## Some More Hints

Ensure that the temperature of all standards and samples are the same to reduce errors.

Using a magnetic stirrer for laboratory analysis is recommended but not essential. It is however important to ensure the solution is homogeneous and a stirrer will help to achieve this.
NOTE: DO NOT stir during measurements.

Prior to sample measurement ensure that the electrode is thoroughly rinsed with deionised water. It is worth performing this rinse twice given the possibility of carryover being greatest in high concentration solutions. Before reading sample values it is a good idea to rinse with sample in a seperate beaker.

Prepare standards by serial dilution.

Make sure your electrode is conditioned by leaving the tip in the lowest concentration standard for 1 hour prior to analysis.

## Methods of Analysis

Direct Potentiometry is described under operation. This method is simplified by using a direct reading ion meter. There are several other methods, which are useful.

**Known Addition**: An incremental technique where the potential of the sample solution is measured followed by addition of a small volume of a higher concentration standard solution.

**Sample Addition**: An incremental technique where the potential of a dilute standard solution is measured followed by the addition of a small volume of more concentrated sample.

**End Point Titration**: ISE's are ideal end point indicators and will produce a significant potential change at the equivalence point. The Ion in question must be contained in the titrand or the titrant and must therefore be in excess or absence at the end point.

## Specifications

| | |
|---|---|
| Overall length | 155 mm |
| Body Diameter | 12 mm |
| Cap Diameter | 16mm |
| Connector | S7 |
| Resistance at 25°C | < 5 Meg Ohm |
| Concentration Range | 0.02-17000ppm |
| Slope | 54 to 59 mV/decade |
| Potential Drift Operating | 2 mV per day |
| pH range | 11-13pH |
| Temperature range | 5 to 50°C |
| Endpoint time | Typically 10-60 seconds |
| Interferences: Ions with coefficients above 0.001 | Hydrazine |
| Reference Type | Single Junction Ag/AgCl |

S7 Connector can be connected directly to TRUEscience cap or used with an adapter cable for other meters. See our website for details..

Refillable membrane cap


The TRUEscience cap is ideal for multiple measuring up to six different parameters at the same time. It simply clips onto your beaker and can measure pH, Redox,Dissolved oxygen or specific ions simultaneously on an Android Tablet

info@truescience.co.uk
+44 (0) 1954 233 144

# 1140989 - Ammonia ISE
# Instruction Manual



Camlab Ltd, Norman Way Industrial Estate, Over, Cambridge, CB24 5WE, England


www.truescience.co.uk

## Ammonia ISE

The TRUEscience Ammonia ion selective electrode is a traditional pH glass sensor with a refillable membrane cap. When the membrane (which is fixed into a detachable cap) is tightened against the glass electrode, a thin layer is produced and this thin layer acts as a sensor responding to changes in the partial pressure of ammonia in a sample solution.

This electrode does not have the solid state advantage of the Ammonium ISE 1140988 but is able to detect dissolved Ammonia down to around 50ppb. The electrode is designed for the detection and analysis of Ammonia ions in aqueous solutions and is suitable for use in the field, in the laboratory, and in on-line analysers.

### Installation

The ammonia electrode kit consists of the ammonia electrode, two caps with fixed gas-permeable membranes and a filling solution. Assembly for use is as follows:

❶ Fix the membrane cap to the body covering the face of the flat pH electrode and screw it about two-thirds on to the thread.
❷ Fill the electrode with 3-4ml of filler solution.(0.1M Ammonium Chloride)
❸ Tap the electrode gently while upright to move any air from between the membrane and the pH electrode.
❹ Tighten up the cap, until pressure on the membrane is felt (finger-tight).

Connect the ISE directly to the TRUEscience SMART cap or to a mV or ion meter using an appropriate adapter cable.The ISE can be used immediately but pre soaking for 5 minutes in a 100ppm Ammonia standard solution is recommended.

The ionic strength of the standards and solutions should be kept constant between all standards and samples. This is achieved by the simple addition of a Ionic Strength Adjustment Buffer(ISAB). For successful operation NaOH ISAB should be added to the samples and standards to ensure all the Ammonium is converted to $NH_3$. The analysis is best done in 100ml conical flasks to reduce the loss of $NH_3$ gas

In principle the Ammonia penetrates the membrane and causes a change in the pH of the internal solution locally at the interface. This pH change is directly proportional to NH3 concentration.

No temperature correction is necessary however standards and samples should be measured at the same temperature.Begin calibration from the lowest concentration standard to avoid cross contamination. Calibration should cover the anticipated range of the samples.

Rinse tip with deionised water between measurements. Avoid strongly acidic samples, strong detergents and organic solvents.

## Storage and Maintenance

After use rinse with deionised water, wipe clean with a tissue or lint free cloth and store dry in its box.

### Tips For Successful Analysis

TRUEscience ISE's are designed to be used with the TRUEscience SMART Cap but can be used with any pH/mV meter or Ion meter. You will require an adpater cable with an S7 female to the connector type for your meter. This is usually BNC or DIN and these cables are available from your TRUEscience distributor.

Meters with a 0.1 mV resolution are recommended whilst dedicated Ion meters will provide direct concentration readouts saving time and effort in constructing calibration curves and performing calculations. Your TRUEscience distributor can advise on the most suitable meter.

### Required Solutions

*Distilled or deionised water* will be required to prepare Standards, ISABs and to rinse the electrode between measurements.

*1000 ppm Stock Standard solution*. Used for preparation of Standards. (Prepared by customer)

*ISAB*. Used to adjust the Ionic strength of all standards and samples. Typical addition is 1 ml of ISAB to 50ml of all standards and samples.

## Operation

❶ Connect the electrode to the meter being used for analysis.

❷ Prepare a series (at least 2) of standards that bracket the expected sample concentration. This is best done by serial dilution of the stock solution. Ideally standards should be a decade in concentration apart e.g. 1, 10, and 100 ppm.

❸ Dispense 50 ml of each standard into analytically clean beakers. (100 to 150 ml size is perfect)

❹ Add ISAB in the appropriate ratio. As a guide with sample concentrations in the 1 to 1000 ppm range 1ml of a 2 Molar ISAB to 50 ml sample is satisfactory.

❺ Rinse the electrode with deionised water and blot dry with a lint free cloth and place in the lowest standard. When the reading is stable record the mV value.

❻ Repeat step ❺ for all subsequent standards proceeding from lowest to highest.

❼ Use an ion meter to create a calibration curve or plot a calibration curve on semi log paper using mV values on the linear Axis and concentration on the log scale. Note that towards the end of the scale the curve is not linear.

❽ Rinse the electrode in deionised water and blot dry. Place the electrode in the sample and record the stable mV value.

❾ Using the calibration curve determine the unknown sample concentration.

NOTE: The TRUEscience app allows you to save sets of Standard Dilutions ❷ and creates a calibration curve ❼ using your readings ❺❻ . This curve will then be used to calculate your sample readings ❾ and can then be referred to at any point in the future. It also keeps track of the batch of Standard ❷ and ISAB's ❹ used.