

Some More Hints

pH meters often indicate high degrees of resolution such as +/-0.001 pH units. Please be aware that this is not normally possible to achieve in practical use as the electrode and buffers will limit the achievable measurement accuracy usually to around +/-0.02 at best.

For example low priced sticks may only give +/-0.1 pH at best and are usually about +/-0.2. As a high end meter solution TRUEscience is designed to give the maximum accuracy that the electrode and buffers allow (0.02 pH) with a resolution of 0.1 pH

To achieve this it is recommended that you check your calibration each morning or before you take readings if used less frequently. For highly sensitive applications you may wish to calibrate more often for maximum accuracy.

Tips For Successful Analysis

TRUEscience pH electrodes are designed to be used with the TRUEscience SMART Cap but can be used with any pH/mV meter. You will require an adapter 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.

Required Solutions

Distilled or deionised water will be required to rinse the electrode between measurements.

Electrode storage solution is recommended to maintain the salt balance in the electrode. This storage solution also provides a slightly acidic environment for the pH sensing bulb : Storage Solution, Part No: 1145514 (500ml)

Electrode cleaning solution is ideal for cleaning pH electrodes gently but effectively. Part No:1145463 (500ml)

pH Buffers are required for calibration.

Reference Filling Solution - 4M KCL/AgCL

To fill the electrode remove the fill hole plug to reveal the hole in side. Using a small syringe, fill the outer part of the electrode (via the hole) with the filling solution until the filling solution is just level with the hole. Replace the hole plug. Note: Remove hole plug during measurements.

Specifications

Overall length	155 mm
Body Diameter	12 mm
Cap Diameter	16mm
Connector	S7 Male
Range	0 to 14 pH
Body Type	Glass
EO point	-25mV to +25mV
Junction Type	Annular Ceramic
Reference Type	AgCl liquid filled
Temperature range	0 - 80°C
Speed of Response	95% in < 30 seconds



S7 male connector can be connected directly to the TRUEscience cap or used with an adapter cable for other meters using a S7 Female connector. See our website for details.



The TRUEscience cap is ideal for 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



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pH



1201575 - pH
Glass Body

Instruction Manual

pH

These TRUEscience electrodes have a glass body with a single junction liquid filled reference which requires re-filling periodically as the filling solution is designed to migrate through the ceramic junction.

Setup

These electrodes are shipped with the delicate pH sensing end immersed in a soaker bottle containing electrode storage solution. It is important to follow the instructions below when removing the storage bottle to prevent damage to the electrode.

Removing the Soaker Cap Bottle: CAUTION

- ① Unscrew the bottle to release any pressure. Do not attempt to simply pull the soaker off as the negative pressure will damage your electrode.
 - ② Move the white screw cap up the electrode clear of the black sealing ring
 - ③ Gently remove the sealing ring over the electrode tip then remove the white screw cap.
- Once removed retain this bottle for future long term storage of the electrode. Replace in reverse of above instructions.

Before Use:

- During shipment it is possible for air bubbles to move into the glass bulb. To remove any trapped air shake the electrode gently, like a clinical thermometer until the glass bulb fills with solution and no air bubbles can be seen.
- ① Connect the electrode to the SMART Cap following the instructions in the TRUEpH Meter Quickguide.
 - ② Ensure the electrode is calibrated before use.
 - ③ Remove the hole plug before taking measurements and replace again when complete.

Interferences

Certain compounds such as sulphide ions, proteins, TRIS buffers or Orange juice and others can 'poison' the combination electrode reference by reacting with the silver ions in the reference electrolyte. You must avoid using this electrode for solutions of this type. If you need to test solutions that you suspect may poison your electrode you should use a model with a double junction design which protects the main junction through a salt bridge.

Storage and Maintenance

Electrode Storage:

Epoxy pH electrodes should be stored in pH electrode storage solution preferably in a storage tube stand.

Electrode Care & Cleaning:

Slow response and non reproducible measurements are signs that the electrode has become coated or clogged (normally 95% of final reading should be achieved in less than 10 seconds).

Rinsing with IPA or the solvent that dissolves your sample, should remove the coating and restore the speed of the response.

If cleaning the electrode above does not restore the speed of response:

- ① Soak in 0.1M HCl for five minutes.
- ② Remove and rinse with water and place in 0.1M NaOH for five minutes.
- ③ Remove, rinse again and soak in pH 4.0 buffer for ten minutes before recalibration and subsequent use.

If the pH electrode is used above 60°C the outer layer of the glass loses sensitivity:

- ① Prepare a 10% solution of ammonium bifluoride.
- ② Immerse electrode for 10-20 seconds.
- ③ Rinse in water.
- ④ Immerse in 5M HCl for 5 minutes.
- ⑤ Rinse again in water.
- ⑥ Soak in pH 4 buffer for 1 hour before use.

Lifetime:

In normal use you should expect your pH electrode to last 12-18 months. It is possible however to greatly extend this lifetime by following the care instructions above.

Physical shock, 'poisoning' with interfering ions, blocking of surfaces with sticky or adhesive samples or allowing your electrode to dry out will drastically reduce the expected lifetime and may even stop it functioning immediately. In these cases you can try the cleaning and care instructions above or you may need to replace your electrode.

Operation

- ① Connect the electrode to the meter being used for analysis.
- ② Select your pH buffers that bracket the expected pH value. A large range of buffers are available for this purpose.
- ③ Dispense 50 ml of each standard into analytically clean beakers. (100 to 150 ml size is perfect)
- ④ Rinse the electrode with deionised water and place in the buffer indicated by your meter. This is usually a midpoint buffer (7). Stir the buffer gently with a magnetic stirrer or by swirling the buffer around the probe and then wait for the reading to stabilise. When the reading is stable set the value as your first calibration reading. Be careful not to damage the delicate pH sensing bulb which is exposed on this glass body model.
- ⑤ Repeat step ④ for all subsequent buffers as required.
- ⑥ Calibrate your meter as you go using the buffers you have read.
- ⑦ Rinse the electrode in deionised water and blot dry. Place the electrode in the sample and record the stable mV value or pH value.
- ⑧ pH electrodes are temperature sensitive and even a small temperature difference can give a big shift in readings. If your meter does not have automatic temperature compensation (ATC) make sure you have your samples at the same temperature as your calibration buffers.

NOTE: The TRUEscience app creates a calibration curve ⑥ using your readings ④⑤. This curve will then be used to calculate your sample readings ⑦ taking the temperature into account automatically ⑧. This calibration curve can be recalled at any point in the future. The app also keeps track of the user who performed the calibration, when it was done and the batch number of the buffers used ②.