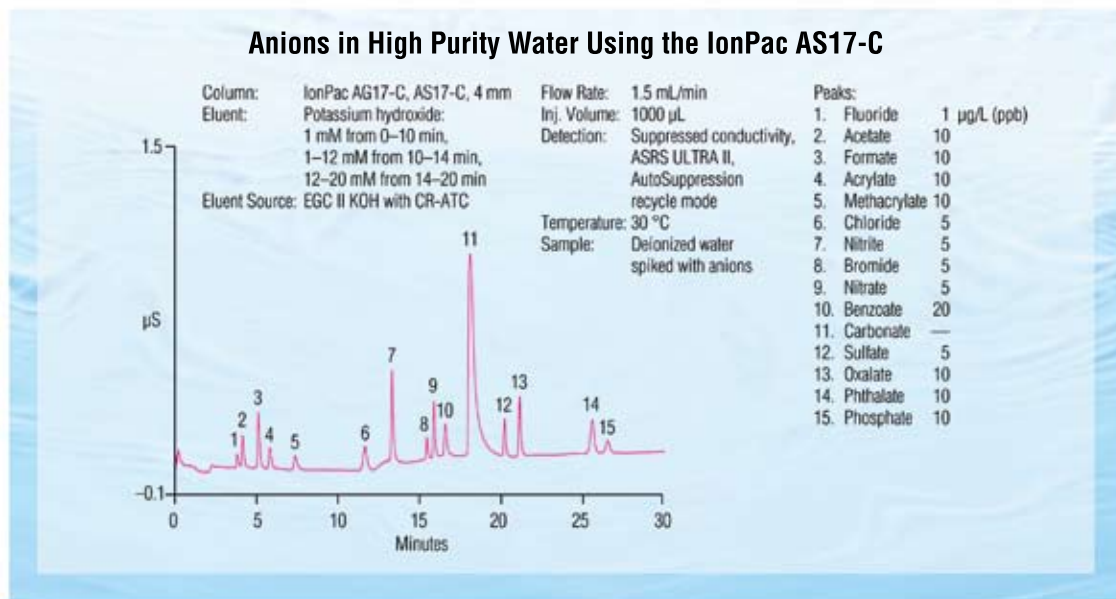


## IonPac® AS17-C Anion Exchange Column



The IonPac AS17-C is a hydroxide-selective anion exchange column designed for fast gradient separation of inorganic anions. The key application for the AS17-C column is the determination of common inorganic anions in high purity water matrices. The AS17-C can resolve fluoride, acetate, chloride, nitrite, bromide, nitrate, carbonate, sulfate, and phosphate in less than 10 minutes using a hydroxide gradient delivered with an Eluent Generator as shown in Figure 5. The AS17-C column provides low sulfate blanks and fast equilibration time for the analysis of trace anions in high purity water matrices. The IonPac AS17-C is suited for all IonPac AS17 column applications.

The AS17-C column is designed to be used in conjunction with the Eluent Generator. The Eluent Generator automatically produces potassium hydroxide eluents from water, making gradient separations as easy as isocratic runs. Using the Eluent Generator under gradient conditions, common inorganic anions can easily be separated in a variety of sample matrices including high purity water, drinking water, wastewater, process streams, and scrubber solutions. The AS17-C selectivity provides excellent retention of fluoride from the water dip and baseline resolution of fluoride, acetate, propionate, and formate. Solvent compatibility permits easy column clean-up after the analysis of complex matrices.

#### Recommended for Inorganic Anions in Diverse Sample Matrices

- High purity water
- Source water and drinking water
- Municipal and industrial waste water
- Industrial cooling water
- Hazardous waste extracts and dump site leachates
- Acid rain
- Foods and beverages
- Anionic counterions in pharmaceutical preparations and synthetic peptides
- Polymers such as polyols and polysulfonates
- Scrubber solutions

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## Superior Chromatographic Performance

- Fast gradient separation of inorganic anions in high purity water matrices.
- Ideal alternative for AS17 inorganic anion applications.
- Hydroxide eluent is easy to suppress to a very low background for trace level determinations (including fluoride) even with a large loop injection.
- Superior retention and quantification of fluoride, acetate, propionate, and formate
- Compatible with the Eluent Generator.
- Meets performance requirements specified in U.S. EPA Method 300.0 (A).
- Operates at ambient or elevated temperatures. Column selectivity is optimized for operating temperature of 30 °C to ensure reproducible results.
- Compatible with organic solvents to enhance analyte solubility, modify column selectivity, or for effective column clean-up.

## High Efficiency Particle Structure

The IonPac AS17-C packing is a unique structure composed of a highly crosslinked core and a MicroBead™ anion-exchange layer attached to the surface, as shown in Figure 1. The substrate for the IonPac AS17-C column is a 10.5 µm diameter microporous resin bead, consisting of ethylvinylbenzene crosslinked with 55% divinylbenzene.

The anion exchange layer is functionalized with very hydrophilic quaternary ammonium groups. The latex bead anion-exchange layer has a controlled thickness, this results in excellent mass transfer characteristics which yield highly efficient peaks.

## Trace Analysis of Inorganic Anions in High Purity Water

The AS17-C selectivity allows for determination of trace levels of inorganic anions and low molecular weight

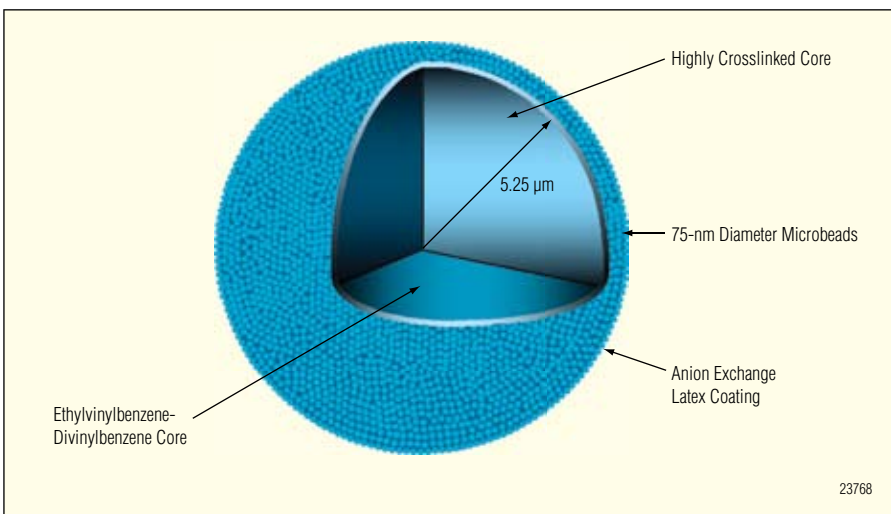


Figure 1. Structure of an IonPac AS17-C packing particle.

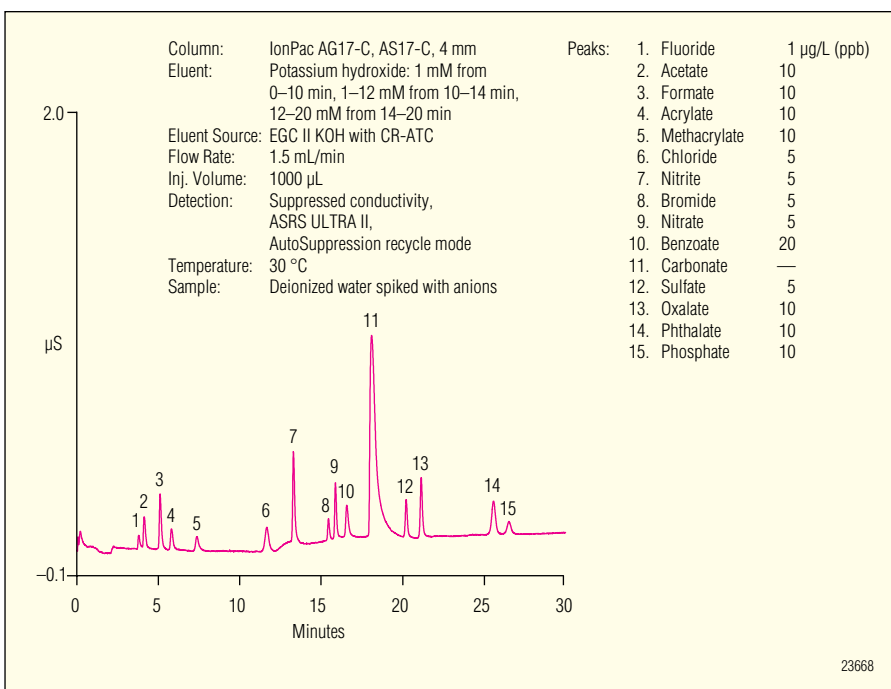


Figure 2. Determination of inorganic anions and low molecular weight organic acids in high purity water using a large loop injection with potassium hydroxide gradient on a 4-mm IonPac AS17-C column.

organic acids in high purity water matrices using a large sample loop injection. The AS17-C resin is functionalized with carboxylic acid groups which provide low sulfate blanks and fast equilibration time. Figure 2 illustrates the separation of inorganic anions and low molecular weight organic acids in a high purity water sample using

a large loop injection with a hydroxide gradient coupled with suppressed conductivity detection. These analytes can easily be quantified at low ppb levels using a 1.0 mL injection loop on a 4-mm AS17-C column. The hydroxide eluent can be suppressed to a very low background, facilitating trace level analysis.

## New Application Capabilities

The unique selectivity of the AS17-C column makes it the ideal column for methods development of specialized anion applications. For example, sulfur species such as sulfite, sulfate, and thiosulfate can be determined in a simulated chemical industrial wastewater sample. With an optimized potassium hydroxide gradient, these species can easily be determined in less than 10 minutes as shown in Figure 3.

The IonPac AS17-C column is also ideal for the determination of anionic additives in personal care products. For example, monofluorophosphate, phosphate, and sulfate found in dental care products can be separated in less than 20 minutes using a simple potassium hydroxide gradient as shown in Figure 4.

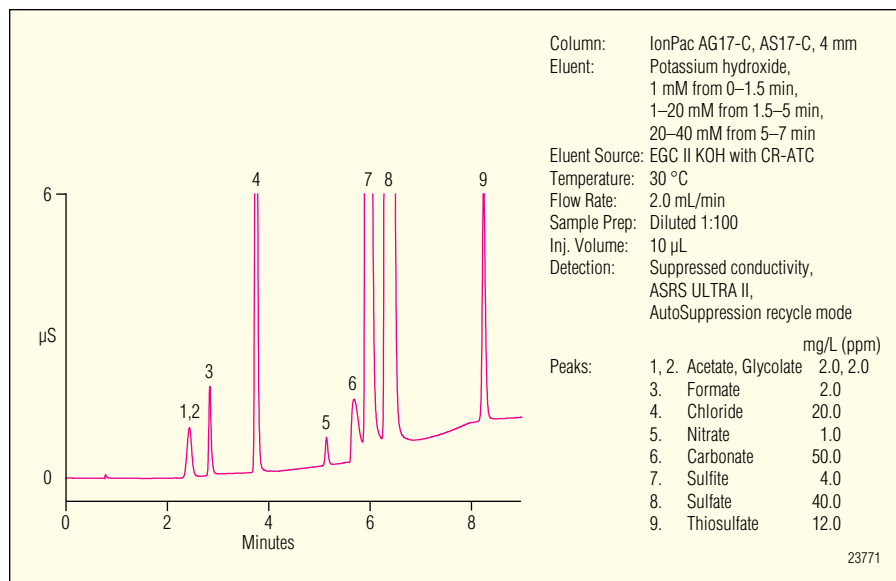


Figure 3. Determination of sulfur species in a simulated industrial waste water sample on an IonPac AS17-C column using a potassium hydroxide gradient delivered by an Eluent Generator.

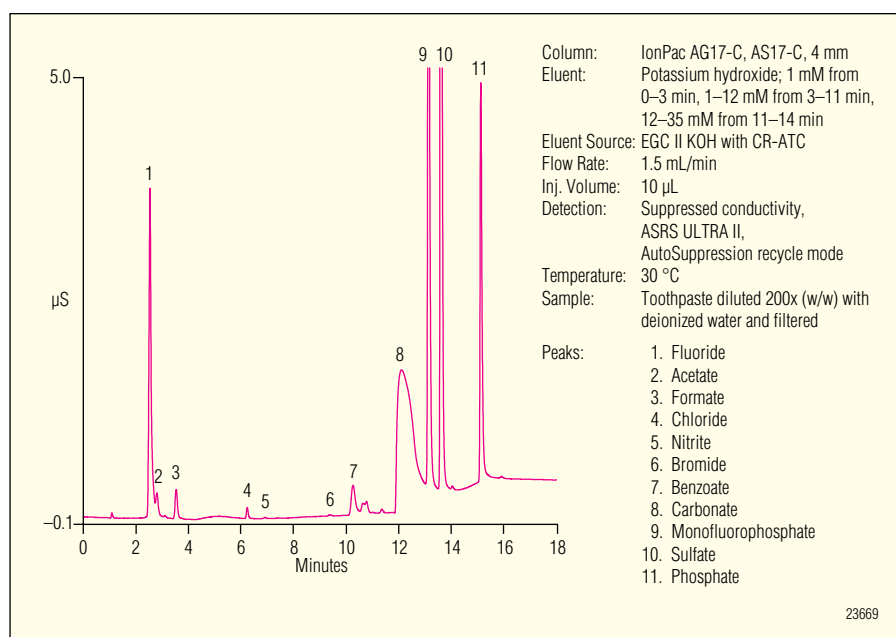


Figure 4. Determination of anionic additives in toothpaste on an IonPac AS17-C column using a potassium hydroxide gradient delivered by an Eluent Generator.

## Gradient Separations as Simple as Isocratic Runs with the Eluent Generator

The Eluent Generator produces high purity potassium hydroxide eluent electrolytically from water, eliminating the need for eluent preparation. The potassium hydroxide eluent produced is free of carbonate contamination. The use of carbonate-free hydroxide eluents results in minimal baseline shifts when using hydroxide gradients, which in turn yields greater retention time reproducibility, lower background conductivity, and lower detection limits for target analytes. Figure 5 illustrates the separation of common anions using a potassium hydroxide gradient delivered with the Eluent Generator. The common inorganic anions can easily be determined within 10 minutes.

## Inorganic Anions in Drinking Water and Waste Water

The IonPac AS17-C column can be used for compliance monitoring of drinking water and waste water, and it meets the requirements of U.S. EPA Method 300.0 Part A. As shown in Figure 5, fluoride is well resolved from the system void and can be quantified at very low concentrations. Low levels of inorganic anions are also easily determined in drinking water and bottled drinking water samples as shown in Figure 5. Carbonate is well resolved from chloride and sulfate and does not interfere with quantification of these analytes.

## Expanded Anion Analysis Using Gradient Elution with the Eluent Generator

The AS17-C column provides excellent separation of a variety of ions including inorganic anions, oxyhalides and organic acids using a hydroxide gradient. Weakly retained organic acids such as acetate, propionate, and formate are resolved using an isocratic hydroxide eluent, and the inorganic anions and oxyhalides are separated with a hydroxide gradient. Figure 6 shows the separation of inorganic anions, oxyhalides and organic acids in a simulated water

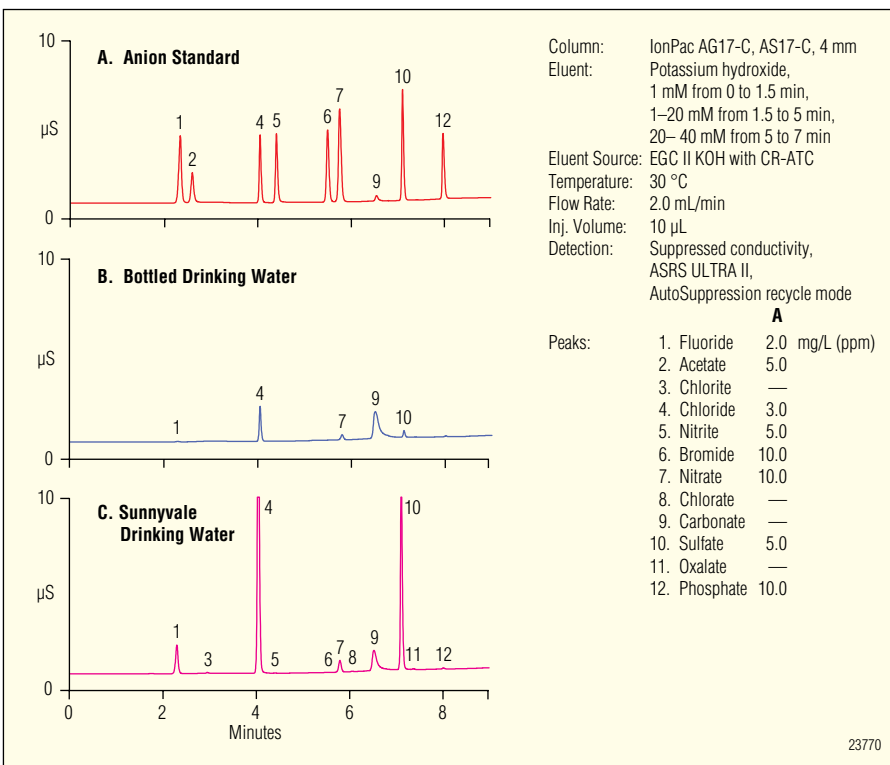


Figure 5. Determination of inorganic anions in drinking water samples on the IonPac AS17-C column using a potassium hydroxide gradient delivered by an Eluent Generator.

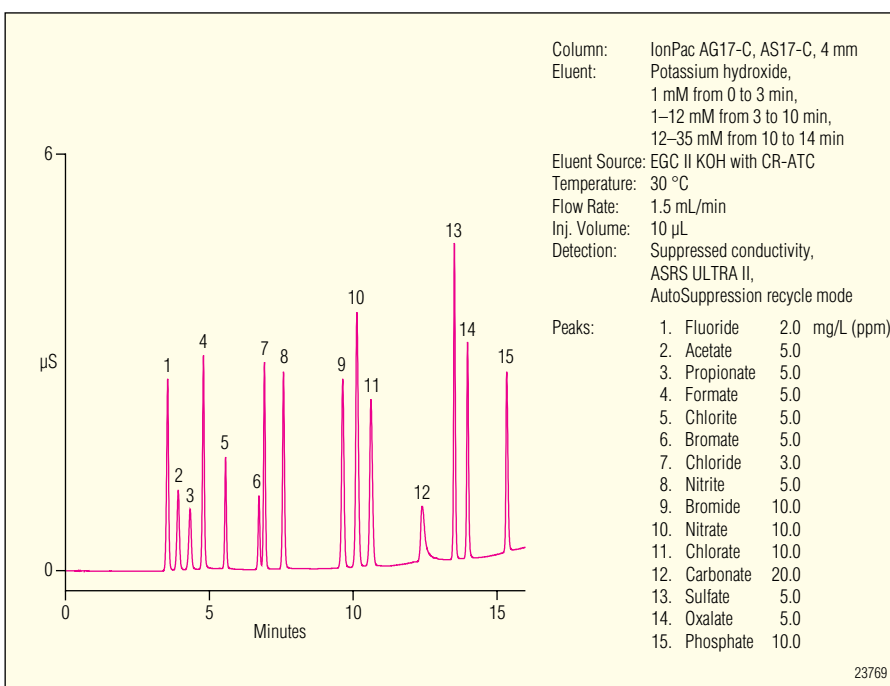


Figure 6. Anion separation including oxyhalides on an IonPac AS17-C column using a potassium hydroxide gradient delivered by an Eluent Generator.

sample. Using a potassium hydroxide gradient, these anions are easily separated in less than 20 minutes.

## SPECIFICATIONS

### *Dimensions:*

IonPac AS17-C Analytical Column: 2 × 250 mm and 4 × 250 mm

IonPac AG17-C Guard Column: 2 × 50 mm and 4 × 50 mm

### *Maximum Operating Pressure:*

4000 psi

### *Mobile Phase Compatibility:*

pH 0–14; 0–100% HPLC solvents

### *Substrate Characteristics:*

Bead Diameter (µm): 10.5 µm

Crosslinking (%DVB): 55%

### *Latex Characteristics:*

#### *Functional Group:*

Alkanol quaternary ammonium ion

Latex Crosslinking: 6%

Latex Diameter: 75 nm

Hydrophobicity:

Low Hydrophobic

### *Capacity:*

7.5 µeq (2 × 250 mm analytical column)

1.5 µeq (2 × 50 mm guard column)

30 µeq (4 × 250 mm analytical column)

6 µeq (4 × 50 mm guard column)

### *Column Construction:*

PEEK with 10-32 threaded ferrule-style end fittings.

All components are nonmetallic.

## Ordering Information

### System Recommendations

The AS17-C column is recommended for use with ICS-2000 or ICS-3000 IC Systems equipped with an Eluent Generator. The AS17-C can be used with older Dionex IC Systems equipped with an Eluent Generator or an RFC-30 Reagent Free Controller. The Eluent Generator is used to automatically produce potassium hydroxide gradients from deionized water.

It is recommended to use the IonPac AS17-C column at an elevated temperature (30 °C) to ensure reproducible retention times.

### Suppressor Recommendations

For optimum ease-of-use and economy, the IonPac AS17-C column should be used with the ASRS Anion Self-Regenerating Suppressor, ASRS-ULTRA II.

### Concentrator Columns

For concentrator work, use the IonPac AG17-C guard column, UTAC-ULP1 or UTAC-XLP1 Ultra Trace Anion Concentrator Columns, or TAC-ULP1 Trace Anion Concentrator Column, TAC-2 when a single piston pump such as the DQP or DXP pump (pulse damper required) is used for sample delivery. Use the UTAC-LP1 Ultra Trace Anion Concentrator Column or TAC-LP1 Trace Anion Concentrator Column when the sample is delivered with a syringe or with a low pressure autosampler such as the AS40.

### Anion Trap Columns

When using the Eluent Generator for eluent delivery, a Continuously Regenerated Anion Trap Column (CR-ATC) should be installed between the EluGen cartridge and the Eluent Generator degas module. As an alterna-

## PART NUMBERS

To order, using the following part numbers, contact your local Dionex office or distributor nearest you. In the U.S., call (800) 346-6390. In other regions, refer to the phone numbers below.

IonPac AS17-C Analytical Column (4 × 250 mm) .....	P/N 066294
IonPac AG17-C Guard Column (4 × 50 mm) .....	P/N 066295
IonPac AS17-C Analytical Column (2 × 250 mm) .....	P/N 066296
IonPac AG17-C Guard Column (2 × 50 mm) .....	P/N 066297
CR-ATC Continuously Regenerated Anion Trap Column.....	P/N 060477
(For use with the EG50, ICS-3000, or ICS-2000 with built-in CR-TC control, EG40 with EG40 CR-TC Add-on Kit or the RFC-30 Reagent Free Controller)	
ATC-3 Anion Trap Column (9 × 24 mm) .....	P/N 059660
(For use with 4-mm or 5-mm columns with conventional proportional gradients)	
ATC-3 Anion Trap Column (4 × 35 mm) .....	P/N 059661
(For use with 2-mm or 3-mm columns with conventional proportional gradients)	
ATC-HC Anion Trap Column .....	P/N 059604
(For use with the EG40 or EG50, if the CR-ATC is not used)	
TAC-LP1 Low Pressure Trace Anion Concentrator (4 × 35 mm).....	P/N 046026
TAC-ULP1 Ultra Low Pressure Trace Anion Concentrator (5 × 23 mm) .....	P/N 061400
UTAC-LP1 Ultra Trace Anion Concentrator- Low Pressure (4 × 35 mm) .....	P/N 063079
UTAC-ULP1 Ultra Trace Anion Concentrator- Ultra Low Pressure (5 × 23 mm) .....	P/N 063475
UTAC-XLP1 Ultra Trace Anion Concentrator- Extremely Low Pressure (6 × 16 mm) .....	P/N 063459

tive, an Anion Trap Column (ATC-HC) can be installed between the pump outlet and inlet of the EluGen Cartridge in the Eluent Generator Module.

When running sodium hydroxide gradient anion exchange applications on the AS17-C using hand-prepared bottled eluents, the ATC-3 Anion Trap Column should be installed between the gradient pump and the injection valve to remove anionic contaminants from the eluent.

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