

# METHOD STATEMENT



## Determinand:

Determination of Bromide, Chlorate and Chlorite.

## Matrix:

Sample Types: Raw, Potable, Surface and Ground waters.

## Principle of Method:

This method applies to the Thermo Scientific Integrion.

Direct Injection Ion Chromatography using an electrolytically generated potassium hydroxide eluent combined with a hydroxide selective column and using suppressed conductivity detection for the determination of chlorite, chlorate and bromide.

## Sampling and Sample Preparation:

Samples are normally collected in 250 ml or 300 ml amber glass bottles. No special preservation is required

If analysis cannot be immediately undertaken, samples should be stored at a temperature of  $3 \pm 2^{\circ}\text{C}$  until the day of analysis. Samples should be warmed up to room temperature prior to analysis and analysed within the following days of the sampling date.

- Bromide 31 days
- Chlorate 19 days
- Chlorite 19 days.

## Interferences

High concentrations of chloride, sulphate and other anions can cause poor chromatography including poor peak resolution and column overload. Metals in high concentration can irreversibly damage the analytical column set.

## Performance of Method:

### Range of Application:

Chlorate LOQ - 500  $\mu\text{g/l}$  as  $\text{ClO}_3$

Chlorite LOQ - 500  $\mu\text{g/l}$  as  $\text{ClO}_2$

Bromide LOQ - 500  $\mu\text{g/l}$  as Br

The analytical range may be extended by sample dilution. Samples with a concentration higher than that of the top standard of 500  $\mu\text{g/l}$  should be diluted with deionised (Milli-Q) water.

### Limit of Quantification:

Determinand $\mu\text{g/l}$	Thermo Scientific Integrion		
	Quantification Limit ( $\mu\text{g/l}$ )		Reporting limit ( $\mu\text{g/l}$ )
	DNX_3 - asset 2734	DNX_5 - asset 3214	
Chlorate	5.05	2.96	5.1
Chlorite	4.96	4.39	5.2
Bromide	8.87	2.75	8.9

### Recoveries of Compounds:

Thermo Scientific Integrion - DNX3

	Bromide	Chlorate	Chlorite
Soft Water	99.47	100.47	94.95
Medium Water	99.76	99.80	90.08
Hard Water	99.47	99.76	92.32
Raw Surface	98.87	95.92	94.16

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Raw Borehole	102.37	98.94	98.77
Bottled Water	99.70	98.47	97.04

Thermo Scientific Integrion - DNX5

	Bromide	Chlorate	Chlorite
Hard Water	100.65	105.69	103.36

## Bias, RSD and Uncertainty of measurement:

Thermo Scientific Integrion-DNX3

	Concentration $\mu\text{g/l}$	% Bias	% RSD	% Uncertainty
Bromide	400	0.55	2.00	$\pm 10.526$
Chlorate	400	0.05	2.19	$\pm 11.583$
Chlorite	400	0.26	2.06	$\pm 20.009$

Thermo Scientific Integrion-DNX5

	Concentration $\mu\text{g/l}$	% Bias	% RSD	% Uncertainty
Bromide	400	2.12	1.71	$\pm 5.595$
Chlorate	400	2.30	1.84	$\pm 12.381$
Chlorite	400	3.35	1.80	$\pm 7.835$

## References:

Determination of Disinfection By-product Anions and Bromide in Drinking Water Using A Reagent Free Ion Chromatography System Followed by Postcolumn Addition of an Acidified Online Generated Reagent for Trace Bromate Analysis. Application Note 171, Dionex Corporation.

Water Quality-Sampling-Part 3: Guidance on the Preservation and Handling of Water Samples. BS EN ISO 5667-3-2018.