



METHOD STATEMENT

Determinand:

Electrical Conductivity

Matrix:

Surface water, Ground water, Potable Water

Principle of Method:

The electrical conductivity of a solution depends upon the concentration of dissociated ions in solution and the temperature of that solution. The concentration of these ions will affect the current flow between two electrodes. The magnitude of this effect is directly proportional to the concentration of ions present, assuming a constant temperature. Consequently, after calibration with suitable standards and with the use of a temperature probe to correct for temperature differences between standards and samples, the electrical conductivity of a solution may be measured.

Sampling and Sample Preparation:

Samples are normally collected in 500 ml PET bottles. Other size PET bottles are also suitable. No special preservation is required.

If analysis cannot be immediately undertaken, samples should be stored at a temperature of 1 - 5°C until the day of analysis.

Analyte	Maximum period of analyte stability	Source
Conductivity	23 days	In-house data

Interferences:

If oil or grease is present in the sample the electrode may become coated, this could cause measurement errors.

The electrical conductivity measurement is temperature corrected by the instrument. However, large deviations between sample temperature and standard temperature (greater than 5°C) may lead to inaccuracies during the compensation. Whenever possible, ensure that the samples and standards are at room temperature during measurement.



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Performance of Method:

Range of application:

The range of application is routinely LOQ to 1276 $\mu\text{S}/\text{cm}$, however this range may be extended by the use of appropriate check standards up to 4523 $\mu\text{S}/\text{cm}$ if this check standard shows satisfactory performance.

Instrument	75.8 $\mu\text{S}/\text{cm}$ Standard		650 $\mu\text{S}/\text{cm}$ Standard		11664 $\mu\text{S}/\text{cm}$ Standard	
	%RSD	% Recovery	%RSD	% Recovery	%RSD	% Recovery
Meter 14	3.44	96.36	2.92	98.28	1.16	99.25
Meter 173	2.27	100.23	1.74	100.37	0.69	97.72

Sample Type	Meter 14		Meter 173	
	Mean sample result ($\mu\text{S}/\text{cm}$)	RSD %	Mean sample result ($\mu\text{S}/\text{cm}$)	RSD %
Potable. Sheffield tap (soft)	155.645	4.51	256.364	2.95
Potable. Wakefield tap (medium)	241.773	5.46	512.636	2.89
Potable. Otterbourne tap (hard)	532.864	3.77	543.545	1.40
Surface. Itchen river	511.500	5.13	507.727	2.23
Groundwater. Otterbourne combined borehole	494.409	3.39	520.045	2.37

Limit of Quantification:

Statistically obtained limits of quantification from re-evaluation (11/06/21): -

Asset No. 14: - 0.815 $\mu\text{S}/\text{cm}$.

Asset No. 173: - 1.399 $\mu\text{S}/\text{cm}$.

The reporting limit is 1.4 $\mu\text{S}/\text{cm}$

Uncertainty of Measurement:

The Uncertainty of Measurement values are available on request

References:

The Measurement of Electrical Conductivity and the Laboratory Determination of the pH Value of Natural, Treated and Waste Waters 1978. Methods for the Examination of Waters and Associated materials. (HMSO). ISBN 0117514284.

Jenway Conductivity meter model 4510 instruction manual.