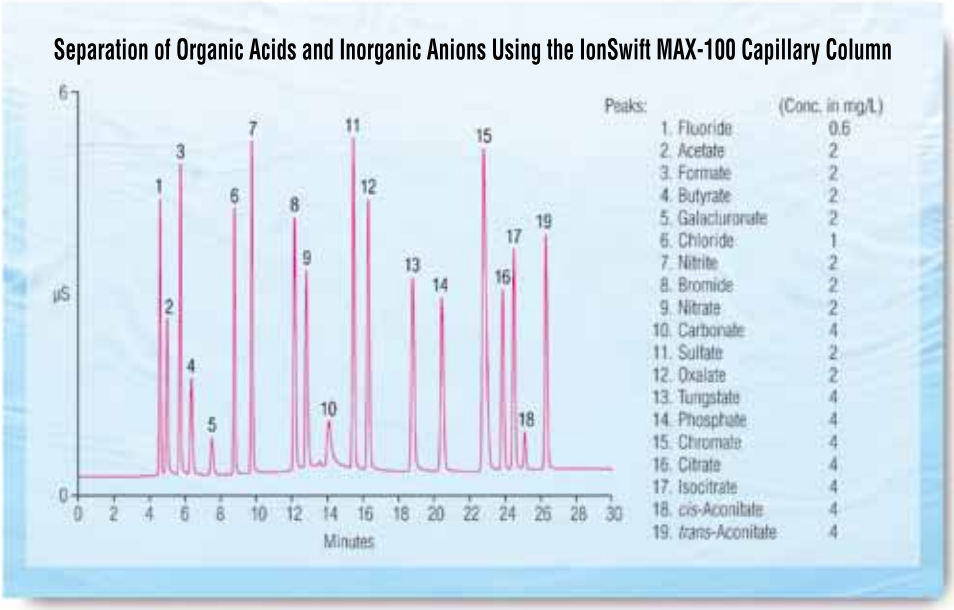
columns

IonSwift MAX-100 Anion-Exchange Column



The IonSwift™ MAX-100 is a high-capacity anion-exchange column with selectivity similar to the IonPac® AS11-HC column. IonSwift is a new generation of separation media, which is uniquely designed and engineered for the separation of small molecules including organic acids and inorganic anions. The MAX-100 column is the first of a series of columns developed using monolith technology and is designed to provide high-speed, high-resolution separations of organic acids and inorganic anions using a hydroxide gradient delivered by an eluent generator.

Now sold under the Thermo Scientific brand

Thermo SCIENTIFIC

The IonSwift MAX-100 column is recommended for the fast separation of organic acids and inorganic anions in approximately 25 min using hydroxide gradient elution. The MAX-100 column can be used in most AS11-HC applications, but for optimum resolution of the organic acids and inorganic anions in complex sample matrices, the IonPac AS11-HC column is recommended. The MAX-100 column is available in 1.0 × 250 mm and 0.25 × 250 mm formats. These formats offer the advantage of reduced eluent consumption, providing reduced operating costs. High mass sensitivity can be achieved with both formats providing lower MDLs. The MAX-100 column can be used at relatively high linear velocity due to its low backpressure. The MAX-100 Analytical column (1 × 250 mm) is operated with scale ICS-2100 or ICS-5000 systems. The MAX-100 capillary column (0.25 × 250 mm) is operated with the ICS-5000 capillary-scale IC system.

Major Column Features and Benefits

The IonSwift MAX-100 is a high-speed, high-resolution column designed for the separation of organic acids and inorganic anions. The MAX-100 columns provide:

- Fast mass transfer
- Fast separations
- High throughput and improved productivity
- Long column lifetime
- Outstanding reproducibility

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Superior Chromatographic Performance

- Fast gradient separation of organic acids and inorganic anions in approximately 25 min.
- Ideal alternative for most AS11-HC applications. (For highest resolution and capacity use the AS11-HC column).
- Compatible with the Eluent Generator (EG).
- High capacity: 12 µeq per column (1 × 250 mm column).
- Eluent suppression using the ASRS® 300 (2 mm) suppressor for the MAX-100 column (1 × 250 mm) or ACES™ 300 suppressor for the MAX-100 column (0.25 × 250 mm) provides Reagent-Free™ operation with low backgrounds and enhanced analyte sensitivity.
- Operate at ambient or elevated temperatures. Column selectivity is optimized for a 35 °C operating temperature to ensure reproducible results.
- Compatible with HPLC organic solvents to enhance analyte solubility, modify column selectivity, or for effective column cleanup.

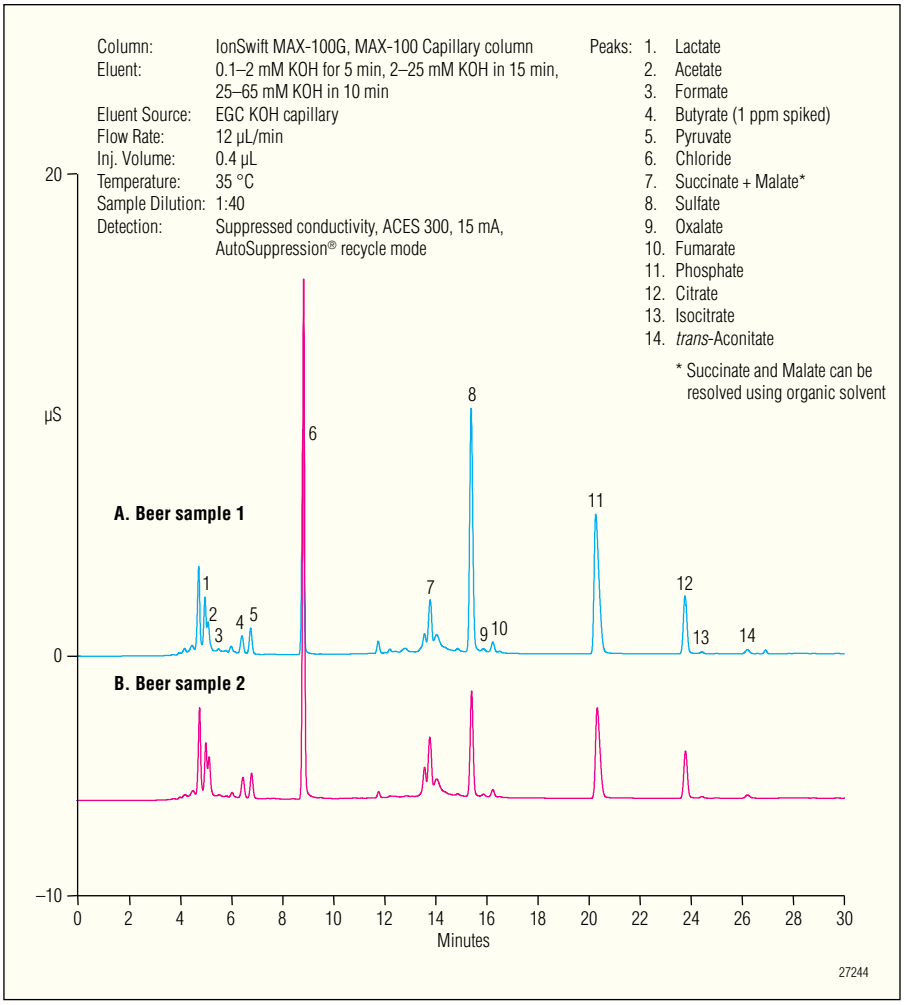

Figure 1. Analysis of beer using the MAX-100 capillary column.

Key Applications

The MAX-100 column is solvent-compatible which allows for anion-exchange selectivity control and easy column cleanup after the analysis of complex matrices. Typical applications include the determination of organic acids and inorganic anions in diverse sample matrices including:

- Fruit juices and wines
- Foods and beverages
- Fermentation and process solutions
- Chemical additives
- Chemical process solutions
- Wastewater
- Power plant waters

Morphology of IonSwift Monoliths

The IonSwift monolith structure is designed and engineered to contain an uninterrupted, interconnected network of channels of a specific, controlled pore size. There are two types of pores: large pores (approximately a micron or larger) for eluent to flow through and small pores (ten to hundreds of nanometers) where most of the separations take place. These large pores allow the eluent to flow through with moderate backpressure, allowing high flow rates for faster analyte separations over traditional packed-bed media.

The MAX-100 column uses a high-capacity monolithic media (12 µeq/column for 1 × 250 mm and 0.80 µeq/column for 0.25 × 250 mm) with optimized selectivity for organic acids and inorganic anions in a variety of sample matrices.

Determination of Carboxylic Acids in Complex Matrices

The MAX-100 column can be used to monitor the organic acid and inorganic anion content in the quality control of foods, wines, and beverages. The MAX-100 is an ideal column for the fast analysis of organic acids and inorganic anions in approximately 25 min using a hydroxide gradient delivered with an EG. The MAX-100 column is an ideal alternative to the AS11-HC column for most organic acid and inorganic anion applications. For highest resolution and capacity, the AS11-HC column is recommended. Figure 1 illustrates the separation of the MAX-100 column for the analysis of beer. The MAX-100 column shows excellent peak shapes for the monovalent organic acids. Butyric acid is an important indicator of deterioration of foods and beverages and can be separated easily from pyruvic acid on the MAX-100 column without the use of solvent in the eluent. Figure 2 illustrates the separation of organic acids and inorganic anions in apple juice using the MAX-100 column.

IonSwift MAX-100 Column for Organic Acids and Inorganic Anions in Fermentation Broths

Examining ingredients in fermentation broths is a valuable tool for process control because many ingredients resulting from metabolic processes have been shown to affect yield or quality of the desired fermentation products. Inorganic anions serve to maintain osmolarity and provide cofactors for biosynthesis. Certain organic acids are waste products, and their accumulation inhibits cell growth or product yields. The high capacity of the MAX-100 column allows for the determination of a number of organic acids and inorganic anions in fermentation broths. Figure 3 illustrates the separation of common fermentation broth anions using the IonSwift MAX-100 column with a hydroxide gradient delivered by an EG.

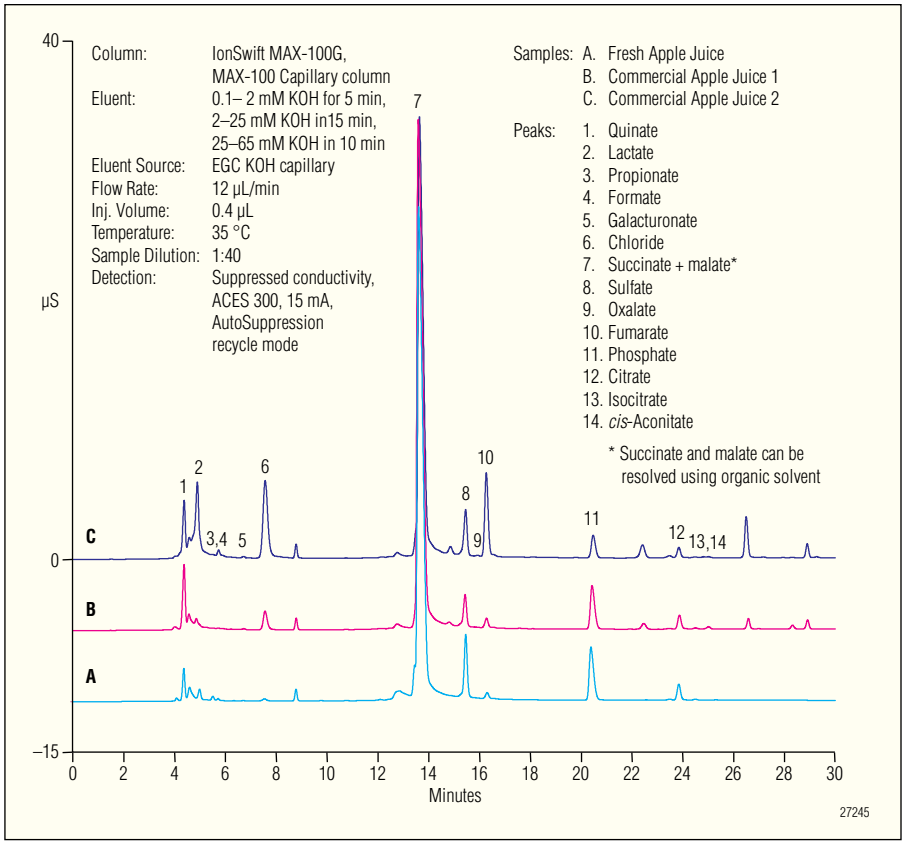

Figure 2. Analysis of apple juice using the IonSwift MAX-100 column.

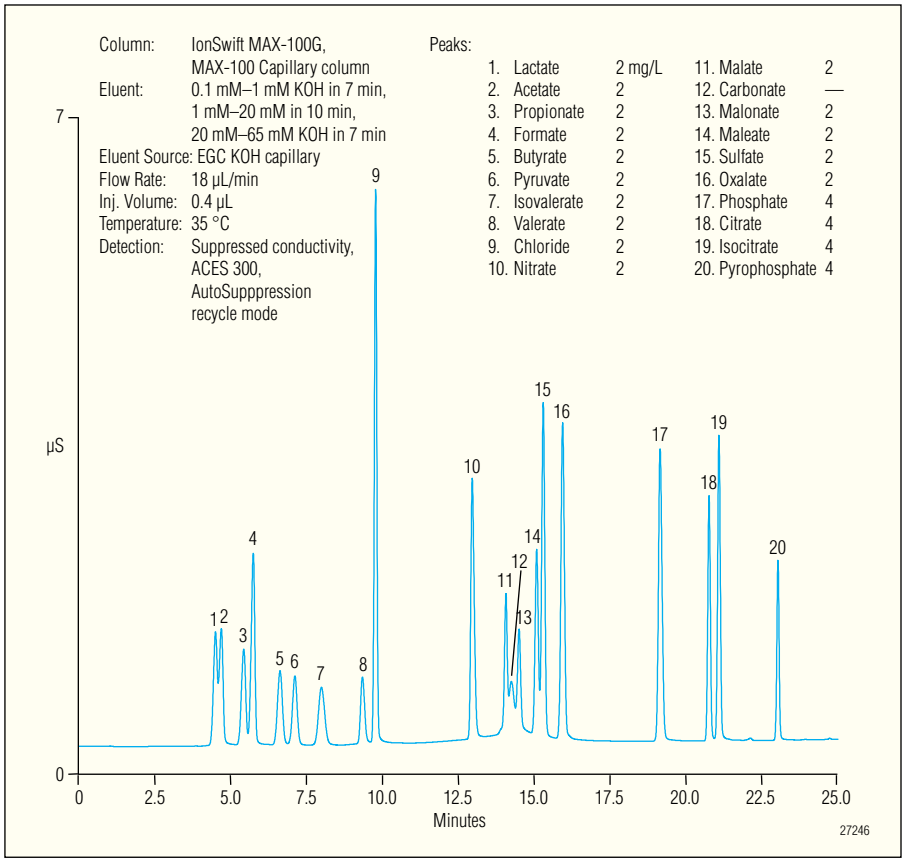

Figure 3. Separation of common fermentation broth anions using the IonSwift MAX-100 column.

Anions Monitored in the Petrochemical Industry

The MAX-100 column is ideal for use in the petrochemical industry due to its ruggedness and superior separation for many anions of interest. The range of anions that can be resolved in a single run provides important information to help troubleshoot problems encountered in the petrochemical industry. The MAX-100 column can be used to resolve a diverse range of anions for corrosion monitoring (chloride in process waters), characterizing reservoir brines (chloride, bromide, nitrate, sulfate in produced waters), analyzing amine scrubber solutions (heat stable salt anions in alkanolamines); and monitoring waste-waters. Figure 4 illustrates the separation of petrochemical anions using the MAX-100 column using a hydroxide gradient delivered by an eluent generator.

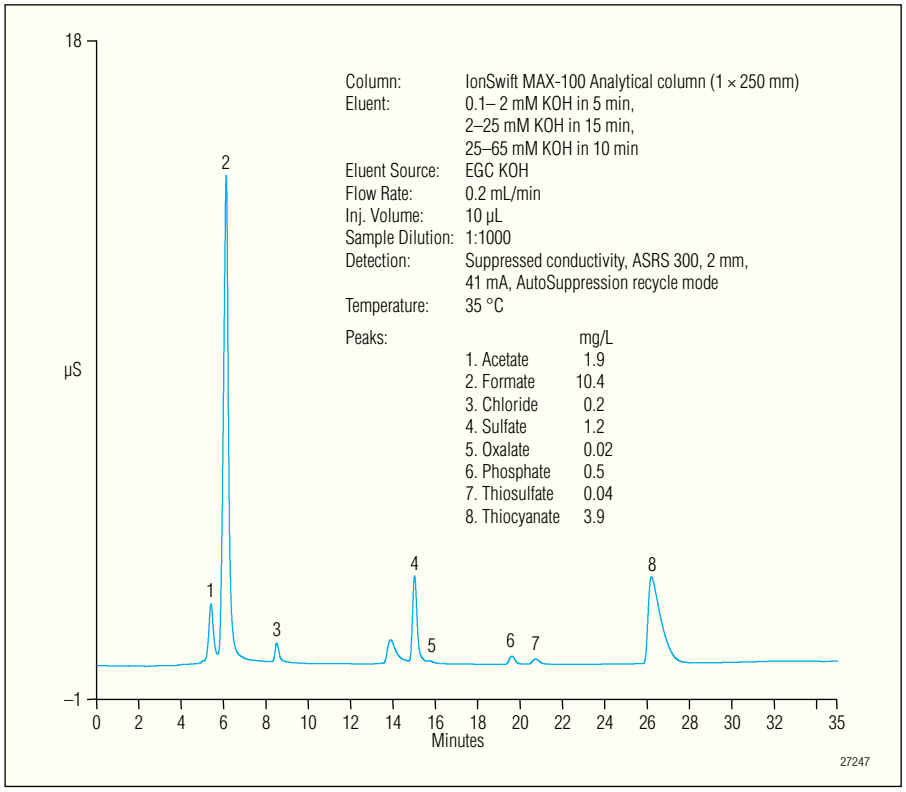

Figure 4. Separation of common petrochemical anions using the IonSwift MAX-100 analytical column.

Reduced Operating Costs with the MAX-100 Capillary Format

The MAX-100 Capillary column (0.25 × 250 mm) offers the same selectivity as the MAX-100 analytical-scale column, thus producing the same performance as a 1 mm column, but requiring only 1/16th the eluent flow rate. The capillary format offers the advantage of less eluent consumption, providing reduced operating costs. Figure 5 illustrates the separation of organic acids and inorganic anions using the MAX-100 Capillary column.

System Recommendations

The MAX-100 (1 mm) column in the suppressed conductivity mode is recommended for use with the ICS-2100 or ICS-5000 IC systems equipped with an EG. The MAX-100 (1 mm) column can be used with older Dionex IC Systems equipped with an EG or an RFC-30 Reagent-Free Controller. The EG is used to automatically produce hydroxide gradients from deionized water. The MAX-100 Capillary column is recommended for use with the ICS-5000 Capillary scale system.

Suppressors

For optimum ease of use and economy, the MAX-100 (1 mm) column can be used with the ASRS 300 (2 mm) Anion Suppressor. For the MAX-100 column (0.25 mm), use the ACES 300 suppressor.

Anion Trap Columns

When using the EG for eluent delivery, a CR-ATC Continuously Regenerated Anion Trap Column should be installed between the EG cartridge and the EG degas module. Alternatively, for the 1 mm MAX-100 column, an ATC-HC Anion Trap Column can be installed between the pump outlet and inlet of the EG cartridge in the EG module.

Concentrator Columns

For concentrator work with the MAX-100 (1 mm), use the IonSwift MAX-100 guard column, ultratrace anion concentrator columns (UTAC-LP1, UTAC-ULP1, UTAC-XLP1, UTAC-LP2, UTAC-ULP2, UTAC-XLP2), or trace anion concentrator column (TAC-ULP1, or TAC-2) when a single piston pump such as the AXP pump (pulse damper required) is used for sample delivery. Use the UTAC-LP1, UTAC-LP2 or TAC-LP1 trace anion concentrator columns when the sample is delivered with a syringe or with a low-pressure autosampler such as the AS-DV.

SPECIFICATIONS

Dimensions:

IonSwift MAX-100 Analytical Column:

1 × 250 mm

IonSwift MAX-100G Guard Column:

1 × 50 mm

IonSwift MAX-100 Capillary Column:

0.25 × 250 mm

IonSwift MAX-100G Capillary Guard Column:

0.25 × 50 mm

Maximum Operating Pressure:

3000 psi

Mobile Phase Compatibility:

pH 0–14; 0–100% HPLC solvents

Substrate Characteristics:

Analytical and Guard Column:

Monolithic Backbone

Modal Pore Size: 1.6 µm (Mercury Porosimetry)

Crosslinking (%DVB): 55%

Ion Exchange Group:

Functional Group: Alkanol quaternary ammonium ion

Functional Group Characteristics:

Hydrophobicity: Medium low hydrophobic

Capacity:

12 µeq (1 × 250 mm column)

2.4 µeq (1 × 50 mm column)

0.80 µeq (0.25 × 250 mm column)

0.16 µeq (0.25 × 50 mm column)

Column Construction:

PEEK™ with 10–32 threaded ferrule-style end fittings. All components are nonmetallic.

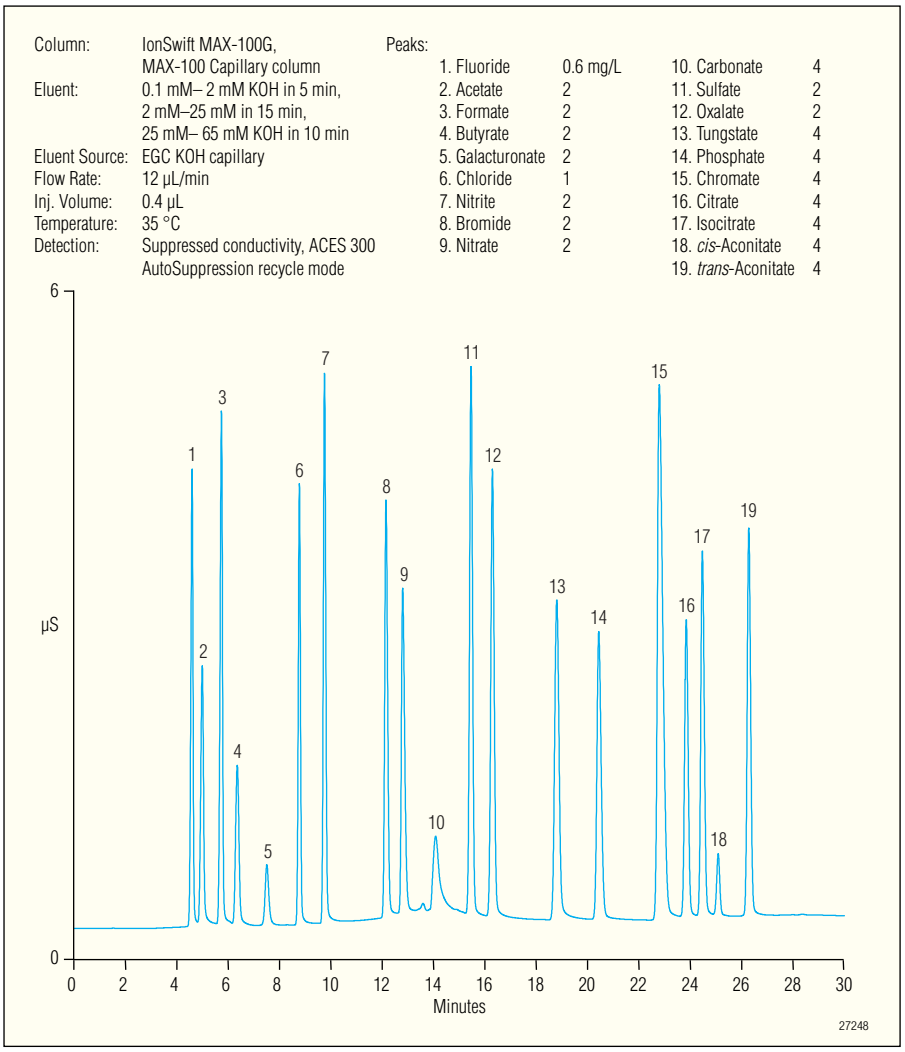

Figure 5. Separation of organic acids and inorganic anions using the IonSwift MAX-100 capillary column.

ORDERING INFORMATION

In the U.S., call (800) 346-6390 or contact the Dionex Regional Office nearest you. Outside the U.S., order through your local Dionex office or distributor. Refer to the following part numbers:

IonSwift MAX-100 Columns	Part Number
IonSwift MAX-100 Analytical Column (1 × 250 mm)	071279
IonSwift MAX-100G Guard Column (1 × 50 mm)	071280
IonSwift MAX-100 Capillary Column (0.25 × 250 mm)	074246
IonSwift MAX-100G Capillary Guard Column (0.25 × 50 mm)	074247

Trap Columns	Part Number
CR-ATC Continuously Regenerated Anion Trap Column (For use with systems equipped with an Eluent Generator or RFC-30)	060477
CR-ATC Continuously Regenerated Anion Trap Column (Capillary) (For use with Capillary Anions Columns)	072078

Concentrator Columns	Part Number
UTAC-LP1 Ultra Trace Anion Concentrator-Low Pressure (4 × 35 mm)	063079
UTAC-ULP1 Ultra Trace Anion Concentrator-Ultra Low Pressure (5 × 23 mm)	063475
UTAC-XLP1 Ultra Trace Anion Concentrator-Extremely Low Pressure (6 × 16 mm)	063459
UTAC-LP2 Ultra Trace Anion Concentrator-Low Pressure (4 × 35 mm)	079917
UTAC-ULP2 Ultra Trace Anion Concentrator-Ultra Low Pressure (5 × 23 mm)	079918
UTAC-XLP2 Ultra Trace Anion Concentrator-Extremely Low Pressure (6 × 16 mm)	072781

Suppressors	Part Number
ASRS 300 (2 mm) Anion Self-Regenerating Suppressor	064555
ACES 300 Anion Capillary Electrolytic Suppressor (For use with the anion capillary columns)	072052

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