Application Specific HPLC and UHPLC Columns

Innovative chemistries tailored for challenging and critically important applications

Application specific columns utilize novel and unique chemistries to provide superior resolution with ease of use for key pharmaceutical and environmental applications.

- **Acclaim AmG C18**
  Aminoglycoside antibiotics separation
- **Acclaim Trinity P1 and P2**
  API & counterion analysis
- **Acclaim Organic Acid**
  Fast organic acid analysis
- **Acclaim Surfactant and Surfactant Plus**
  Separation of surfactants
- **Acclaim Explosives**
  Separation of explosive residues
- **Acclaim Trinity Q1**
  Diquat and paraquat analysis
- **Acclaim Carbamate**
  The separation of carbamate pesticides
- **Acclaim Carbonyl C18**
  Separation of DNPH derivatives of aldehydes and ketones

The Application Specific column web page contains the latest news, applications and downloads for the Application Specific HPLC column range.
Visit **www.thermoscientific.com/columns**

Acclaim AmG C18

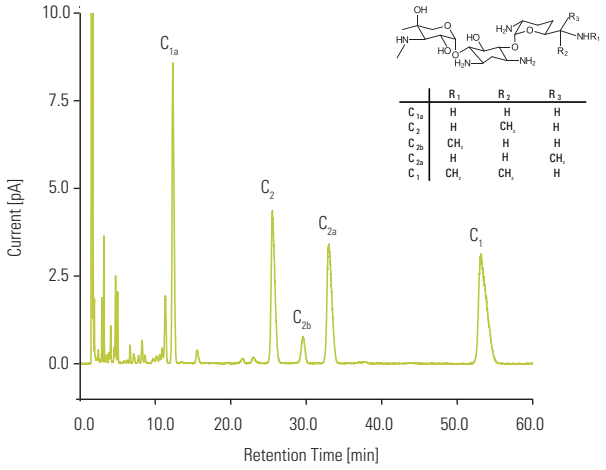
Designed to provide rugged and reproducible reversed-phase chromatography of aminoglycoside antibiotics.

- Rugged and reproducible
- Excellent selectivity for the HPLC of aminoglycosides
- Superior resistance to acidic conditions for long column lifetime
- Easy to use with only aqueous mobile phase; TFA only, or TFA/HFBA or PFPA is needed
- Compatible with simple rugged methods; no solvents are required
- High efficiency and throughput

Aminoglycoside antibiotics are commonly used as clinical and veterinary medicines to treat bacterial infections. HPLC using ion-pairing reversed-phase separations is an effective technique for simultaneous qualitative and quantitative determination of aminoglycosides.

The Acclaim AmG C18 column is designed to provide excellent stability, selectivity and high resolution. It has a unique surface, a polymer encapsulated silica covalently bonded with a C18 ligand. This ensures ultra-stability when exposure to low pH (<1) and high temperature separation conditions.

Isocratic separation of gentamicin sulfate using 100 mM TFA as the mobile phase



Acclaim AmG C18, 3µm, 150 x 3.0mm

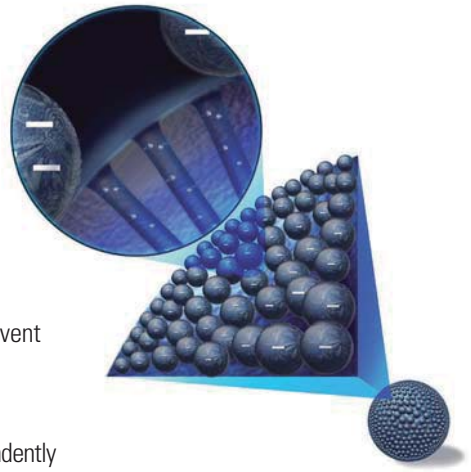
Mobile Phase:	100 mM TFA
Temperature:	30°C
Flow Rate:	0.425 mL/min
Injection Volume:	2µL
Detection:	Corona Veo RS (Filter = 5.0 s; Evaporation Temp = 35 °C; Data Rate = 5 Hz; Power Function = 1.00)
Sample:	Gentamicin (1 mg/mL)

Acclaim AmG C18

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	Guard Cartridges (2/pk)	10	**088754**	**088756**	**088758**
	HPLC Column	150	**088753**	**088755**	**088757**
Guard Cartridge Holder			**069580**	**069580**	**069580**

Acclaim Trinity P1

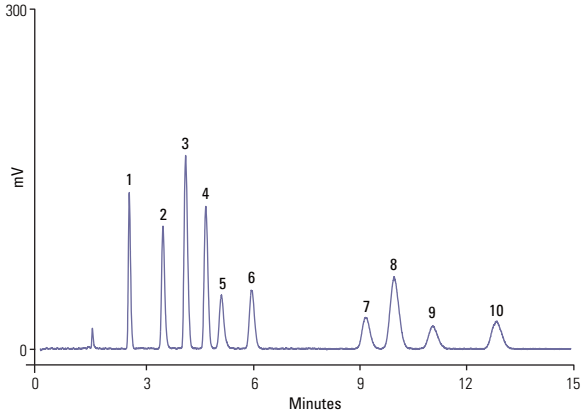
Mixed mode column technology combining reversed-phase, anion exchange and cation exchange functionality on a single support



- Ideal selectivity for simultaneous separation of API and counterion
- Adjustable selectivity by mobile phase ionic strength, electrolyte type, pH, and organic solvent
- Low bleed; compatible with MS, CAD and ELSD
- Retention of hydrophilic ionic and ionizable analytes without ion-pairing reagents
- Greater flexibility in method development: each retention mechanisms can be controlled independently

The Thermo Scientific™ Acclaim™ Trinity™ P1 HPLC column is designed with Nanopolymer Silica Hybrid (NSH) technology, which results in a multimode surface chemistry ideal for the simultaneous separation of drugs and their counterions. The surface chemistry concurrently provides reversed-phase, cation exchange, and anion exchange functionalities. The result is maximum flexibility in method development. Separations can be optimized easily by adjusting the chromatographic parameters (mobile phase pH, ionic strength, and organic strength).

Simultaneous separation of pharmaceutical counterions



Acclaim Trinity P1, 3µm, 100 x 3.0mm

Mobile Phase:	60/40 v/v CH_3CN/20mM (total) NH_4OAc, pH 5
Temperature:	30°C
Flow Rate:	0.5mL/min
Injection Volume:	2µL
Detection:	Corona ultra (Gain = 100 pA; Filter = med; Neb Temp = 30°C)
Analytes: (50 to 100ppm)	1. Choline 2. Tromethamine 3. Sodium 4. Potassium 5. Meglumine 6. Mesylate 7. Nitrate 8. Chloride 9. Bromide 10. Iodide

Acclaim Trinity P1

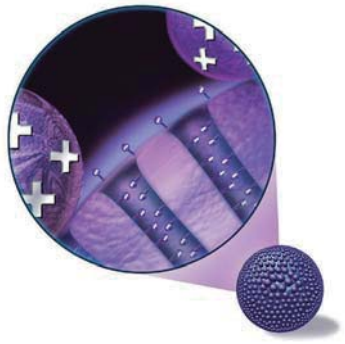
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID
3	Guard Cartridges (2/pk)	10	**071391**	**071390**
	HPLC Column	50	**075565**	**071388**
		100	**071389**	**071387**
		150	**075564**	**075563**

Acclaim Guard Holder

Format	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	**069580**
Acclaim Guard Kit (Holder and coupler) V-2	**069707**
Guard to Analytical Column Coupler V-2	**074188**

Acclaim Trinity P2

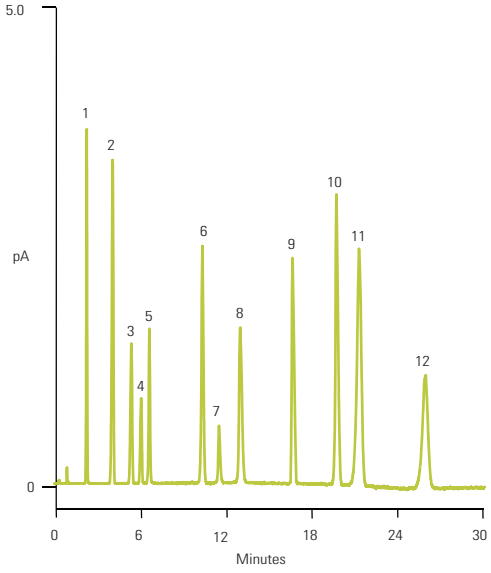
Mixed-mode column technology; hydrophilic interaction combining HILIC, anion exchange and cation exchange functionalities



- Ideal for separating pharmaceutical counterions, including monovalent and divalent cations or anions
- Selectivity complementary to the Trinity P1 column
- Low column bleed, compatible with CAD and MS
- Hydrolytically stable
- High efficiency

The Acclaim Trinity P2 is a unique, high-efficiency, silica-based column specifically designed for separation of pharmaceutical counterions, including monovalent and divalent cations or anions. This column is based on Nanopolymer Silica Hybrid (NSH) technology, which consists of high-purity porous spherical silica particles coated with charged nanopolymer particles. The inner-pore area of the silica bead is modified with a covalently bonded organic layer that provides cation-exchange retention, while the outer surface is modified with anion-exchange nano-polymer beads. Acclaim Trinity P2 column is aimed to complement Acclaim Trinity P1 to provide a total solution for pharmaceutical counter ion analysis by HPLC.

Pharmaceutical-related anions and cations



Acclaim Trinity P2, 3µm, 100 x 3.0mm

Mobile Phase:	D.I. water and 100 mM NH4OFm, pH 3.65 gradient
Temperature:	30°C
Flow Rate:	0.60 mL/min
Injection Volume:	2µL
Detection:	Corona Veo Charged Aerosol Detector
Analytes:	1. Phosphate 2. Sodium 3. Potassium 4. Chloride 5. Malate 6. Bromide 7. Nitrate 8. Citrate 9. Fumarate 10. Sulfate 11. Magnesium 12. Calcium
Samples:	0.02 – 0.10 mg/mL each in D.I. water

Time (min)	H_2O	0.1 M Ammonium formate, pH3.65
-10	0.760	1.474
0	80	20
2	80	20
22	0	100
30	0	100

Acclaim Trinity P2

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID
3	Guard Cartridges (2/pk)	10	**085435**	**085436**
	HPLC Column	50	**085431**	**085433**
		100	**085432**	**085434**

Acclaim Guard Holder

Format	Cat. No.
Acclaim Guard Cartridge Holder V-2	**069580**
Acclaim Guard Kit (Holder and coupler) V-2	**069707**
Guard to Analytical Column Coupler V-2	**074188**

Acclaim Organic Acid

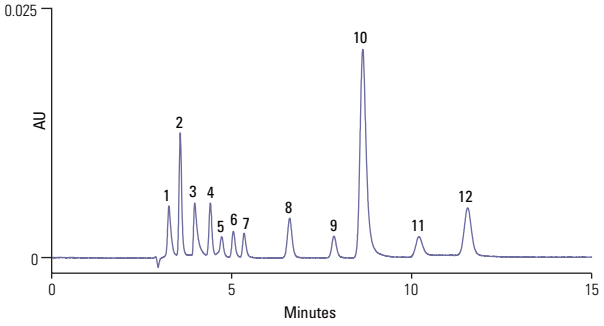
Optimized and application-tested for the analysis of hydrophilic organic acids

- Tested to guarantee consistent hydrophilic organic acid separations
- Compatible with 100% aqueous mobile phases
- Hydrolytic stability at low-pH conditions
- Ideal selectivity for separating a wide spectrum of organic acids
- Excellent column efficiency and peak shapes for organic acids

The Acclaim Organic Acid (OA) is a silica-based reversed-phase column designed for high-efficiency, high-throughput organic acids analysis. It offers unparalleled performance for separating hydroxyl aliphatic and aromatic organic acids.

The Acclaim OA is the recommended column for determining small hydrophilic organic acids, C1 to C7 aliphatic acids, and hydrophilic aromatic acid and is also valuable for the analysis and quality assurance of food and beverage products, pharmaceutical preparations, plating baths, and manufacturing chemicals, chemical intermediates, and environmental samples.

Hydrophilic organic acids



Acclaim Organic Acid, 5µm, 4 × 250mm

Mobile Phase:	100mM Na_2SO_4, pH 2.65 (adjusted with methanesulfonic acid)
Temperature:	30°C
Flow Rate:	0.6mL/min
Injection Volume:	5µL
Detection:	UV, 210nm
Analytes:	1. Oxalic acid 15mg/L (ppm) 2. Tartaric acid 120 3. Formic acid 180 4. Malic acid 120 5. iso-Citric acid 120 6. Lactic acid 180 7. Acetic acid 120 8. Citric acid 120 9. Succinic acid 120 10. Fumaric acid 7 11. cis-Aconitic acid * 12. trans-Aconitic acid *

* 7ppm total for cis and trans isomers

Acclaim Organic Acid

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.0mm ID
3	HPLC Column	150	**070087**	**070086**	–
5	Guard Cartridges (2/pk)	10	–	**071987**	**069700**
	HPLC Column	150	–	–	**062903**
		250	–	–	**062902**

Acclaim Guard Holder

Format	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	**069580**
Acclaim Guard Kit (Holder and coupler) V-2	**069707**
Guard to Analytical Column Coupler V-2	**074188**

Acclaim Surfactant

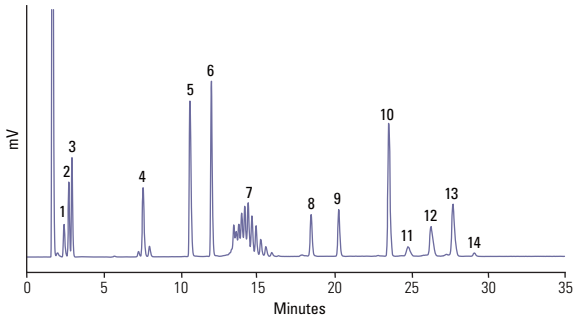
Excellent performance for separating a broad range of surfactants

- Ideal selectivity for separation of anionic, nonionic, cationic and amphoteric surfactants
- Excellent peak shapes, especially for cationic surfactants
- Compatible with highly aqueous mobile phases
- Improved resolution for ethoxylated surfactants
- Rugged separations under a variety of conditions

The Acclaim Surfactant columns are the first generation high-efficiency, silica-based columns designed specifically for separating a wide variety of surfactants, including anionic, cationic, nonionic, ethoxylated and amphoteric surfactants using UV, ELSD or RI detection.

Surfactants are widely used in industrial, agricultural, and pharmaceutical markets, in products as diverse as pesticides, detergent powders, petroleum products, cosmetics, and pharmaceuticals. The Acclaim Surfactant column was designed specifically for HPLC separation of these surfactants.

Inorganic anion, hydrotropes, cationic, nonionic, amphoteric, and anionic surfactants



Acclaim Surfactant, 5µm, 150 x 4.6mm

Mobile Phase A:	CH_3CN,
Mobile Phase B:	0.1 M NH_4OAc, pH 5.4
Gradient:	25% to 85% A in 25min, then hold 85% A for 10min
Temperature:	30°C
Flow Rate:	1mL/min
Injection Volume:	25µL
Detection:	ELS detector
Analytes:	1. Chloride 2. Bromide 3. Nitrate 4. Xylene sulfonate 5. Laurylpyridinium chloride 6. Lauryldimethylbenzyl-ammonium chloride 7. Triton X-100 8. Cetyl betaine 9. Decyl sulfate 10. Dodecyl sulfate 11. C_{10}-LAS 12. C_{11}-LAS 13. C_{12}-LAS 14. C_{13}-LAS

Acclaim Surfactant

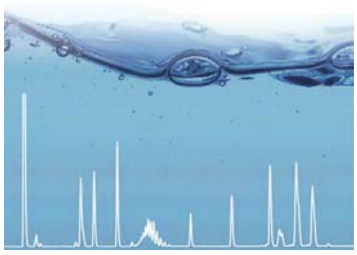
Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
3	HPLC Column	150	**070085**	**070084**	–
5	Guard Cartridges (2/pk)	10	**069693**	**071991**	**069701**
	HPLC Column	150	**068123**	–	**063201**
		250	–	–	**063203**

Acclaim Guard Holder

Description	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	**069580**
Acclaim Guard Kit (Holder and coupler) V-2	**069707**
Guard to Analytical Column Coupler V-2	**074188**

Acclaim Surfactant Plus

Column of choice for surfactant analysis using higher sensitivity detection: performance, versatility, throughput

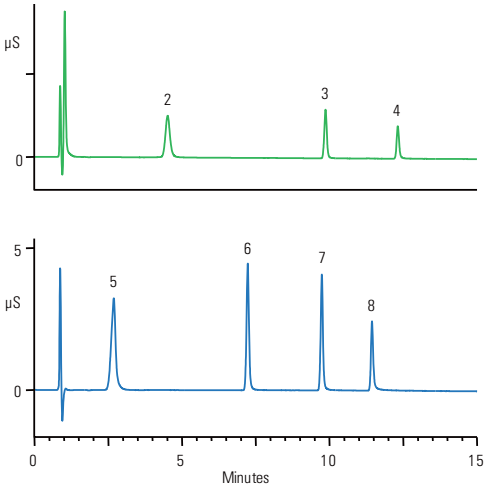


- Ideal selectivity for simultaneous separation of anionic, nonionic, cationic, and amphoteric surfactants
- Compatible with multiple detectors including MS, CAD, ELSD and UV
- Well suited for the determination of cationic surfactants
- High efficiency and fast analysis
- Rugged separations under a variety of conditions

Acclaim Surfactant Plus is a new generation of columns offering improved performance and higher throughput for analyzing surfactants. These columns exhibit exceptionally low bleed and are ideal for use with charged aerosol detectors (CAD) and mass spectrometers (MS). These columns can be used to separate a wide variety of surfactants including anionic, cationic, nonionic and amphoteric surfactants, as well as isomers of xylene sulfonate.

These columns can be used with evaporative light scattering detectors (ELSD), suppressed conductivity detectors (SCD), and UV-Vis detectors (UV). Non-metallic PEEK hardware is available for best compatibility with Dionex ion chromatography systems.

Cationic surfactants



Acclaim Surfactant Plus, 3µm, 150 x 3.0mm

Mobile Phase A: Acetonitrile
Mobile Phase B: 100mM Formic acid
Mobile Phase C: Water
Gradient:

Time (min)	%A	%B	%C
-12	5	5	90
0	5	5	90
12	40	5	55
20	40	5	55

Temperature: 25°C
Flow Rate: 0.5mL/min
Injection Volume: 5µL
Detection: Conductivity with blank subtraction
Analytes:
1. Tetrabutylammonium
2. Tetrapentylammonium
3. Tetrahexylammonium
4. Tetraheptylammonium
5. Decyl-trimethylammonium
6. Dodecyl-trimethylammonium
7. Tetradecyl-trimethylammonium
8. Hexadecyl-trimethylammonium

Acclaim Surfactant Plus

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID	4.0mm ID PEEK
3	HPLC Column	100	**078955**	**078952**	–	–
		150	**078954**	**078951**	**078950**	–
		250	**078953**	–	–	–
5	Guard Cartridges (2/pk)	10	**078960**	**078959**	**082773**	–
	HPLC Column	250	–	–	**082767**	–
		150	–	–	**082768**	**078956**

Acclaim Guard Holder

Description	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	**069580**
Acclaim Guard Kit (Holder and coupler) V-2	**069707**
Guard to Analytical Column Coupler V-2	**074188**

Acclaim Explosives E2

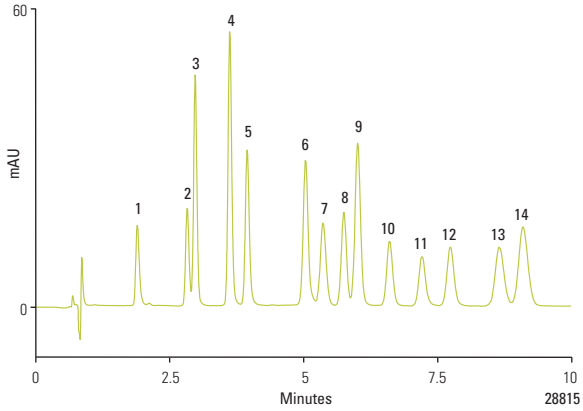
The best solution for explosives analysis (EPA Method 8330)

- Acclaim E2 columns provide baseline resolution of all 14 compounds targeted by EPA Method 8330
- Columns available in 2.2, 3 and 5µm particle size
- Simple isocratic elution conditions
- Rugged columns with good lot-to-lot reproducibility

Acclaim Explosives E2 columns are specifically designed to resolve all 14 explosives listed in EPA SW-846 Method 8330: Nitroaromatics and Nitramines by HPLC. The novel and unique chemistries of these columns provide superior resolution with complementary selectivities.

The Acclaim Explosives E2 may be used as either a primary or a confirmatory column. The unique selectivity and versatility of this column provides a wider application range, including the analysis of explosives beyond U.S. EPA Method 8330 (ISO22478).

Rapid determination of EPA 8330A explosives



Acclaim RSLC Explosives E2, 2.2µm, 100 x 2.1mm

Mobile Phase:	Methanol:water 48:52 (v/v)	
Temperature:	31°C	
Flow Rate:	0.34mL/min (293 bar)	
Injection Volume:	1µL	
Detection:	UV, 254nm	
Analytes:	1. HMX	8. 2,6-DNT
	2. RDX	9. 2,4-DNT
	3. 1,3,5-TNB	10. 2-NT
	4. 3,5-DNB	11. 4-NT
	5. NB	12. 3-NT
	6. 2,4,6-TNT	13. 4-Am-2,6-DNT
	7. Tetryl	14. 2-Am-4,6-DNT
Sample:	Calibration mix, 25µg/mL in 50% acetontrile	

Acclaim Explosives E2

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	100	**076225**	**076227**	–
		150	**076226**	–	–
3	HPLC Column	150	**070083**	**070082**	–
		250	–	**070081**	–
5	Guard Cartridges (2/pk)	10	–	**071989**	**069703**
	HPLC Column	250	–	–	**064309**

See page 4-**054** for Acclaim Guard Holder Ordering Guide

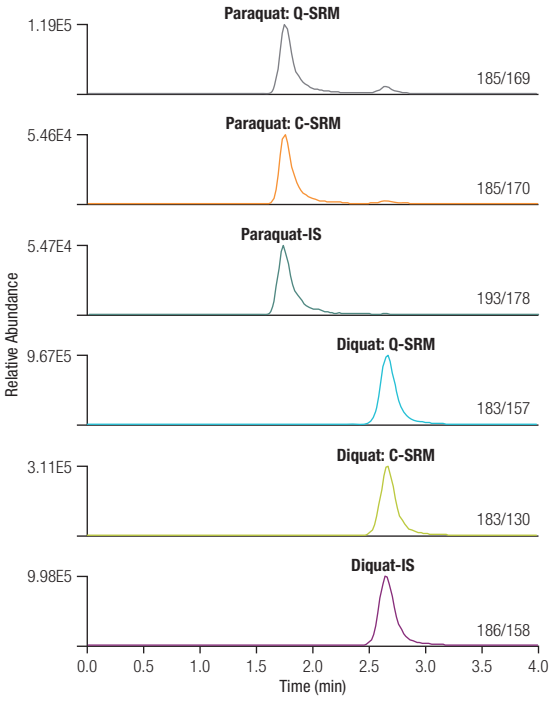
Acclaim Trinity Q1

For trace analysis of diquat and paraquat

- Excellent resolution of diquat and paraquat
- Good peak shape
- Fast analysis
- LC-MS compatible
- No ion-pairing reagent needed

Acclaim Trinity Q1 columns are unique, high-efficiency, silica-based columns designed for the separation of the herbicides diquat and paraquat. These herbicides are toxic and residues are monitored in drinking water, wastewater and agricultural products. The Acclaim Trinity Q1 column is a tri-mode (WCX, WAX, RP), column based on Nano-polymer Silica Hybrid technology. It offers unmatched high-resolution and high-throughput trace analysis of the herbicides diquat and paraquat by LC-MS/MS and LC-UV methods.

Diquat and paraquat



Acclaim Trinity Q1, 3µm, 50 x 3.0mm

Mobile Phase:	25% ammonium acetate (100mM, pH 5.0); 75% acetonitrile
Temperature:	Ambient
Flow Rate:	0.5mL/min
Injection Volume:	5µL
Detection:	Show Mass Spectrometric conditions and the scan events etc. table underneath are the peaks section
Mass Spectrometric Conditions	
System:	Thermo Scientific TSQ Quantiva Access MAX Quadrupole Mass Spectrometer
Interface:	Heated Electrospary Ionization with HESI II probe
Spray Voltage:	1500 V
Vaporizer Temp:	400 °C
Sheath Gas Pressure:	70
Aux Gas Pressure:	10
Capillary Temp:	350 °C
Quantitation Mode:	Selected Reaction Monitoring (SRM)

Scan Events	Precursor	Quantitative SRM (CID)	Confirmative SRM (CID)
Paraquat	185	169 (27)	170 (17)
Paraquat-d_6	193	178 (17)	
Diquat	183	157 (22)	130 (31)
Diquat-d_3	186	158 (22)	

Acclaim Trinity Q1

Particle Size		Length (mm)	2.1mm ID	3.0mm ID
3	HPLC Column	50	**083242**	**083241**
		100	**079717**	**079715**
5	Guard Cartridges (2/pk)	10	**083244**	**079719**

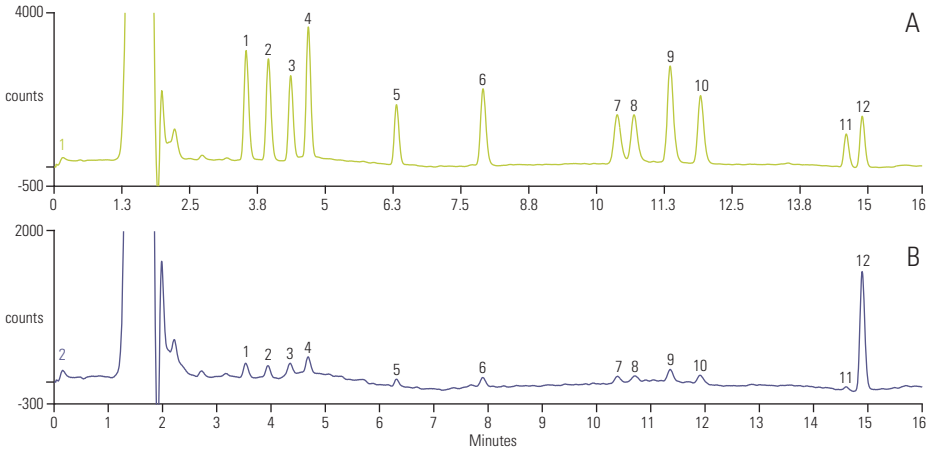
Acclaim Carbamate

Designed for baseline separation of carbamate pesticides specified in US EPA Method 531.2

- Baseline separation of carbamate pesticides specified in US EPA Method 531.2
- Use with either LC/postcolumn derivatization/fluorescence or LC-MS detection
- Available in 2.2, 3 and 5µm particle size
- Compatible with both binary (methanol/water) and ternary (acetonitrile/methanol/water) mobile phase gradients
- High-efficiency, extremely low column bleed, and rugged column packing

Acclaim Carbamate columns are designed for baseline separation of carbamates (*N*-methylcarbamate and *N*-methylcarbamoyloxime pesticides) specified in US EPA Method 531.2. Carbamate pesticides are widely used throughout the world. Drinking water and raw surface water is monitored for the presence of carbamate pesticides and related compounds using an established EPA Method 531.2 that uses HPLC with postcolumn derivatization. LC-MS is the method of choice for the ultimate sensitivity.

Carbamate standard - spiked rice samples



A: without dispersive SPE
B: with dispersive SPE using PSA

Acclaim Carbamate, 3µm, 150 x 3.0mm

Mobile Phase:	Methanol–H_2O
Gradient:	Methanol, -4.0–0.0 min, 14%; 2.0 min, 20%; 8.0 min, 40%; 13.6–16 min, 70%
Temperature:	50 °C
Flow Rate:	0.9mL/min
Injection Volume:	250µL
Detection:	Excitation/330nm and Emission/465nm
Analytes:	1. Aldicarb sulfoxide 2. Aldicarb sulfone 3. Oxamyl 4. Methomyl 5. 3-Hydroxy carbofuran 6. Aldicarb 7. Propoxur 8. Carbofuran 9. Carbaryl 10. 1-Naphthol 11. Methiocarb 12. BDMC (I.S.)

Acclaim Carbamate

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	100	**075597**	–	–
		150	**075596**	–	–
3	Guard Cartridges (2/pk)	10	**072930**	**072929**	**072928**
	HPLC Column	150	**072927**	**072926**	**072925**
5	HPLC Column	250	–	–	**072924**

Acclaim Guard Holder

Description	Cat. No.
Acclaim SST Guard Cartridge Holder V-2	**069580**
Acclaim Guard Kit (Holder and coupler) V-2	**069707**
Guard to Analytical Column Coupler V-2	**074188**

Acclaim Carbonyl C18

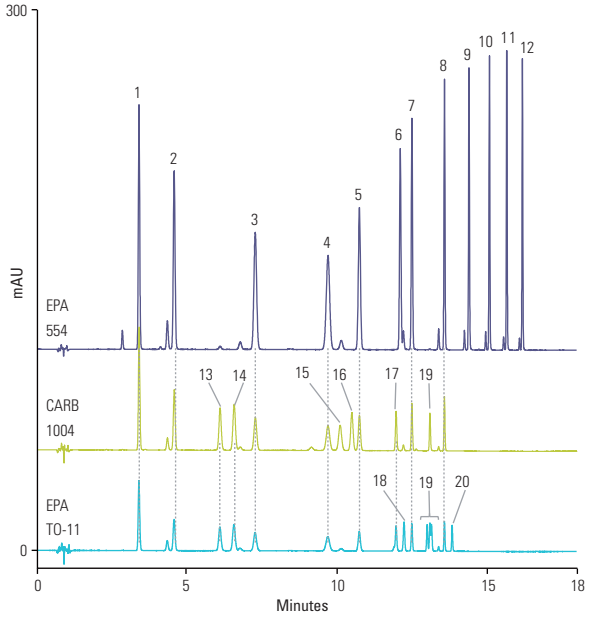
A silica-based, reversed-phase column designed specifically for separating DNPH derivatives of aldehydes and ketones

- Ideal selectivity for baseline resolution of DNPH derivatives of aldehydes and ketones regulated by various official methods, including EPA 554, EPA 8315, EPA 1667, EPA TO-11, and CARB 1004
- High efficiency for UHPLC performance
- Rugged columns with good lot-to-lot reproducibility
- Proven robust methods

Acclaim Carbonyl C18 columns are silica-based reversed phase columns designed specifically for separating DNPH derivatives of aldehydes and ketones. They exhibit superior resolution compared with other commercially available columns.

Aldehydes and ketones are common pollutants in air and water. Several standard methods have been developed to apply using dinitrophenylhydrazine (DNPH) to various environmental situations to measure these compounds. Some of the better known ones include CARB 1004 for vehicle exhaust, EPA 554 for drinking water, EPA 1667 for pharmaceutical wastewater, and EPA 8315 for general wastewater.

DNPH aldehydes and ketones



Acclaim Carbonyl RSLC, 2.2µm, 150 x 2.1mm

Mobile Phase A:	D.I. water
Mobile Phase B:	Acetonitrile
Gradient (min):	-4.5 0.0 8.3 15.0 18.0 %A 48 48 48 0 0 %B 52 52 52 100 100
Flow Rate:	0.400mL/min
Injection Volume:	1µL
Temperature:	28°C
Detection:	UV, 360nm
Samples:	Calibration mixes diluted in methanol
Analytes:	1. Formaldehyde DNPH 2. Acetaldehyde DNPH 3. Propionaldehyde DNPH 4. Crotonaldehyde DNPH 5. Butyraldehyde DNPH 6. Cyclohexanone DNPH 7. Valeraldehyde DNPH 8. Hexanal DNPH 9. Heptanal DNPH 10. Octanal DNPH 11. Nonanal DNPH 12. Decanal DNPH 13. Acetone DNPH 14. Acrolein DNPH 15. Butanone DNPH 16. Methacrolein DNPH 17. Benzaldehyde DNPH 18. Isovaleraldehyde DNPH 19. Tolualdehyde DNPH 20. Xylylaldehyde DNPH

Acclaim Carbonyl C18

Particle Size (µm)	Format	Length (mm)	2.1mm ID	3.0mm ID	4.6mm ID
2.2	RSLC Column	100	**077972**	**077974**	–
		150	**077973**	–	–
3	HPLC Column	150	**079011**	**079010**	–
		250	–	**079009**	–
5	Guard Cartridge (2/pk)	10	**079012**	**079013**	**079014**
	HPLC Column	150	–	–	**079008**
		250	–	–	**083214**