

# METHOD STATEMENT

**Determinand:**

Manual determination of pH

**Matrix:**

Sample Types: Raw and Potable waters.

**Principle of Method:**

This method uses a Jenway model 3510 pH meter and a suitable pH electrode.

The pH of a solution is defined as the negative logarithm to the base 10 of the hydrogen ion concentration. pH is measured in moles per litre, although by convention results are quoted without units.

The pH of a solution is determined by measuring a series of electromotive forces (EMF) created in and around the pH electrode. The electromotive forces create a potential difference between two electrodes and this difference is measured by a high impedance voltmeter (the pH meter). In acid solution the H<sup>+</sup> ions permeate the glass membrane of the electrode causing a positive potential on the indicator electrode. In alkaline solution H<sup>+</sup> ions leave the electrode and leave an excess of OH<sup>-</sup> ions within the electrode causing a negative potential on the indicator electrode. It is this potential difference between the indicator electrode and reference electrode that is measured by the pH meter and converted to a pH result. A more extreme pH result is given when the potential difference is greater because of a greater exchange of H<sup>+</sup> ions.

**Interferences:**

Loss of linearity may occur at extreme high pH's (>10.0) or low pH's (<2.0). These extremes are unlikely to be found in Potable waters.

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

Temperature significantly effects pH measurement. Although the instrument compensates for temperature by automatic adjustment, all samples and standards should be analysed at room temperature.

**Performance of the Method:**

**Range of Application:**

A calibration range of 4.0 to 10.0 is obtained using three calibration standards. The calibration range is extended by using a pH 12.0 buffer when necessary.

There is no reporting limits associated with pH and a summary of the performance testing details are documented in the table below.

**pH METER 1 (Asset No 1538 )**

Sample type	Mean sample result	Precision (St)
Potable. Langsett (soft)	6.94	0.019
Potable. Wakefield (medium)	7.58	0.024
Potable. Elvington (hard)	8.07	0.030
Nutwell No 3 Borehole	8.53	0.026
Elvington WTW Raw	8.18	0.024

**pH METER 2 (Asset No 1120)**

Sample type	Mean sample result	Precision (St)
Potable. Bridgend (soft)	7.67	0.048
Potable. Wakefield (medium)	7.61	0.045
Potable. Coventry (hard)	7.66	0.041
Raw. Derwent at Elvington	8.32	0.021



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***Limit of Detection:***

Not applicable to this test

**References:**

Determination of pH in Low Ionic Strength Waters 1988. Methods for the Examination of Waters and Associated materials.(HMSO). ISBN 0117520845

