x	4.6	ACMPAH-3-10046	ACMPAH-5-10046
150	x	2.1	ACMPAH-3-15021	ACMPAH-5-15021
	x	3.0	ACMPAH-3-15030	ACMPAH-5-15030
	x	4.6	ACMPAH-3-15046	ACMPAH-5-15046
250	x	4.6	-	ACMPAH-5-25046

ACME PLUS - 200 Å					
Dimensions Length (mm) x ID			1.9 µm	3 µm	5 µm
30	x	2.1	ACMP-1.9-03021	ACMP-3-03021	ACMP-5-03021
	x	4.6	ACMP-1.9-03046	ACMP-3-03046	ACMP-5-03046
50	x	2.1	ACMP-1.9-05021	ACMP-3-05021	ACMP-5-05021
	x	3.0	ACMP-1.9-05030	ACMP-3-05030	ACMP-5-05030
	x	4.6	ACMP-1.9-05046	ACMP-3-05046	ACMP-5-05046
100	x	2.1	ACMP-1.9-10021	ACMP-3-10021	ACMP-5-10021
	x	3.0	ACMP-1.9-10030	ACMP-3-10030	ACMP-5-10030
	x	4.6	ACMP-1.9-10046	ACMP-3-10046	ACMP-5-10046
150	x	2.1	ACMP-1.9-15021	ACMP-3-15021	ACMP-5-15021
	x	3.0	-	ACMP-3-15030	ACMP-5-15030
	x	4.6	-	ACMP-3-15046	ACMP-5-15046
250	x	4.6	-	-	ACMP-5-25046

Ordering Information

For guard cartridges and holders please see page 45

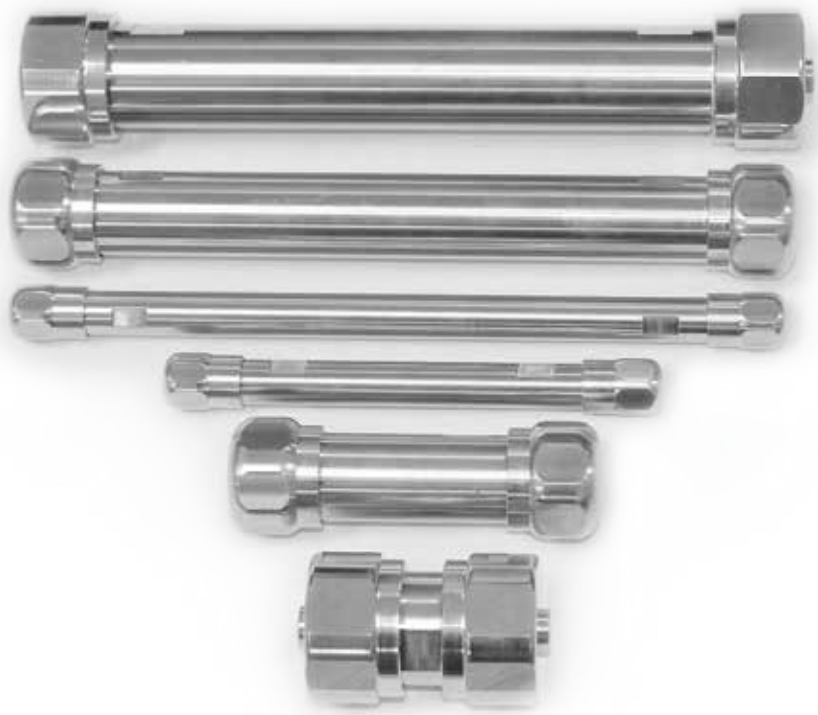
ACME XCEED - 100 Å					
Dimensions Length (mm) x ID			1.9 µm	3 µm	5 µm
30	x	2.1	ACMXD-1.9-03021	ACMXD-3-03021	ACMXD-5-03021
	x	4.6	ACMXD-1.9-03046	ACMXD-3-03046	ACMXD-5-03046
50	x	2.1	ACMXD-1.9-05021	ACMXD-3-05021	ACMXD-5-05021
	x	3.0	ACMXD-1.9-05030	ACMXD-3-05030	ACMXD-5-05030
	x	4.6	ACMXD-1.9-05046	ACMXD-3-05046	ACMXD-5-05046
100	x	2.1	ACMXD-1.9-10021	ACMXD-3-10021	ACMXD-5-10021
	x	3.0	ACMXD-1.9-10030	ACMXD-3-10030	ACMXD-5-10030
	x	4.6	ACMXD-1.9-10046	ACMXD-3-10046	ACMXD-5-10046
150	x	2.1	ACMXD-1.9-15021	ACMXD-3-15021	ACMXD-5-15021
	x	3.0	ACMXD-1.9-15030	ACMXD-3-15030	ACMXD-5-15030
	x	4.6	ACMXD-1.9-15046	ACMXD-3-15046	ACMXD-5-15046
250	x	4.6	ACMXD-1.9-25046	ACMXD-3-25046	ACMXD-5-25046

ACME BIPHENYL - 120 Å					
Dimensions Length (mm) x ID			1.9 µm	3 µm	5 µm
30	x	2.1	ACMBP-1.9-03021	ACMBP-3-03021	ACMBP-5-03021
	x	4.6	ACMBP-1.9-03046	ACMBP-3-03046	ACMBP-5-03046
50	x	2.1	ACMBP-1.9-05021	ACMBP-3-05021	ACMBP-5-05021
	x	3.0	ACMBP-1.9-05030	ACMBP-3-05030	ACMBP-5-05030
	x	4.6	ACMBP-1.9-05046	ACMBP-3-05046	ACMBP-5-05046
100	x	2.1	ACMBP-1.9-10021	ACMBP-3-10021	ACMBP-5-10021
	x	3.0	ACMBP-1.9-10030	ACMBP-3-10030	ACMBP-5-10030
	x	4.6	ACMBP-1.9-10046	ACMBP-3-10046	ACMBP-5-10046
150	x	2.1	ACMBP-1.9-15021	ACMBP-3-15021	ACMBP-5-15021
	x	3.0	ACMBP-1.9-15030	ACMBP-3-15030	ACMBP-5-15030
	x	4.6	ACMBP-1.9-15046	ACMBP-3-15046	ACMBP-5-15046
250	x	4.6	ACMBP-3 1.9-25046	ACMBP-3-25046	ACMBP-5-25046

Ordering Information - Prep Columns

For guard cartridges and holders please see page 45

Dimensions Length (mm) x ID			ACME C18 Prep - 120 Å		ACME C8 Prep - 120 Å		ACME PLUS Prep - 120 Å	
			5 µm	10 µm	5 µm	10 µm	5 µm	10 µm
50	x	7.8	ACMC18-5-05078P	ACMC18-10-05078P	ACMC8-5-05078P	ACMC8-10-05078P	ACMP-5-05078P	ACMP-10-05078P
	x	10	ACMC18-5-05010P	ACMC18-10-05010P	ACMC8-5-05010P	ACMC8-10-05010P	ACMP-5-05010P	ACMP-10-05010P
	x	21.2	ACMC18-5-05021P	ACMC18-10-05021P	ACMC8-5-05021P	ACMC8-10-05021P	ACMP-5-05021P	ACMP-10-05021P
	x	30	-	ACMC18-10-05030P	-	ACMC8-10-05030P	-	ACMP-10-05030P
75	x	7.8	ACMC18-5-07578P	ACMC18-10-07578P	ACMC8-5-07578P	ACMC8-10-07578P	ACMP-5-07578P	ACMP-10-07578P
	x	10	ACMC18-5-07510P	ACMC18-10-07510P	ACMC8-5-07510P	ACMC8-10-07510P	ACMP-5-07510P	ACMP-10-07510P
	x	21.2	ACMC18-5-07521P	ACMC18-10-07521P	ACMC8-5-07521P	ACMC8-10-07521P	ACMP-5-07521P	ACMP-10-07521P
	x	30	-	ACMC18-10-07530P	-	ACMC8-10-07530P	-	ACMP-10-07530P
100	x	7.8	ACMC18-5-10078P	ACMC18-10-10078P	ACMC8-5-10078P	ACMC8-10-10078P	ACMP-5-10078P	ACMP-10-10078P
	x	10	ACMC18-5-10010P	ACMC18-10-10010P	ACMC8-5-10010P	ACMC8-10-10010P	ACMP-5-10010P	ACMP-10-10010P
	x	21.2	ACMC18-5-10021P	ACMC18-10-10021P	ACMC8-5-10021P	ACMC8-10-10021P	ACMP-5-10021P	ACMP-10-10021P
	x	30	-	ACMC18-10-10030P	-	ACMC8-10-10030P	-	ACMP-10-10030P
150	x	7.8	ACMC18-5-15078P	ACMC18-10-15078P	ACMC8-5-15078P	ACMC8-10-15078P	ACMP-5-15078P	ACMP-10-15078P
	x	10	ACMC18-5-15010P	ACMC18-10-15010P	ACMC8-5-15010P	ACMC8-10-15010P	ACMP-5-15010P	ACMP-10-15010P
	x	21.2	ACMC18-5-15021P	ACMC18-10-15021P	ACMC8-5-15021P	ACMC8-10-15021P	ACMP-5-15021P	ACMP-10-15021P
	x	30	-	ACMC18-10-15030P	-	ACMC8-10-15030P	-	ACMP-10-15030P
250	x	7.8	ACMC18-5-25078P	ACMC18-10-25078P	ACMC8-5-25078P	ACMC8-10-25078P	ACMP-5-25078P	ACMP-10-25078P
	x	10	ACMC18-5-25010P	ACMC18-10-25010P	ACMC8-5-25010P	ACMC8-10-25010P	ACMP-5-25010P	ACMP-10-25010P
	x	21.2	-	ACMC18-10-25021P	-	ACMC8-10-25021P	-	ACMP-10-25021P
	x	30	-	ACMC18-10-25030P	-	ACMC8-10-25030P	-	ACMP-10-25030P



Compound List

Compound List

Compound	Page #
Anthracene	42
Atenolol	12, 29
Benzo(a)anthracene	42
Benzo(a)pyrene	42
Benzo(b)fluoranthene	42
Benzo(g,h,i)perylene	42
Benzo(j)fluoranthene	42
Benzo(k)fluoranthene	42
Benzoic Acid	15
Benzophenone	8, 22
Biphenyl	8, 22
Caffeine (1,3,7-Trimethylxanthine)	15, 16, 33
Cannabichromene (CBC)	19, 40
Cannabidiol (CBD)	19, 40
Cannabidivarinic Acid (CBDVA)	19
Cannabidivarin (CBDV)	19
Cannabidiolic Acid (CBDA)	19
Cannabigerolic Acid (CBGA)	19
Cannabigerol (CBG)	19
Cannabinol (CBN)	19, 40
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