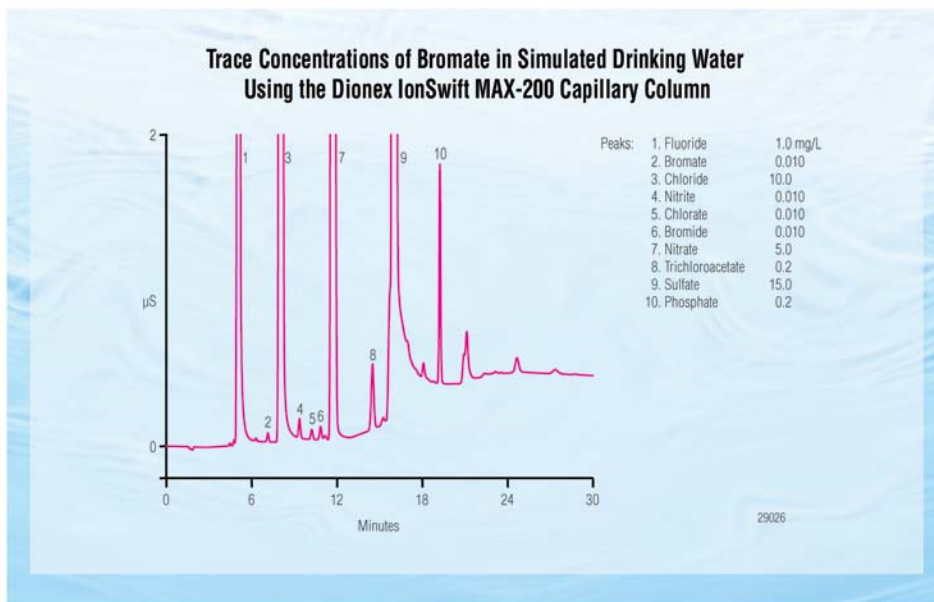


Thermo Scientific Dionex IonSwift MAX-200 Anion-Exchange Column



The Thermo Scientific Dionex IonSwift™ MAX-200 is a high-capacity anion-exchange column with selectivity similar to the Thermo Scientific Dionex IonPac™ AS19 column. Dionex IonSwift is a new generation of separation media, which is uniquely designed and engineered for the separation of small molecules. The Dionex IonSwift MAX-200 column is the second in a series of columns developed using monolith technology and is designed to provide high-speed, high-resolution separations of oxyhalides and inorganic anions using a hydroxide gradient delivered by an eluent generator.

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The Dionex IonSwift MAX-200 column is recommended for the fast separation of oxyhalides and inorganic anions in under 20 minutes using hydroxide gradient elution. This column can be used in most Dionex IonPac AS19 applications, however, for optimum resolution of the oxyhalides and inorganic anions in complex sample matrices, the Dionex IonPac AS19 column is recommended.

The Dionex IonSwift MAX-200 column is available in 0.25 × 250 mm format. This capillary format offers the advantage of reduced eluent consumption, providing reduced operating costs. High mass sensitivity can be achieved providing lower method detection

limits (MDLs). The Dionex IonSwift MAX-200 capillary column can be used at relatively high linear velocity due to its low backpressure. The Dionex IonSwift MAX-200 capillary column is operated with the Thermo Scientific Dionex ICS-5000 capillary-scale ion chromatography system.

Major Column Features and Benefits

The Dionex IonSwift MAX-200 is a high-speed, high-resolution column designed for the separation of oxyhalides and inorganic anions. This column provides:

- Fast mass transfer
- Fast separations
- High throughput
- Long column lifetime



Part of Thermo Fisher Scientific

Superior Chromatographic Performance

- Fast gradient separation of oxyhalides and inorganic anions in under 20 minutes
- Ideal alternative for most Dionex IonPac AS19 applications. (For highest resolution and capacity, use the Dionex IonPac AS19 column.)
- Compatible with the Dionex ICS-5000 EG Eluent Generator.
- High capacity: 0.8 μeq per column (0.25×250 mm column).
- Eluent suppression using the Thermo Scientific Dionex ACES™ 300 Anion Capillary Electrolytic Suppressor provides Reagent-Free™ operation with low backgrounds and enhanced analyte sensitivity.
- Operate at ambient or elevated temperatures. Column selectivity is optimized for a 30 °C operating temperature to ensure reproducible results.
- Compatible with organic solvents to enhance analyte solubility, modify column selectivity, or for effective column cleanup.

Key Applications

The Dionex IonSwift MAX-200 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 oxyhalides and inorganic anions in diverse sample matrices including:

- Drinking water
- Ground water
- Wastewater

Morphology of IonSwift Monoliths

The Dionex 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 (tens to hundreds of nanometers) where most of the separations take place. These large pores allow the eluent to flow through with

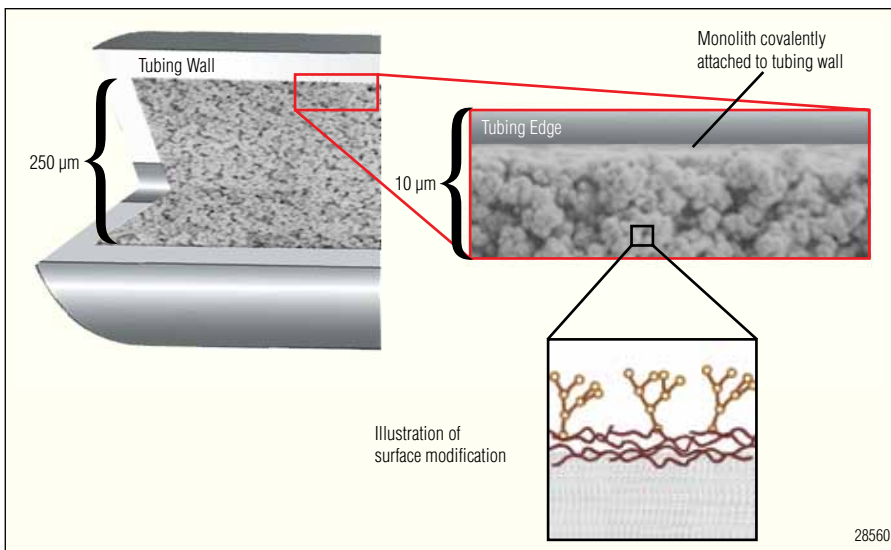


Figure 1. Schematic of monolith structure.

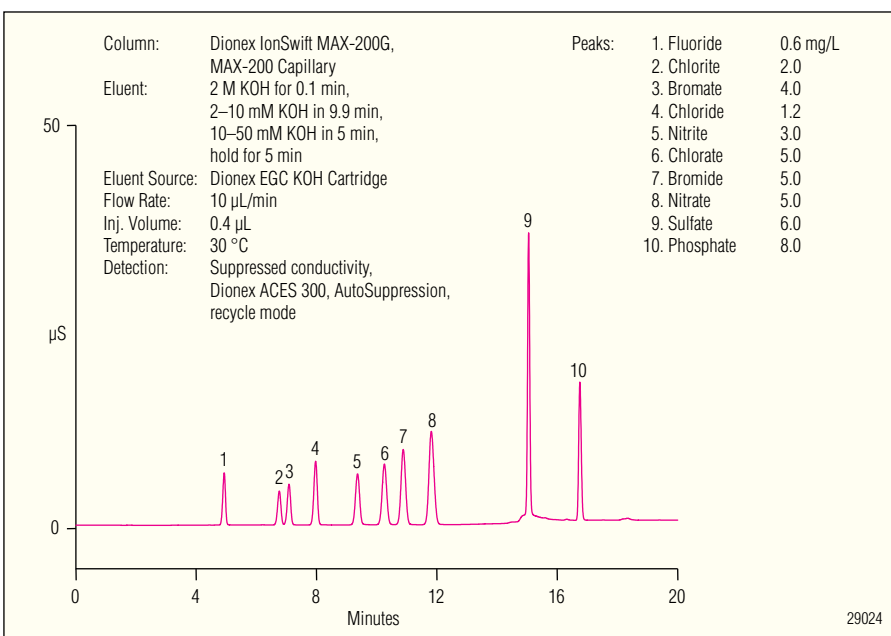


Figure 2. Separation of oxyhalides and inorganic anions using the Dionex IonSwift MAX-200 column and a hydroxide gradient.

moderate backpressure, allowing relatively high flow rates for faster analyte separations over traditional packed-bed media.

The Dionex IonSwift MAX-200 column uses the hyperbranched anion-exchange condensation polymer, electrostatically attached to the surface of the monolith. Alternating treatments of epoxy monomer and amines produce a coating that grows directly off the surface of the monolith, as illustrated in Figure 1. The number of alternating coating cycles controls the capacity of the column.

The resulting polymer is extremely hydrophilic and therefore has excellent selectivity for hydroxide eluent, allowing the use of lower eluent concentrations. Figure 2 shows the separation of inorganic anions and oxyhalides using the Dionex IonSwift MAX-200 column.

The Dionex IonSwift MAX-200 column uses a high-capacity monolithic media (0.8 $\mu\text{eq}/\text{column}$ for 0.25×250 mm) with optimized selectivity for oxyhalides and inorganic anions in a variety of sample matrices.

Determination of Trace Bromate in Drinking Water Matrices

The high-capacity Dionex IonSwift MAX-200 column can be used to determine bromate at low $\mu\text{g/L}$ concentrations in drinking water matrices. Bromate, a byproduct of the ozonation disinfection process for drinking water, has been cited by the EPA and the World Health Organization as a potential carcinogen, even at low- $\mu\text{g/L}$ concentrations. Treatment plants that use ozone for disinfection are required to monitor bromate, at an MCL of $19 \mu\text{g/L}$, in addition to the common inorganic anions. The Dionex IonSwift MAX-200 column does not require sample pretreatment or preconcentration. This method uses a standard injection with potassium hydroxide gradient coupled with suppressed conductivity detection, as illustrated in Figure 3.

Figure 4 shows the analysis of simulated drinking water using a large loop injection on the Dionex IonSwift MAX-200 column. Bromate is spiked in at $10 \mu\text{g/L}$ and is easily quantitated in this simulated drinking water matrix.

Gradient Separations as Simple as Isocratic Runs with the Eluent Generator

The Dionex IonSwift MAX-200 column is recommended for use with eluent generation and Dionex RFIC-EG systems. The eluent generator (EG) electrolytically produces high-purity potassium hydroxide eluent from water, eliminating the need for eluent preparation. The potassium hydroxide eluent is free of carbonate contamination. Carbonate-free hydroxide eluents minimize baseline shifts during hydroxide gradients, which provides greater retention time reproducibility, lower background conductivity, and lower detection limits for analytes.

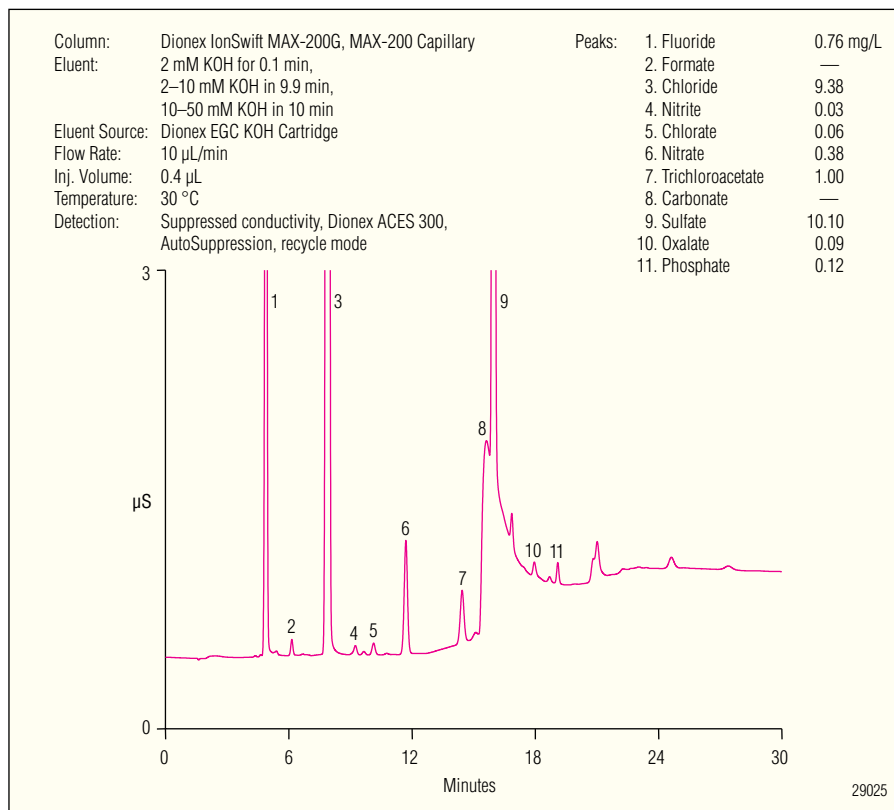


Figure 3. Determination of inorganic anions and organic acids in drinking water spiked with trichloroacetate using the Dionex IonSwift MAX-200 column.

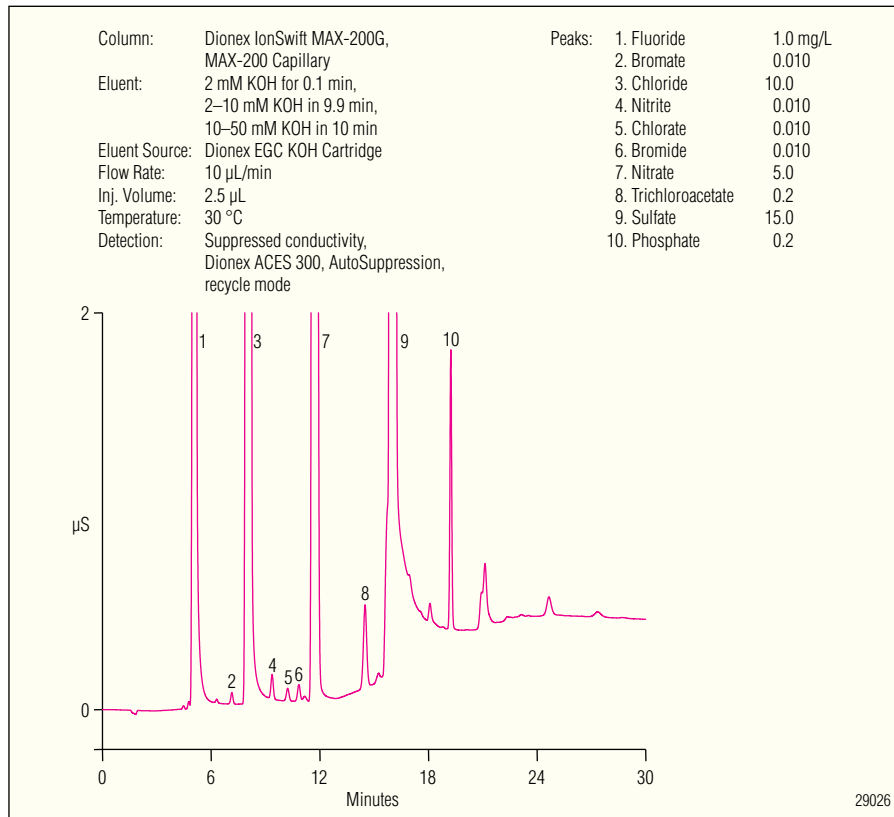


Figure 4. Analysis of simulated drinking water using the Dionex IonSwift MAX-200 capillary column.

The separation of 21 environmental anions using a potassium hydroxide gradient with the EGC KOH for eluent delivery is demonstrated in Figure 5.

Analysis of Disparate Ratios Using the Dionex IonSwift MAX-200 Column

Figure 6 shows the analysis of a low level of nitrate in the presence of a high level of chloride. Even at a ratio of 10,000 to 1, chloride to nitrite, the nitrite peak is easily quantitated on the shoulder of the chloride. Using a large loop injection with a gradient separation on the Dionex IonSwift MAX-200, the sample can be easily analyzed.

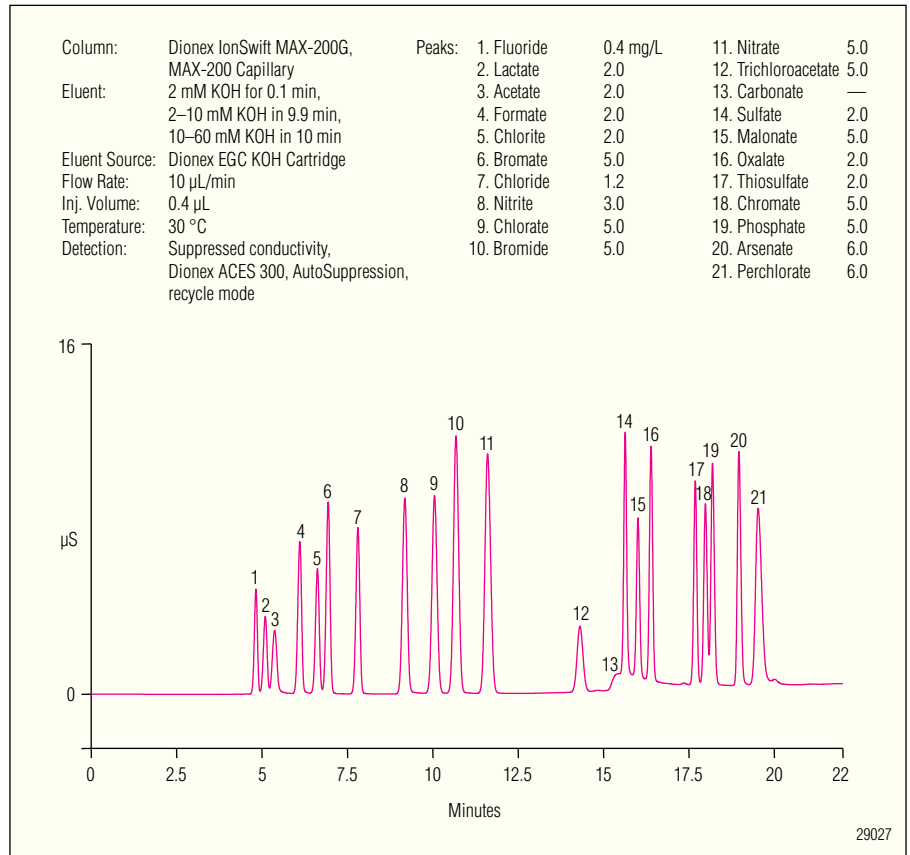


Figure 5. Determination of inorganic anions, oxyhalides, organic acids, and oxyanions using the Dionex IonSwift MAX-200 column and a potassium hydroxide gradient delivered by eluent generation.

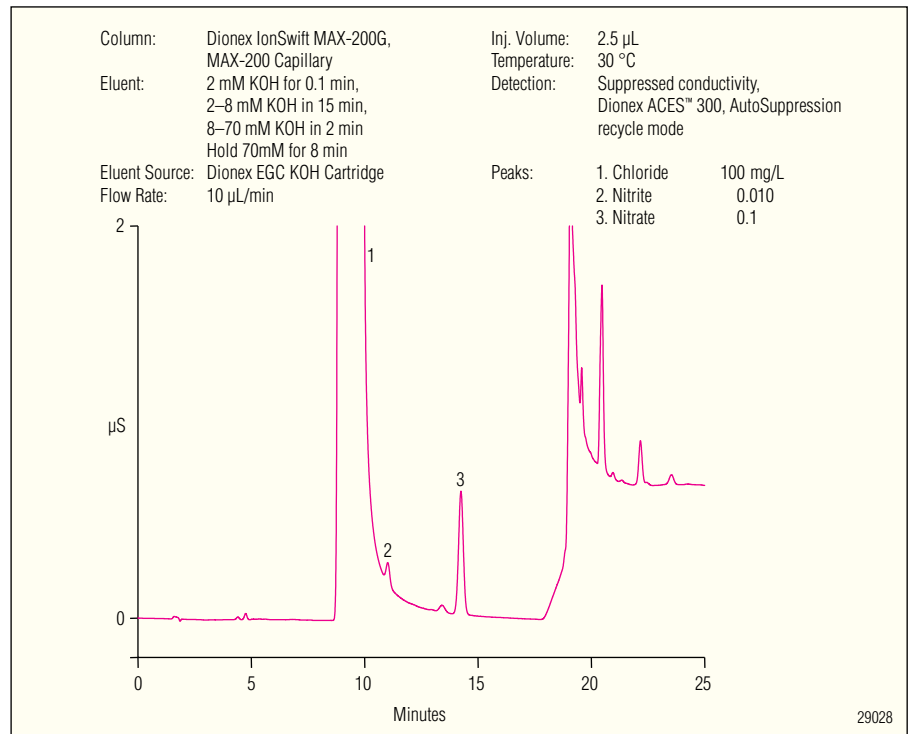


Figure 6. Analysis of 10,000 to 1 ratio of chloride and nitrite using the Dionex IonSwift MAX-200 capillary column.

Analysis of a Tobacco Sample using the Dionex IonSwift MAX-200 Column

The analysis of a tobacco sample shown in Figure 7 indicates the presence of inorganic anions, organic acids and oxyhalides. The sample was prepared by diluting 0.1 g in 100 mL deionized water.

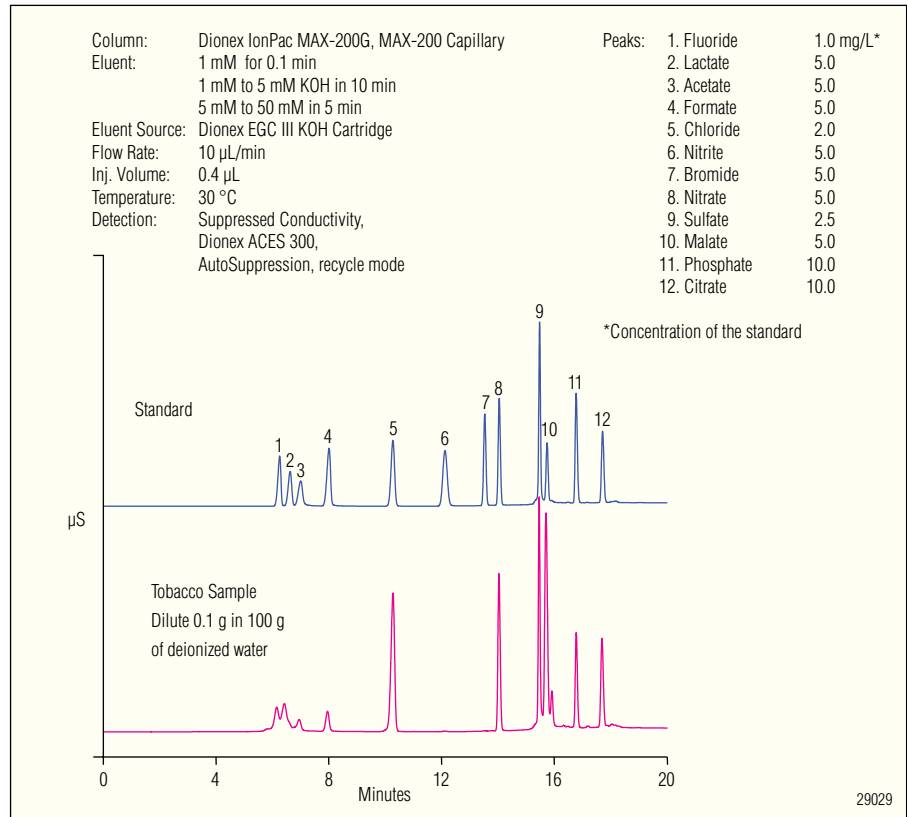


Figure 7. Separation of organic and inorganic anions using Dionex IonSwift MAX-200 capillary and guard columns.

Reduced Operating Costs with the Dionex IonSwift MAX-200 Capillary Format

The Dionex IonSwift MAX-200 capillary column (0.25 × 250 mm) offers the advantage of less eluent consumption, providing reduced operating costs.

System Recommendations

The Dionex IonSwift MAX-200 capillary column is recommended for use with the Dionex ICS-5000 capillary-scale ion chromatography system.

Suppressors

For optimum ease of use and economy, the Dionex IonSwift MAX-200 column is used with the Dionex ACES 300 Anion Capillary Electrolytic Suppressor.

Anion Trap Columns

When using the Dionex EG for eluent delivery, a Thermo Scientific Dionex CR-ATC Continuously Regenerated Anion Trap Column should be installed between the EG cartridge and the EG degas module.

Concentrator Columns

For concentrator work with the Dionex IonSwift MAX-200 0.25 mm capillary column, use the Dionex IonSwift MAX-200G capillary guard column or the Thermo Scientific Dionex IonSwift MAC-100. For 2D-IC applications, use the Thermo Scientific Dionex IonSwift MAC-200 concentrator column.

SPECIFICATIONS

Dimensions:

Dionex IonSwift MAX-200
Capillary Column:
0.25 × 250 mm

Dionex IonSwift MAX-200G
Capillary Guard Column:
0.25 × 50 mm

Maximum Operating Pressure:

3000 psi

Mobile Phase Compatibility:

pH 0–14; 0–100% HPLC
solvents

Substrate Characteristics:

Capillary and Capillary 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:

0.8 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.

ORDERING INFORMATION

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

Dionex IonSwift MAX-200 Columns	Part Number
Dionex IonSwift MAX-200 Capillary Column (0.25 × 250 mm)	075889
Dionex IonSwift MAX-200G Capillary Guard Column (0.25 × 50 mm)	075891

Trap Columns	Part Number
Dionex CR-ATC Continuously Regenerated Anion Trap Column (Capillary) (For use with Capillary Anions Columns).....	072078

Concentrator Columns	Part Number
Dionex IonSwift MAC-100 Monolith Anion Concentrator Column (0.5 × 80 mm)	074702
Dionex IonSwift MAC-200 Monolith Anion Concentrator Column (0.75 × 80 mm)	075461

Suppressors	Part Number
Dionex ACES 300 Anion Capillary Electrolytic Suppressor	072052
(For use with the anion capillary columns)	

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