SPECIFICATIONS

Ligand: diisobutyloctadecylsilane
Particle Size: 2 µm, 2.7 µm
Pore Size: 90 Å

USP Designation: L1
Carbon Load: 6.5%
Surface Area:
2 µm: 120 m2/g
2.7 µm: 135 m2/g

Endcapped: No
Low pH Limit /Max T: 1/90 °C
High pH Limit/Max T: 8/40 °C

PART NUMBERS

2.7 µm ANALYTICAL COLUMNS	
Dimensions: ID x Length (in mm)	**Part Number**
1.5 x 50	9282X-416
1.5 x 100	9282X-616
1.5 x 150	9282X-716
2.1 x 50	92822-416
2.1 x 100	92822-616
2.1 x 150	92822-716
3.0 x 50	92823-416
3.0 x 100	92823-616
3.0 x 150	92823-716
4.6 x 50	92824-416
4.6 x 100	92824-616
4.6 x 150	92824-716

2.0 µm ANALYTICAL COLUMNS	
Dimensions: ID x Length (in mm)	**Part Number**
2.1 x 50	91822-416
2.1 x 100	91822-616
2.1 x 150	91822-716
3.0 x 50	91823-416
3.0 x 100	91823-616
3.0 x 150	91823-716

2.7 µm GUARD COLUMNS	
Guard columns, 3-pack	
Dimensions: ID x Length (in mm)	**Part Number**
2.1 x 5	M2822-116
3.0 x 5	M2823-116
4.6 x 5	M2824-116
Guard Column Holder	94900-001

2.0 µm GUARD COLUMNS	
Guard columns, 3-pack	
Dimensions: ID x Length (in mm)	**Part Number**
2.1 x 5	M1822-116
3.0 x 5	M1823-116
Guard Column Holder	94900-001

INNOVATION YOU CAN TRUST – PERFORMANCE YOU CAN RELY ON

HALO®

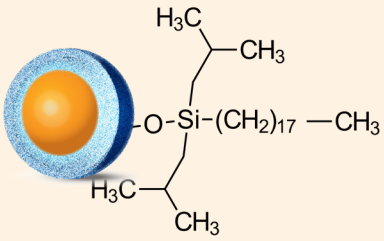
LPH - C18

ENHANCED STABILITY FOR LOW PH APPLICATIONS

HALO® LPH - C18

INTRODUCING HALO® LPH-C18

Introducing a low pH compatible, 90 Å, superficially porous particle C18 phase useful for any chromatographer running under low pH conditions. The sterically protected ligand reduces acidic hydrolysis which enables low pH mobile phases to be used without sacrificing column performance over time.



FEATURES OF HALO® LPH-C18

- Improved stability with low pH mobile phases of pH 1-2
- Highly reproducible alkyl chain bonded phase coverage
- Built upon Fused-Core® Technology for fast, efficient, rugged separations

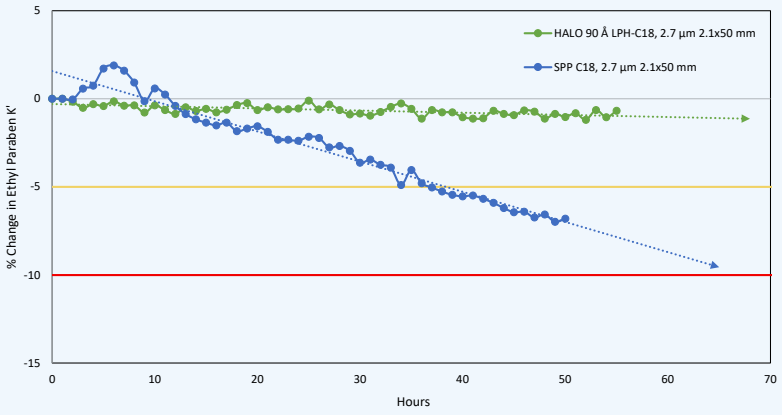
Best Applications:

Wide range of small molecule applications including:

- polyphenols
- cannabinoids
- pesticides

QUALITY YOU CAN COUNT ON

A separation of parabens is performed on a HALO 90 Å LPH-C18 column under low pH (pH 1) and high temperature conditions compared to a standard C18 SPP column. Due to the sterically protected ligand, the LPH-C18 column can withstand these conditions and maintain stable retention times.



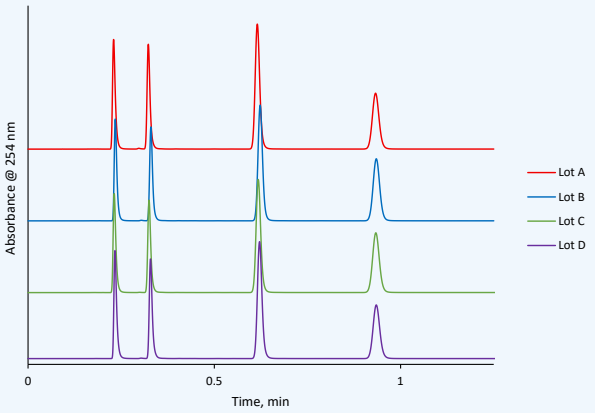
TEST CONDITIONS

Column: HALO 90 Å LPH-C18, 2.7 µm 2.1x50 mm
Part Number: 92822-416
Mobile Phase A: Water, 1% TFA (pH: 1)
Mobile Phase B: Acetonitrile
Gradient:

Time	%B
0.0	20
7.50	20
7.51	5
45.00	5
47.00	100
51.00	100
51.01	20
60.00	20

Flow Rate: 0.5 mL/min
Pressure: 108 bar
Temperature: 60 °C
Detection: UV 254 nm, PDA
Injection Volume: 0.4 µL (methyl and ethyl paraben)
Sample Solvent: 25/75 ACN/ Water
Data Rate: 100 Hz
Response Time: 0.025 sec.
Flow Cell: 1 µl
LC System: Shimadzu Nexera X2

Excellent lot-to-lot reproducible is observed with a mixture of neutral compounds.



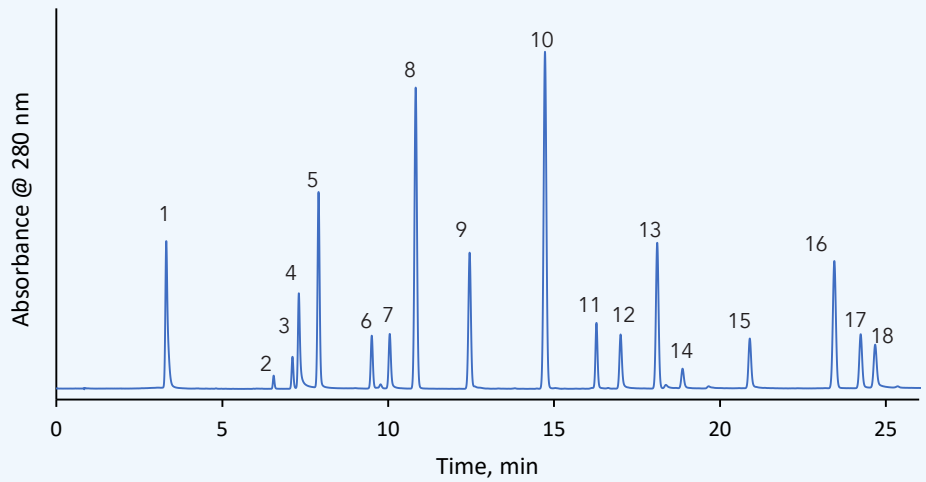
TEST CONDITIONS

Mobile Phase A: Water
Mobile Phase B: Acetonitrile
Isocratic: 60/40 Acetonitrile/Water
Wavelength: 254 nm
Injection: 2.0 µL (uracil, phenol, 1-Cl-4-nitrobenzene, naphthalene)
Temperature: 30 °C
Flow Cell: 1.8 mL/min.
Column: HALO 90 Å LPH-C18 2.7µm 4.6 x 50mm

APPLICATIONS

COMMON POLYPHENOLS FOUND IN WINE

Common polyphenols found in wine are separated using a HALO 90 Å LPH-C18 column using analytical standards. This stationary phase contains a sterically protected ligand which is ideal for high stability under low pH conditions.



PEAK IDENTITIES

1. Gallic Acid
2. Epigallocatechin
3. Chlorogenic Acid
4. Catechin
5. Caffeic Acid
6. Epicatechin
7. Epigallocatechin Gallate
8. p-Coumaric Acid
9. Ferulic Acid
10. o-Coumaric Acid
11. Quercitrin
12. Myricetin
13. Resveratrol
14. Morin
15. Quercetin
16. Naringenin
17. Apigenin
18. Kaempferol

TEST CONDITIONS

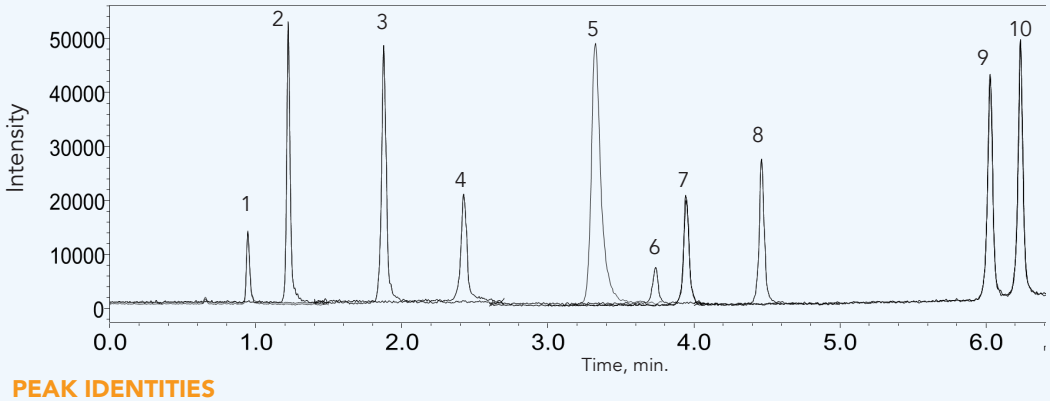
Column: HALO 90 Å LPH-C18, 2.7 µm 2.1x100 mm
Mobile Phase A: Water/ 0.1% Formic Acid
Mobile Phase B: Acetonitrile/ 0.1% Formic Acid
Gradient:

Time (min)	%B
0.0	0
3.5	8
7.1	10
25.0	30
26.0	40
27.0	100
29.0	100
30.0	0
35.0	0

Flow Rate: 0.3 mL/min
Pressure: 159 bar
Temperature: 30 °C
Detection: UV 280 nm, PDA
Injection Volume: 0.7 µL
Sample Solvent: Water
Data Rate: 100 Hz
Response Time: 0.025 sec.
Flow Cell: 1 µL
LC System: Shimadzu Nexera X2

CATECHINS AND CAFFEINE IN TEA

Catechins belong to the subgroup of polyphenols called flavonoids. These compounds contain antioxidant properties and exist in food and medicinal plants, including tea. An LC-MS separation of catechins and caffeine is demonstrated on a HALO® LPH-C18 column showing excellent resolution using purified standards.



PEAK IDENTITIES

1. Gallic Acid
2. Gallocatechin
3. Epigallocatechin
4. Catechin
5. Caffeine
6. Epicatechin
7. Epigallocatechin Gallate
8. Gallocatechin Gallate
9. Epicatechin Gallate
10. Catechin Gallate

TEST CONDITIONS

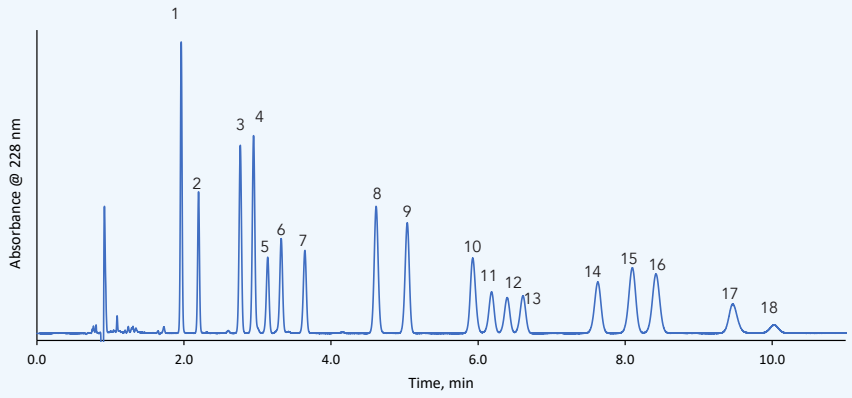
Column: HALO 90 Å LPH-C18 2 µm, 2.1x100 mm
Mobile Phase A: Water, 0.2% Formic Acid (pH 2.45)
Mobile Phase B: Acetonitrile, 0.2% Formic Acid
Gradient:

Time	%B
0.0	10
1.0	10
6.0	21
7.0	21

Flow Rate: 0.3 mL/min
Pressure: 438 bar
Temperature: 40 °C
Detection: +/- ESI MS/MS
Injection Volume: 2 µL
Sample Solvent: Water

SEPARATION OF 18 CANNABINOIDS USING HALO® LPH-C18

Anthocyanins, a category of polyphenols, are a type of pigment found in plants that offer several health benefits. These flavonoids have antioxidant effects that can be found in a variety of different fruits and vegetables, including blueberries. A separation of anthocyanins is performed on a HALO 90 Å LPH-C18 column, which is ideal for the low pH conditions of this method.



TEST CONDITIONS

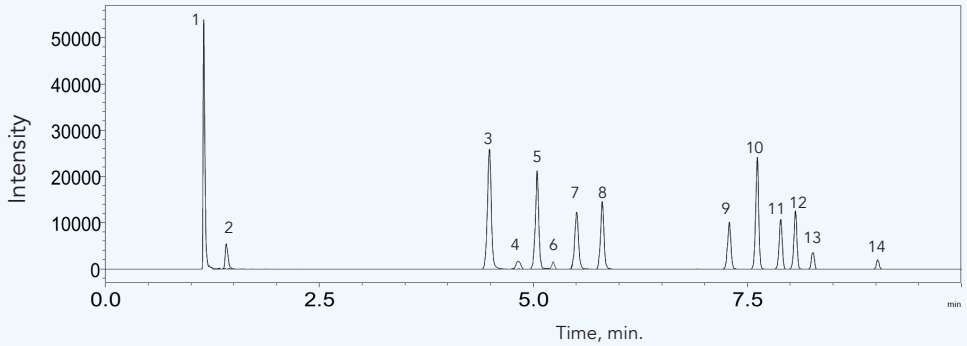
Column: HALO 90 Å LPH-C18, 2.7 µm, 4.6 x 150mm
Mobile Phase A: 5 mM Ammonium Formate, 0.1% Formic Acid
Mobile Phase B: Acetonitrile, 0.1% Formic Acid
Isocratic: 75% B
Flow Rate: 1.5 mL/min
Pressure: 232 bar
Temperature: 30°C
Detection: PDA, UV: 228 nm
Injection Volume: 3 µL
Sample Solvent: 75/25 MeOH/ Water
Data Rate: 100 Hz
Response Time: 0.025 sec.
Flow Cell: 1 µl
LC System: Shimadzu Nexera X2

PEAK IDENTITIES

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. Tetrahydrocannabivarinic acid (THCVA)
9. Cannabinol (CBN)
10. Cannabinolic acid (CBNA)
11. Exo-tetrahydrocannabinol (EXO-THC)
12. delta 9- Tetrahydrocannabinol (D9-THC)
13. delta 8- Tetrahydrocannabinol (D8-THC)
14. Cannabicycol (CBL)
15. Cannabichromene (CBC)
16. Tetrahydrocannabinolic acid A (THCA-A)
17. Cannabichromenic acid (CBCA)
18. Cannabicyclolic acid (CBLA)

BARLEY PESTICIDE SCREENING

Pesticide screening methods can help show whether there is a concern with your soil, crops, and even water supply. A pesticide screening is performed on a sample of barley using a HALO 90 Å LPH-C18 column.



TEST CONDITIONS

Column: HALO 90 Å LPH-C18 2 µm, 2.1x100 mm
Mobile Phase A: Water, 0.1% Formic Acid
Mobile Phase B: Acetonitrile, 0.1% Formic Acid
Gradient:

Time	%B
0.0	30
1.0	30
12.0	100
16.0	100

Flow Rate: 0.2 mL/min
Pressure: 235 bar
Temperature: 30 °C
Detection: +ESI MS/MS
Injection Volume: 2 µL
Sample Solvent: Methanol

PEAK IDENTITIES

1. Carbendazim
2. Dicrotophos
3. Azamethiphos
4. Pyrimethani
5. Carbofuran
6. Dodemorph
7. Atrazine
8. Diuron
9. Iprovalicarb
10. Azoxystrobin
11. Fluopram
12. Methoxyfenozide
13. Flutolanil
14. Picoxystrobin