

# METHOD STATEMENT

**Determinand:**

Methylene blue active substances (anionic detergent)

**Matrix:**

Leachates, effluents and waste waters

**Principle of Method:**

In aqueous solution, methylene blue reacts with anionic-type surface materials to form a blue salt. This salt is extracted into chloroform, where the intensity of colour is measured at a wavelength of 650nm. The intensity of the colour is directly proportional to the concentration of anionic surfactant present and is quantified by comparison with standard solutions.

As other substances can give a similar reaction with methylene blue, the analysis is more correctly referred to as Methylene Blue Active Substances (MBAS).

The instrument will automatically calculate and produce results as sodium lauryl sulphate. The most commonly requested alternative surfactant is Manoxol-OT.

**Sampling and Sample Preparation.**

There is no clearly beneficial preservative for MBAS analysis as the method will detect a range of chemicals rather than a single analyte. Consequently, any preservative may be beneficial to some chemicals but detrimental to others. Samples should be analysed as soon after receipt as possible to minimise loss of analyte. Formaldehyde may be added to a final concentration of 1% to sterilise the sample and thus prevent bacterial degradation.

Samples are stable for 2 days (ISO 5667:3) from sampling.

**Interferences:**

Substances such as organic sulphonates, sulphates, carboxylates, phenols, inorganic thiocyanates, cyanates, nitrates and chlorides will alter the transfer characteristics of the methylene blue into the chloroform layer. This is partly compensated for by standardising the sample ionic concentration with the buffered methylene blue reagent, but excessively high dissolved solids within a sample may not be completely compensated for.

**Performance of Method:**

Range of Application: 0.21 to 5mg/l as Sodium Lauryl Sulphate  
 Limit of Detection: 0.2034 mg/l as Sodium Lauryl Sulphate  
 Normal Reporting Limit: 0.21mg/l as Sodium Lauryl Sulphate  
 0.33mg/l as Manoxol – OT

Determinand	Low Standard		High Standard	
	Tot. RSD %	Bias %	Tot. RSD %	Bias %
Anionic Detergents	9.07	-3.10	5.30	4.00

Determinand		Finham FE		Wolston FE		Barston FE	
		Low	High	Low	High	Low	High
Anionic Detergents	% RSD	9.48	3.61	9.45	6.62	7.07	3.96
	% Rec.	91.3	91.4	94.1	91.5	93.8	90.9



# 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 (%)
Anionic Detergents	27.93

## **References:**

Environmental protection agency, methods for chemical analysis of waters and wastes, 1983.

Standard Methods for the examination of water and wastewater, 17th edition, 1989. ASTM, 1990

14.3 International Organisation for Standardisation, ISO-5667-3

Methods for the Examination of Waters and Associated Materials. Analysis of Surfactants in Waters, Wastewaters and Sludges 1981, method A2. ISBN 01175 16058

