METHOD STATEMENT

Determinand:
Dissolved oxygen

Matrix:
Ground waters, leachates, effluents and waste waters

Principle of Method:
Dissolved oxygen is determined using the Winkler titration method. Samples are fixed on site using manganese(ii)chloride and alkaline iodide-azide solution. The former converts to manganese(ii)hydroxide which reacts rapidly and quantitatively with the oxygen to form manganese(iii)hydroxide which is a brown precipitate. At the laboratory the precipitate is dissolved with phosphoric acid and iodine is released into solution. The iodine is determined titrimetrically using sodium thiosulphate.

Oxygen saturation % can be estimated from dissolved oxygen concentration. For the purpose of this calculation, pressure and temperature are not routinely accounted for. An assumption is made that typically water will contain 12 mg/l dissolved oxygen and oxygen saturation is calculated as a percentage of that. In reality, dissolved oxygen levels greater than 12mg/l are possible; therefore oxygen saturation values greater than 100% are also possible. Where sampling temperature is provided, the oxygen saturation % can be corrected accordingly. Oxygen saturation % is not UKAS accredited.

Sampling and Sample Preparation:
Samples are fixed on site using manganese (ii) chloride and alkaline iodide-azide solution.
Samples are stable for 4 days (ISO 5667:3) from sampling.

Interferences:
No specific information available.

Performance of Method:
Performance characteristics have not been determined due to the nature of the test.

Range of Application: 0.5 to 12.0 mg/l
Normal Reporting Level: 0.5 mg/l

Dissolved oxygen	Oxygen stripped Final effluent	Oxygen saturated Final effluent	Groundwater
Concentration, mgO/l	0.25*	8.41	8.44
Total Standard Deviation, mgO/l	0.07	0.39	0.09
Bias, %	-69.2	-8.6	0.5

* N.B. Values obtained are below the reporting limit for the method.

References:
5 Day Biochemical Oxygen Demand (BOD_5), Second Edition 1988 (with amendments to Dissolved Oxygen in Waters). HMSO, Methods for the Examination of Waters and Associated Materials ISBN 011 7522120.

Dissolved Oxygen in Natural and Waste Waters 1979. HMSO, Methods for the Examination of Waters and Associated Materials ISBN 011 751442 X.