Get the most out of your pH electrode

With careful storage and proper maintenance the life of an electrode will be increased and the accuracy of measurements greatly improved. Various models of both hand held and bench meters are available.

pH sticks

Desktop pH meter

pH sticks

Introduction

pH electrodes are supplied with rubber end caps that protect the bulb and help prevent drying out.

Before using a pH electrode a few simple checks are worthwhile:

- Ensure the rubber cap has been removed.
- Check for air bubbles inside the electrode. Carefully shaking the electrode down will eliminate these.
- Salt deposits around the electrodes are normal and can be dissolved by rinsing with deionised (not distilled) water.
- Do not wipe the electrode as this can create static charges that will interfere with the pH measurement.

When using the electrode, store it in a pH4 or pH7 buffer solution between readings to prevent it drying out.

Storage and Maintenance

- Due to the nature of its construction, a pH electrode should be kept moist at all times.
- For long term storage (more than 24 hr), the electrode should be immersed in a storage buffer solution.
- If possible store in a soaker bottle (see Figure 1) as it is possible to form an air lock if using a rubber cap, causing the electrode to dry out.

Recipe for storage solution

For every 100 cm^3 of pH4 buffer solution, add 10 g of KCl. (or see Table 1 for commercial storage solutions).

Figure 1 - Soaker bottle

- Never store the electrode in distilled or de-ionised water as this will cause ions to leak out of the bulb into the surrounding solution and render your electrode useless.
- Never leave the electrode out in the air as it will dry out - even with the rubber cap fitted.
- If the electrode is accidentally stored dry, immerse it for up to 12 hours (or overnight) in the storage buffer solution. Then check its operation.

Cleaning

General

The pH electrode can be cleaned, if necessary, by soaking in a solution of 0.1M HCl or 0.1M HNO_3 for 20 minutes.

Stubborn deposits and bacteria

Soak the pH electrode in a 1:10 dilution of a solution of thin 5% supermarket bleach solution for 10 minutes to remove.

Protein deposits

Soak the pH electrode in a solution of 1% pepsin in 0.1M HCl for 5 minutes to remove residues.

Oil and grease

Rinse the pH electrode in a solution of a mild detergent or methyl alcohol to remove oil and grease.

Mould

This occasionally grows in the storage buffer solution. It will not harm the probe and can be removed with rinsing.

After any of the above cleaning procedures rinse well in deionised (not distilled) water before use.

Figure 2 - Acids and alkalis

Buffer Solutions

Buffer solutions for storing and for the calibration of electrodes can be prepared from bottles, sachets or tablets (Figure 3).

Suppliers' prices for buffers (and specialist cleaning solutions, soaker bottle prices etc.) can be seen in the following table.

Company	Anderson Scientific	DJB	Griffin	Phillip Harris	Scientific & Chemical	Timstar
Catalogue (page no.)	(70)	online www.djb.co.uk	05/06 (468)	07 (723)	07/08 (235)	07 (238)
Buffer Sachets (price/pk)	pk 25 x 20 cm^3 pH4, 7 or 10, **(£13.30)**	pk 5 x 20 cm^3 pH4, 7 or 10, **(£4.40)**	pk 25 x 20 cm^3 pH4, 7 or 10, **(£16.25)**		pk 25 x 20 cm^3 pH4, 7 or 10, **(£17.00)**	pk 5 x 20 cm^3 each of pH4 and 7, **(£10.50)** pk 5 x 20 cm^3 each of pH7 and 10, **(£10.50)**
Buffer Tablets (price/pk)			Pk 50 Tablets pH4, 7 or 9 **(£9.95)**			
Buffer Solutions			Twin neck, Coloured 0.5 l, pH4, 7 or 10, **(£9.60)**		Twin neck, coloured 1.0 l, pH2-10, **(£5.55)** 2.5 l, pH2-10, **(£8.50)** 5 l, pH2-10, **(£15.00)** Certified Solutions 1 l, pH4, 7 or 10, **(£9.70)**	
Cleaning Solutions		460 ml, **(£14.80)**	pk 6 x 80 ml, **(£23.85/pk)**	230 ml, **(£9.00)**		460 ml, **(£15.60)**
Soaker bottles		pk 2, **(£6.20)**	pk 4, **(£18.50)**	pk 4, **(£16.24)**		
pH Storage Solutions			230 ml, **(£8.65)**	230 ml, **(£8.00)**		460 ml, **(£15.90)**

Table 1 - Buffer solutions and storage

pH sticks

Figure 3 - Buffer solutions and tablets