



Acclaim Mixed-Mode HPLC columns

Columns for challenging separation needs





Broad range of HPLC and UHPLC columns



Broad range of HPLC and UHPLC columns for challenging separation needs

General-purpose RP

Separate complex samples with high surface area columns (C18, etc)

• Mixed-Mode

Retain multiple types of analytes on a single column

• Application-specific

Unique columns for specific applications: surfactants, organic acids, pesticides, aminoglycosides, explosive residues

• HILIC

Designed for the separation of polar compounds

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Gaining more resolution

In liquid chromatography, good resolution of peaks is the goal in order to gain meaningful information. Mixed-Mode chromatography provides better control of resolution, as more parameters can be adjusted in order to optimize resolution. Thermo Scientific[™] Acclaim[™] Mixed-Mode columns provide unique surface chemistries which allows the chromatographer to adjust the elution of analytes easily and achieve maximum resolution, often providing resolution of compounds not possible by other conventional high performance liquid chromatography (HPLC) columns. The combination of ion-exchange with reversed-phase, or HILIC chemistries allows the chromatographer to exploit chemical properties of the analyte mixture to fully resolve the components of a complex sample or for sensitive detection of trace amounts of analytes.¹ Reversed-phase chromatography alone could not accomplish this because it would not retain the very polar analytes or charged analytes. Ion-exchange (IEX) chromatography alone would be insufficient for hydrophobic compounds. Having a column chemistry with a combination of functionalities gives you a whole new tool set to resolve and evaluate your samples.

Acclaim Mixed-Mode columns are available in two functionalities (reversed-phase + ion-exchange) and three functionalities (reversed-phase or HILIC + ion-exchange). The greatest benefit of using Mixed-Mode columns is selectivity optimization, simply by adjusting mobile phase ionic strength, pH and/or organic solvent concentration. With adjustable selectivity, it is also possible to separate analytes with dramatically different hydrophobicity and charge state, such as simultaneous separation of active pharmaceutical ingredients (API) and counterion, in a single analysis.



Mixed-Mode columns

Thermo Scientific[™] Acclaim[™] Mixed-Mode HPLC chromatography columns are packed with silica, which have been bonded with multiple functionalities on a single chromatographic support. For example, Thermo Scientific[™] Acclaim[™] Mixed-Mode WAX-1 columns combines both reversed-phase and anion-exchange chemistries on the silica particle. Other combinations include reversed-phase and Hydrophilic Interaction Liquid Chromatography (HILIC) and tri-modal phases which have three chemistries (Trinity) on the silica surface. These Mixed-Mode combinations allow the chromatographic conditions to be easily modified in order to optimize selectivity by adjusting either mobile phase ionic strength, pH and/or organic solvent concentration. The result is improved resolutions. Multiple complementary selectivities can be achieved on the same column under different, appropriate conditions. Mixed-Mode chromatography is well-suited to retaining ionic analytes, whether hydrophobic or hydrophilic and requires no ion-pairing agents in the method, significantly improving the MS compatibility.^{2,3}

- Excellent performance: selectivity, resolution and retention
- Offers flexibility in method development
- Good when retention requirements are contradictory for a single-mode column
- Good for separations of active pharmaceutical ingredients (APIs), mixtures, formulations, ions etc.
- Compatible with MS (without ion-pairing reagents)

Mixed-Mode chromatography is a separation mode that utilizes RP, IEX, and HILIC interactions. Both bi-modal and tri-modal columns are available to meet the needs of a broad range of applications. In this table the various columns are described.

Multi-functional surface chemistries

Column		Mode of separation	Application
Mixed-Mode WAX-1		Reversed-phaseWeak anion-exchange	Neutral and anionic analytes, including • Acids/organic acids • Hydrophobic cations • Hydrophilic anions • Peptides • Fat-soluble vitamins • Pharmaceuticals
Mixed-Mode WCX-1	Bi-modal	Reversed-phaseWeak cation-exchange	 Neutral, hydrophobic acids and cationic analytes, including Hydrophilic cations Hydrophobic anions Bases /Basic pharmaceuticals Aminophenols
Mixed-Mode HILIC-1		Reversed-phaseHILIC	 Highly polar molecules, including Neutrals Total content of ethoxylated nonionic surfactants PEGS Pharmaceutical Consumer products Chemical
Trinity P1	-	Reversed-phaseStrong cation-exchangeWeak anion-exchange	Higher hydrophobicity, includingAPI and counterionHydrophilic monovalent ionsSmall pharmaceuticals
Trinity P2	Tri-moda	HILICWeak cation-exchangeStrong anion-exchange	Higher hydrophilicity, including Multivalent ion and API Hydrophilic ions Zwitterions Neutral sugars Small pharmaceuticals

Bi-modal Mixed-Mode phases

The Acclaim columns family contains three bi-modal Mixed-Mode columns and two tri-modal columns. As shown here, bimodal columns have both a hydrophobic arm – providing reversed-phase retention, and an ion-exchange or diol group at the tip – providing ion-exchange or HILIC retention.



Tri-modal Mixed-Mode phases

Nanopolymer Silica Hybrid technology: Tri-modal Mixed-Mode phases

Thermo Scientific[™] Acclaim[™] Trinity P1 and P2 columns are based on Thermo Scientific[™] Nanopolymer Silica Hybrid (NSH[™]) technology. These are high-purity porous spherical silica particles coated with charged nanopolymer particles. The inner pores are modified with a covalently bonded bi-modal functionality and the outer surface is modified with nanopolymers having a differing ion-exchange functionality. The spatial separation of the two ion-exchange regions allows both retention mechanisms to function simultaneously and be controlled independently.

Acclaim Trinity P1 column

The inner-pore of the Acclaim Trinity P1 column is bonded with a bi-modal reversed-phase and anion-exchange functionality. The outer surface is modified with cation-exchange nano-polymer beads.

Acclaim Trinity P2 column

The inner-pore area of the Acclaim Trinity P2 consists of the bi-modal hydrophilic surface together with cation exchange retention, while the outer surface is modified with anion-exchange nano-polymer beads.



Adjustable selectivity

Using Mixed-Mode columns, the selectivity can be adjusted by changing ionic strength, pH, and organic solvent content in the mobile phase.

As an example, we will look at the elution of two probe molecules, one neutral and one acidic, separated on the Acclaim Mixed-Mode WAX-1 column. When is increased mobile phase ionic strength, from 20 to 100 mM, while keeping mobile phase pH and organic content constant, the negatively charged acid elutes earlier, but virtually has no effect on retention of the neutral molecule. As a result, the elution order is reversed.

Selectivity adjusted by ionic strength

Acclaim Mixed-I	Mode WAX-1 column, 5 µm, 150 x 4.6 mm			100 mM
Mobile phase	50/50 v/v acetonitrile/phosphate buffer			Phosphate buffer, pH 6
Temperature	30 °C		2	
Flow rate	1 mL/min			
Injection volume	2 µL			
Detection	UV, 210 nm	AU	1	20 mM
Peaks	1. Butylbenzene (0.1 mg/mL) 2. 4-Hydrobenzoic acid (0.5 mg/mL)			Phosphate buffer, pH 6
	CO ₂ H		0 7.5 Minute	15
Butylbenzene	4-Hydroxybenzoic acid			

Selectivity can also be adjusted, or "tuned", by mobile phase pH. At pH 6 the acid is negatively charged. The retention is mainly governed by both electro-static interaction and hydrophobic interaction. On the other hand, the neutral probe is retained solely by hydrophobic interaction. As a result, 4-hydroxybenzoic acid elutes after butylbenzene.

When lowering the pH to 2.6 the acid is protonated and less negatively charged, and the retention is mainly caused by hydrophobic interaction. In this case, the retention of both neutral and acidic molecules are mostly governed by hydrophobic interaction. Because 4-hydroxybenzoic acid is more hydrophilic than butylbenzene, it elutes first, causing selectivity change.

Selectivity adjusted by pH

Acclaim Mixed-Mo	de WAX-1 column, 5 µm, 150 x 4.6 mm
Mobile phase	50/50 v/v acetonitrile/20 mM phosphate buffer
Temperature	30°C
Flow rate	1 mL/min
Injection volume	2 μL
Detection	UV, 210 nm
Peaks	1. Butylbenzene (0.1 mg/mL) 2. 4-Hydrobenzoic acid (0.5 mg/mL)
	CO ₂ H



Butylbenzene 4-Hydroxybenzoic acid

ÓН



Mobile phase organic content mainly affects hydrophobic retention. As shown here, increasing acetonitrile content from 45 to 50%, the retention of the neutral molecule is affected more dramatically than the acidic molecule at pH 6, thus the elution order reversal is observed.

Selectivity adjusted by organic content

Acclaim Mixed-Mo	de WAX-1 column, 5 µm, 150 x 4.6 mm
Mobile phase	Acetonitrile/20 mM phosphate buffer, pH 6
Temperature	30 °C
Flow rate	1 mL/min
Injection volume	210 µL
Detection	UV, 210 nm
Peaks	1. Butylbenzene (0.1 mg/mL) 2. 4-Hydrobenzoic acid (0.5 mg/mL)
~	CO ₂ H

ĺ

OH

Butylbenzene

4-Hydroxybenzoic acid





Adjustable selectivity using Acclaim Mixed-Mode WCX-1 column

Selectivity is the most important factor in determining the success of a separation. The Thermo Scientific[™] Acclaim[™] Mixed-Mode WCX-1 column combines both hydrophobic and cation-exchange characteristics, and thus facilitates adjustable selectivity through changes in mobile phase ionic strength, pH and the organic solvent content, individually or concurrently.



Tracking selectivity changes

Selectivity changes can be tracked. For example, optimizing the chromatographic separation of engine coolant by varying the pH, ionic strength, and organic content of the mobile phase, to find the best resolution.

Ethylene glycol, with engine use, degrades to glycolic acid which can corrode the engine. For this reason, engine coolant often contains ethylene glycol as well as several corrosion inhibitors, as no single corrosion inhibitor is 100% effective. These inhibitors generally are from three compound classes; azoles, inorganic salts, and organic acids, and therefore represent both organic and anionic compounds. This mixture is very difficult to separate by reversed-phase mode alone but is possible using Acclaim Mixed-Mode WAX-1 column.

In the example below glycolate and the inhibitors are separated under varying pH, buffer concentrations and buffer proportions. Thus, determining the optimal chromatographic conditions for separation.



Acclaim Mixed-N	lode WAX-1 column, 5 μm, 150 x 4.5 mm
Mobile phase	(A) 100 mM KH ₂ PO ₄ buffer with different pH values (B) Acetonitrite, isocratic (A-60%, B-40%)
Temperature	30 °C
Flow rate	1 mL/min
Injection volume	10 µL
Detection	UV, 214 nm
Peaks	 Glycolate Tolyl-triazole (TT) Sebacate 2-Mercaptobenzothiazole (MBT) 2-Ethyl hexanoate

Bi-modal Mixed-Mode phases

Acclaim Mixed-Mode WAX-1 column

The column chemistry of the Acclaim Mixed-Mode WAX-1 column consists of an alkyl chain, an amide linker and a tertiary amine terminus. This combination offers multimode separation mechanisms including hydrophobic, anionexchange, and cation-exclusion interactions.

Hydrophilic organic acids, shown below, are difficult to separate on a reversedphase column, but the combined functionality of the anion-exchange and reversed-phase on the Acclaim Mixed-Mode WAX-1 column provides very nice resolution. Even weakly charged hydrophilic monocarboxylic organic acids are nicely separated in the example below.



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Separation of mono-carboxylic acids

Combining RP and anion-exchange characteristics, the Acclaim Mixed-Mode WAX-1 column provides not only sufficient retentions, but also ideal selectivity for a variety of anionic molecules, even for weakly charged ones like hydrophilic mono-carboxylic organic, which would be difficult if not impossible to separate with RP columns.

Pain relief medicine

The Acclaim Mixed-Mode WAX-1 column is used below for the separation of pain relief pharmaceutical compounds. This example shows the simultaneous separation of the basic, acidic and neutral components with excellent resolution and symmetrical peak shape.

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Acclaim Mixed-Mo	de WAX-1 column, 5 μm, 150 x 4.6 mm
Mobile phase	40/60 v/v Acetonitrile/buffer (6.8 g potassium monophosphate and 0.5 g pyrophosphate in 1000 g D.I. H_2O , pH is adjusted to 6.0 with NaOH)
Flow rate	1 mL/min
Injection volume	1 μL
Detection	UV, 220 nm
Temperature	30 °C
Analytes	 Caffeine Acetaminophen Salicylamide Acetyl salicylic acid (Aspirin) Salicylic acid



Analysis of soft drinks

The adjustable selectivity of Mixed-Mode separation is a powerful tool in optimizing separations as is shown here in the separation of these sweeteners and soft drink additives. The chromatographic separation can be run a pH 6.0 and 2.9 to achieve complimentary results.

Acclaim Mixed-Mo	ode WAX-1 column, 5 µm, 150 x 4.6 mm
Mobile phase	(A) 55/45 v/v Acetonitrile/ 0.2 M phosphate buffer, pH 6.0 (B) 57/43 v/v Acetonitrile/ 0.12 M phosphate buffer, pH 2.9
Temperature	30 °C
Flow rate	1 mL/min
Injection volume	2.5 μL
Detection	UV, 210 nm
Peaks	 Caffeine 100 μg/mL Aspartame 100 Acesulfame, potassium 100 Saccharin 100 Sorbate, poassium 100 Benzoic acid 100 Citrin acid 300



6. Benzoic acid



1. Caffeine

2. Aspartame 3. Acesulfame, potassium

n 4. Saccharin

5. Sorbate, potassium

7. Citric acid

Acclaim Mixed-Mode WCX-1 column

The combination of both reversed-phase and weak cation exchange properties of the Acclaim Mixed-Mode WCX-1 column is achieved by incorporating a hydrophobic alkyl chain with carboxyl terminus. The multiple retention mechanisms of the Acclaim Mixed-Mode WCX-1 column, including reversedphase, cation exchange, and ion-exclusion results in the ability to separate highly hydrophilic, basic molecules. For example, below is the simultaneous separation of acidic, neutral and basic pharmaceuticals.



Separation of basic, neutral, and acidic pharmaceuticals

Separation of different types of molecules including bases, neutrals, and acids (BNAs) within a single chromatographic run on the same column is highly desirable but challenging. The unique column chemistry of the Acclaim Mixed-Mode WCX-1 column provides multiple separation mechanisms. Consequently, retention of basic, neutral, and acidic molecules can be either independently or concurrently adjusted by changing mobile phase ionic strength, pH, or organic solvent content. While all types of molecules are retained by hydrophobic interaction, the cation-exchange functionality results in increased retention for cationic species through electrostatic attraction, decreased retention for anionic compounds through electrostatic repulsion, and virtually no effect on neutral molecules. This figure demonstrates simultaneous separations of a mixture of basic, neutral, and acidic molecules using an isocratic method, with excellent peak shape and resolution.

Acclaim Mixed-Mo	ode WCX-1 column, 5 μm, 150 x 4.6 mm
Mobile phase	40/60 v/v CH_3CN/NH_4OAc , pH 5.2 (20 mM total)
Temperature	30°C
Flow rate	1 mL/min
Injection volume	5 µL
Detection	UV, 225 nm
Peaks	 Maleate 50 µg/mL Ketoprofen 30 µg/mL Naproxen 30 µg/mL Hydrocortisone 60 µg/mL Dexamethasone 60 µg/mL Oxprenolol 300 µg/mL Timolol 250 µg/mL



Separation of catecholamines

Hydrophilic basic pharmaceuticals, such as catecholamines can be nicely separated with this column.

Acclaim Mixed-Mod	e WCX-1 column, 5 μm, 150 x 4.6 mm
Mobile phase	$2/98 \text{ v/v CH}_2 \text{CN/sodium phosphate, pH 6.2}$ (10 mM total concentration)
Temperature	30 °C
Flow rate	1 mL/min
Injection volume	5 µL
Detection	UV, 215 nm
Peaks (0.25 nM each)	 Norepinephrine Epinephrine 4-Dihydroxybenzylamine (DHBA) Dopamine



Acclaim Mixed-Mode HILIC-1 column

The bi-modal Thermo Scientific[™] Acclaim[™] Mixed-Mode HILIC-1 column combines both reversed-phase (RP) and hydrophilic interaction liquid chromatography (HILIC) properties. The surface chemistry features a long-chain hydrophobic alkyl group with a hydrophilic diol polar terminus, which provides great potential for separating a wide range of polar and non-polar molecules.



Separation dependency of organic solvent

This surfactant alkylphenol ethoxylate (IGEPAL CA-630) can be measured in two modes of separation. On top, in the reversed-phase mode when the mobile phase contains less than 75% acetonitrile, the ethoxylated surfactant elutes as one peak, for easy total content measurements. The same column, when eluted with greater organic solvent concentration in the mobile phase (the HILIC mode), separates all the ethoxylated components individually which can be used to determine the degree of ethoxylation of the surfactant.

Mobile phase	(A) CH ₃ CN (B) 0.1 M NH ₄ OAc, pH 5.2
Temperature	30 °C
Flow rate	1 mL/min
Injection volume	10 µL
Detection	UV, 225 nm
Sample	IGEPAL CA-630 (0.1%)



Analysis of polyethylene glycols (PEGs)

n ~ 9

IGEPAL CA-630

Polyethylene glycols (PEGs) have a wide variety of uses, including medical formulations, personal care products, and industrial applications. Separation of PEGs with different molecular weights are shown below.

Acclaim Mixed-Mode HILIC-1 column, 5 µm, 150 x 4.6 mm				
Mobile phase	(A) MeOH (B) D.I. H ₂ O 20% to 95% A in 20 min			
Temperature	30 °C			
Flow rate	1 mL/min			
Injection volume	25 μL			
Detection	ELS detector			
Sample	Various PEGs (0.04% each)			



Tri-modal Mixed-Mode phases

Acclaim Trinity P1 column applications

The Thermo Scientific[™] Acclaim[™] Trinity P1 column is a trimodal surface functionality; the column inner-pore is bonded with a bi-modal reversed-phase and anion-exchange functionality and the outer surface is modified with cationexchange nano-polymer beads.

The Acclaim Trinity P1 column can separate both pharmaceutically related cations and anions on one column. The selectivity is good and peaks are symmetrical. The column is designed such that cations elute before anions.



Simultaneous separation of pharmaceutical counterions (gradient method)

Acclaim Trinity P1 column, 3 µm, 50 x 3.0 mm							
Mobile phase	(A) CH ₃ CN (B) DI H ₂ O (C) 0.2 M NH ₄ OAc, p	oH 4					
Temperature	30 °C						
Flow rate	0.5 mL/min						
Injection volume	2 µL	2 µL					
Detection	Corona <i>ultra</i> (Gain = 100 pA; Filter = med; Neb temp = 30°C)						
Peaks	 Procaine Choline Tromethamine Sodium Potassium Meglumine Mesylate Maleate 	 9. Chloride 10. Bromide 11. lodide 12. Phosphate 13. Malate 14. Tartrate 15. Citrate 16. Sulfate 					

Gradient	-10	0	2	7	15
A%	60	60	60	10	10
B%	35	35	35	0	0
C%	5	5	5	90	90



LC-MS-MS analysis of ethanol amines (SCX mode)

Below is the separation of five common ethanolamines with excellent retention and resolution using liquid chromatography with tandem mass spektrometry (LC-MS-MS).

Ethanolaines are widely used as emulsifying agents, detergents, ingredients in bactericides and cosmetics, and also in the pesticide manufacturing process. Inefficient removal and/or inappropriate disposal of ethanolamimes may cause adverse effects to the environment. In addition, ethanolamines have been used as bio- and environmental markers for nitrogen mustards (HN1, HN2, and HN3), thus they are important for monitoring human and environmental exposure to nitrogen mustards.

As shown here, five common ethanolamines can be separated on the Acclaim Trinity P1 column with excellent retention and resolution.

Acclaim Trinity P1 column	n, 3 μm, 100 x 2.1 mm					
Chromatography conditions						
System	Dionex RSLC LC LCi system					
Temperature	20 °C					
Mobile phase	90% CH ₃ CN, 10% NH₄OOCH buffer					
Flow rate	600 µL/min					
Injection volume	20 µL					
Mass spectrometric conditions						
System	LC-MS-MS QTRAP					
Interface	TurboSpray with Electrospray ionization					
Curtain gas	15					
Collision gas	Medium					
lonSpray voltage	4500 V					
Temperature	700 °C					
lon source gas 1	50					
lon source gas 2	20					
Detection mode	Multiple reaction monitoring (MRM)					

Analyte	Q1MS	Q3MS	DP	CE	СХР
EA	62	44	46	15	6
DEA	106	88	66	19	6
DEA-IS	114	78	53	24	6
MDEA	120	102	46	19	8
EDEA	134	116	51	21	8
TEA	150	132	61	19	0



Acclaim Trinity P2 column applications

The Thermo Scientific[™] Acclaim[™] Trinity P2 column is based on HILIC/strong anion exchange/weak cation exchange trimodal phase.

Acclaim Trinity P2 column can separate both pharmaceutical API and related mono- and multi-valent counterions on a single column. The selectivity is good and peaks are symmetrical.



Pharmaceutical-related anions and cations

Acclaim Trinity P2 column, 3 µm, 100 x 3.0 mm						
Mobile phase	D.I. water and 100 mM NH ₄ OFm, pH 3.65 gradient					
Temperature	30 °C					
Flow rate	0.60 mL/min					
Injection volume	2 μL					
Detection	Corona Veo Charged Aerosol					
Sample	Water: 0.02 – 0.10 mg/mL each in D.I.					
Analytes	 Phosphate Sodium Potassium Chloride Malate Bromide Nitrate Citrate Fumarate Sulfate Magnesium Calcium 					

Time (min)	H₂O	0.1 M Ammonium formate, pH 3.65
-10	0.760	1.474
0	80	20
2	80	20
22	0	100
30	0	100



Electrolytes in sports beverages

These sports beverages are commonly advertised to replenish electrolytes after vigorous exercise. The product labels indicate they contain sodium, potassium, magnesium and calcium. The Acclaim Trinity P2 column is designed to resolve a broad range of anions and cations, mono- or multi-valent, in a single analysis using a simple gradient method.

Acclaim Trinity P2 c	olumn, 3 µm, 50 x 3.0 mm			
Mobile phase	(A) Water (B) 100 mM Ammonium formate, pH 3.65			
System	UltiMate 3000 RS			
Temperature	30 °C			
Flow rate	0.60 mL/min			
Injection volume	2 µL			
Detection	Corona Veo Charged Aerosol (evaporator 55 °C, data rate 5 Hz, filter 2 sec, power function 1.5)			
Sample	(A) Sports drink (Orange flavor) (B) Sports drink, zero-calorie (Fruit punch flavor)			
Sample prep	Decolorized with Dionex OnGuard-II P cartridge			
Peaks	 Sugars Ascorbic acid Phosphate Sodium Potassium Chloride Citrate Acesulfame Unknown Magnesium Calcium 			



Gradient	-8.0	0.0	1.0	11.0	20.0
A%	90	90	90	0	0
B%	10	10	10	100	100

Separation of buffering agents

Acclaim Trinity P2 c	olumn, 3 µm, 100 x 3.0) mm			
Mobile phase	(A) Acetonitrile (B) 100 mM ammonium formate, pH 3.65				
Isocratic elution	79% A, 21% B (v/v)				
Temperature	320 °C				
Flow rate	0.60 mL/min				
Injection volume	5 µL				
Detection	Corona Veo charged aerosol detector, evaporator temperature 55 °C, gas pressure 60 psi, data rate 5 Hz, filter 2 s, power function 1.0				
Peaks	1. CHES 2. CAPS 3. CAPSO 4. MES 5. MOPS 6. MOPSO 7. AMPSO 8. Chloride 9. Bicine 10. TES, 11. ACES	 TAPS Tricine TAPSO HEPES Glycine PIPES HEPPS Phosphate, POPSO Sodium TRIS 			



Taken from Application Note 20977.

Acclaim Mixed-Mode HPLC column specifications

Acclaim Mixed-Mode HPLC column specifications

	Acclaim Trinity P1	Acclaim Trinity P2	Acclaim Mixed-Mode WCX-1	Acclaim Mixed-Mode WAX-1	Acclaim Mixed-Mode HILIC-1			
Functionality	 Reversed-phase Weak anion exchange Strong cation exchange 	HILICStrong anion exchangeWeak cation exchange	 Reversed-phase Weak cation exchange 	sed-phase cation nge • Reversed-phase • Weak anion exchange • HILIC				
USP type	_	_	L85	L78 -				
Starting material	Ultrapure silica							
Particle shape			Spherical					
Particle sizes	3 µm	3 µm	3 μm 5 μm	3 μm 5 μm	3 μm 5 μm			
Average pore diameter	300 Å	300 Å	120 Å	120 Å	120 Å			
Surface area	100 m²/g	100 m²/g	300 m²/g	300 m²/g	300 m²/g			
pH range	2.5–7.5	2.5–7.5	2.5–7.5	2.5–7.5	2.5–7.5			

References

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Ordering information

Particle size (µm)	Format	Length (mm)	ID (mm)	Mixed-Mode HILIC-1	Mixed-Mode WAX-1	Mixed-Mode WCX-1	Trinity P1	Trinity P2
Acclaim	Acclaim analytical columns							
		FO	2.1				075565	085431
		50	3.0	071912	071908	071910	071388	085433
2.0		100	2.1				071389	085432
3.0		100	3.0				071387	085434
		150	2.1	070091	070089	070093	075564	
		150	3.0	070090	070088	070092	075563	
		150	2.1	066847	067084	068371		
5.0 HPLC column	HPLC column	150	4.6	066843	064984	068353		
		250	4.6	066844	064985	068352		
Acclaim g	juards							
2.0	Guard cartridge	10	2.1				071391	085435
3.0	Guard carthuge	10	3.0				071390	085436
			2.1	069694	069686	-		
5.0	Guard cartridge	10	3.0	071913	071909	071911		
			4.6	069706	069704	069705		
Acclaim guard cartridge holder			069580	069580	069580	069580	069580	
Acclaim guard cartridge/column coupler			074188	074188	074188	074188	074188	
	Acclaim guard kit (holde	r and couple	er)	069707	069707	069707	069707	069707

thermo scientific

Expect reproducible results with sample prep, columns and vials









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