

METHOD STATEMENT

Determinand:

Reactive Aluminium

Matrix:

Final Effluents and Receiving Waters

Principle of Method:

Reactive aluminium (also called active aluminium, ionic aluminium or free aluminium) is that which is present as free ionic species and is therefore able to react readily with other substances. Reactive aluminium is considered to be more of an environmental issue than other aluminium forms such as water insoluble species. By definition, all reactive aluminium will be water soluble. Due to the reactive nature of the analyte, speed of analysis is important.

Samples should be delivered to the laboratory as soon as possible, where a portion of the sample is reacted with pyrocatechol violet in a solution buffered to pH 6.1

This reaction forms a blue colouration that is measured spectrophotometrically at 570nm. The intensity of the blue colour is proportional to the concentration of reactive aluminium in the sample. Thus, by comparison with standard solutions containing known amounts of reactive aluminium, the concentration within the sample can be calculated.

This is an empirical test, where the volume of sample analysed, the ambient temperature and the colour development time dictates the values obtained.

Sampling and Sample Preparation:

Ideally, samples should be filtered through a 0.45µm filter at the point of sampling. Where this is not practicable, sufficient sample should be filtered immediately upon receipt at the laboratory. A volume of 10ml is needed for each analysis, so a minimum of 30ml is recommended to give sufficient sample for three analyses.

Samples should NOT have been preserved with acid.

Interferences:

Iron is known to interfere, but the interference suppression reagent minimises these effects. The method is empirical, so sample temperature and colour development time will affect the value obtained. The method is presented such that these variables are controlled.

Performance of Method:

Automated Konelab Analysis

Determinand	Range of Application	Normal Reporting Level	LOD
Reactive Aluminium	4 to 200 µg/l	4 µg/l	2.94

Determinand	Low standard		High standard	
	Tot. RSD %	Bias %	Tot. RSD %	Bias %
Reactive Aluminium	3.94	-5.41	1.59	-0.40

Determinand		Finham FE		Stanley Surface water
		20%	80%	80%
Reactive Aluminium	%RSD	4.75	4.66	4.83



METHOD STATEMENT

Uncertainty of Measurement:

The reported uncertainty is an expanded uncertainty calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.

Determinand	Uncertainty of Measurement (%)
Reactive Aluminium	7.51

References:

Thermo Scientific Method ALU001 – Active aluminium

Aluminium speciation in effluents and receiving waters. M J Gardner and S D W Comber, *J. Environ. Monit.*, 2003, **5**, 902-905

National Laboratory Service. Method SX I – Active Aluminium, *July 2007, Issue 1*, R McFarlane and R Carter.

