

Determination of Inorganic Anions in Environmental Waters

EQUIPMENT

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[Dionex LC system consisting of:](#)

[Gradient Pump with degas option](#)

[Conductivity Detector](#)

[LC Chromatography Oven](#)

[Autosampler](#)

[PeakNet Chromatography Workstation](#)

System:

Column: IonPac AS18 Analytical, (4 × 250 mm P/N 060549) IonPac AG18 Guard, (4 × 50 mm P/N 060551)

Col. Oven Temp: 30 °C

Flow Rate: 1.0 mL/min

Injection Volume: 25 µL

Elution Type: Gradient

Eluent: 22–40 mM KOH from 7–8 min

Eluent Source: ICS-2000 with CR-ATC

Detection: Suppressed conductivity, ASRS® ULTRA, 4 mm (P/N 053947), AutoSuppression® Recycle Mode, 100 mA current

System Backpressure: ~2500 psi

Run Time: 20 min

Reagent water: Distilled or deionized water, free of the anions of interest. Water should contain particles no larger than 0.20 microns.

Stock standard solutions, 1000 mg/L (1 mg/mL): Stock standard solutions may be purchased as certified solutions or prepared from ACS reagent grade materials (dried at 105°C for 30 minutes) as listed below.

Bromide (Br) 1000 mg/L: Dissolve 1.2876 g sodium bromide (NaBr CASRN 7647-15-6) in reagent water and dilute to 1 L.

Bromate 1000 mg/L: Dissolve 1.1798g of sodium bromate (CASRN 7789-38-0) in reagent water and dilute to 1 L.

Chlorate 1000 mg/L: Dissolve 1.2753g of sodium chlorate (CASRN 7775-09-9) in reagent water and dilute to 1 L.

Chloride (Cl) 1000 mg/L: Dissolve 1.6485 g sodium chloride (NaCl, CASRN 7647-14-5) in reagent water and dilute to 1 L.

Chlorite 1000 mg/L: Dissolve 1.3410g of sodium chlorite (CASRN 7758-19-2) in reagent water and dilute to 1 L.

Fluoride (F) 1000 mg/L: Dissolve 2.2100g sodium fluoride (NaF, CASRN 7681-49-4) in reagent water and dilute to 1 L.

Nitrate 1000 mg/L: Dissolve 6.0679 g sodium nitrate (CASRN 7631-99-4) in reagent water and dilute to 1 L.

Nitrite 1000 mg/L: Dissolve 4.9257 g sodium nitrite (CASRN 7632-00-0) in reagent water and dilute to 1 L.

Phosphate 1000 mg/L: Dissolve 4.3937 g potassium phosphate (CASRN 7778-77-0) in reagent water and dilute to 1 L.

Sulfate 1000 mg/L: Dissolve 1.8141 g potassium sulfate (CASRN 7778-80-5) in reagent water and dilute to 1 L.

TABLE 1. LINEAR RANGE AND CALCULATED MDLs FOR EACH TARGET ANION WITH PEAK ELUTION ORDER

Analyte	Range (mg/L)	Peak #	Calculated MDL ($\mu\text{g/L}$)
Fluoride	0.1–100	1	2.3
Chloride	0.2–200	2	2.5
Nitrite-N	0.1–100	3	1.6 (5.3 as NO_2)
Bromide	0.1–100	4	5.7
Nitrate-N	0.1–100	5	1.6 (7.1 as NO_3)
Phosphate-P	0.1–100	6	5.3 (16.3 as PO_4)
Sulfate	0.2–200	7	5.1

References:

Dionex Corporation. Application Note 154; Sunnyvale, CA.

Dionex Corporation. Application Note 133; Sunnyvale, CA.

Dionex Corporation. Application Note 135; Sunnyvale, CA.

U.S. Environmental Protection Agency, Office of Water; November 19, 2002.

U.S. EPA method 300.0 The Determination of Inorganic Anions in Water by Ion Chromatography.