Long live the electrode

The truth about the care and handling of different pH electrodes

1. How often should I calibrate my pH meter?

Probably one of the most common questions we receive, and there is no simple answer we can give.
Directly, from the first time, when the electrodes are switched on, they begin to consume / drift. Consequently, you need to calibrate the pH meter against the electrodes new properties.
Basically it depends on how accurate your test result, the pH must be.
Requires high (0.01pH) accuracy then calibration must be done every day. If the requirements are more normal (pH 0.1), or more of an indication of the pH level, so no need to recalibrate as often.
If the measurement result differs from the expected, you had to do a calibration.
After replacing the batteries or sensor to the meter, always calibrate.

2. How do I calibrate my pH meter?

Most pH meters work the same way but you should always check what is written in its manual.
A general overview of the calibration is below.

Place the instrument in calibration mode either by pressing the CAL or press and hold the on / off button until CAL is displayed. Then, most pH meters require the use of buffer solution pH 7.01 and all meters must be calibrated against pH 7 buffer first.

Place the electrode in buffer solution pH 7 so that the lower 3 centimeters of the electrode is below the surface. Hanna Instruments pH meter is programmed to automatically recognize a number of buffers (check the product specification for the buffer solutions that apply). When the meter is waiting for the measurement to stabilizes, a clock icon or hourglass icon is flashing. If the meter / electrode do not recognize the buffer, the message ERROR (WRONG) appears on the screen. When the meter / electrode have stabilized, it will automatically calibrate itself.

The meter will then request the next buffer solution. The displays now, use the buffer pH 4.01 (or pH 10.01). Remove the electrode from the buffer pH 7 solution and rinse it under running water (or deionized water) and place the electrode in buffer pH 4 solution. Once again, the meter will show a flashing clock / hourglass icon until the meter stabilized.

When the meter accepted calibration, it shifts immediately to the measurement.

3. pH electrode's life-span?

Below we give some practical tips on how to extends the life of your pH electrode

The life of a pH electrode is dependent on a number of factors.
- Is it suitable for the particular application?
- Exposure to adverse temperatures?
- Used in extreme chemicals during tests?
- From acidic to alkaline?
- Proteins?
- How much is it used?
- Care and maintenance of the electrode.

Right electrodes from the beginning:
First, we note the importance of choosing / using the right electrode.
There is a wide choice of electrodes with different characteristics. Be sure to select electrodes that are appropriate for your needs. We are happy to help with suggestions, so you end up right from the start.

Temperatures.
An electrode used in low or high temperatures are consumed faster than if the measurement is done in normal temperatures 15 to 35 °
C. Therefore, try as far as possible to measure under these conditions.

Acid and alkaline.
If the electrode is subjected to loads in the form of pH swings, from acidic to alkaline or vice versa, so will electrode contents (electrolyte) be consumed.
Example: To measure pH when it´s low and the next high (from the pH 5 to over pH 9) or vice versa. If this happens regularly, we recommend first and foremost to use different meters, one for high pH and a low pH or alt. pH electrode with refillable electrolyte.

Proteins.
It is particularly difficult to measure the pH of the protein-rich environments, such as food, beauty creams, meat, etc.
Proteins very easily make the electrode dirty (clogging) and makes it slow. Clean the electrode thoroughly with a cleaning fluid especially for proteins. HI 7073

How often do you measure?
The lifetime is affected by how often you measure. Especially when you are measuring in solutions that are troublesome, see Sections temperature, acid and alkaline and proteins.

Care and maintenance.
In addition to rinsing the electrode in water after use, is the best way to get the electrode thoroughly clean using a Hanna Instruments special cleaning solutions. There are cleaning solutions for specific areas, such as our protein cleaning solution, ideal for anyone who makes pH measurements in food products, while our oil / grease cleaning solution will remove oil and grease deposits from the measuring body of the electrode, which otherwise would have longer response time.
• HI 7061 cleaning solution generalized
• HI 7073 cleaning solution for protein
• HI 7074 cleaning solution for inorganic
• HI 7077 cleaning solution for oil and grease
• HI 70630 Cleaning Solution for Food

Storage
Always store the electrode in storage solution (KCl) or storage solution HI-70300
For a pH electrode to provide the best response time and accuracy, the electrode must be kept wet. The reason for this is that it requires a constant ion concentration to keep the lead "loaded" and ready for use.
The perfect solution for this is Hanna Instruments HI 70300 storage solution, which not only keeps the electrode in its optimal ionic level, but also inhibits the growth of bacteria and algae.
This gives the electrode a "sleep mode" that prolongs its life. (The electrode measures also in inactive storage).Never use distilled / deionized water.

Lifetime
Typically, electrodes used for measuring in water are expected to have between 1 and 3 years of life. An electrode for continuous monitoring, on the other hand, may last for 12-18 months.
The electrode life can be even shorter because of substances that are particularly aggressive, or if the temperature of the solution is particularly high or low.

4. What buffer should I use for calibrate?

In 99% of the cases use pH 7 and pH 4 buffer solutions, they are the two that you need to perform a calibration. If you mostly measuring alkaline solutions, you can use the buffer pH 7 and pH 10. Buffer pH 10 is not as stable as a buffer solution pH 4, it therefore has a much shorter consumption time, once exposed to air.

5. Why do pH electrodes have tips with different shapes?

pH is a critical parameter for a wide variety of applications. Everything from ordinary drinking water to food, agriculture, fruit and vegetables, blood, synthetic products and many other areas. Therefore, manufacturers have developed various pH electrodes for a range of uses. This ensures ease of use and longer life for an electrode in a given area. Different types of electrolytes and materials used in electrode construction is also part of its design. Below are some typical points and their uses:

Round tip: it is the most common in the market which is mainly used in laboratories for ordinary liquids.

Tapered tip, its shape can easily be inserted into semi-solids, emulsions, cheese and meat. Mainly used in the food industry.

Flat tip: its design is intended to measure on the surfaces of peel, fruit and vegetable samples in the form of droplets, human skin, etc.
.
Knife Tip: this design allows for the measurement in half-frozen foods, meat, hard to penetrate food products.

There are many other types of tips. These are the most common.

6. What is "Renewable membrane" that Hanna has invented?

Over time, the membrane, which is the most sensitive part of the pH electrode, becomes clogged. This result in electrodes becomes increasingly viscous and eventually impossible to calibrate. With Hanna Instruments renewable membrane can you by using an ordinary pair of tweezers easily pull out 1-2 mm of the fiber strip that protects the membrane and thus literally repairing the pH electrode. This procedure can be repeated up to 15 times, before the entire strip has ended.

7. What is the difference between single- and double-membrane (junction)?

Conventional electrodes normally have a membrane whose function is to set the reference electrode in contact with the sample. Under unfavorable conditions such as high pressure, high temperature, highly acidic or alkaline solutions, etc., the flow of electrolyte through the membrane can go the reversed way and the test solution penetrates the electrode reference system. This then becomes contaminated, leading to that the electrode is destroyed.
Hanna Instruments dual membrane system, has as its name implies, two membranes, with only one of them is in contact with the sample. Under adverse conditions, the tendency is the same as previously described, but as the reference electrode is physically separated from the intermediate electrolyte, an additional membrane, minimizing contamination of the electrode. This leads to longer life of the electrode. The possibility to restore the electrode is also greater if appropriate maintenance action is taken.

Buffer solutions, traceable according to NIST

Article number	Article	Packaging
7004L	pH- buffer solution 4.01pH	500ml Colored Red
7007L	pH- buffer solution 7.01pH	500ml Colored Green
7010L	pH- buffer solution 10.01pH	500ml Colored violet
7004/1L	pH- buffer solution 4.01pH	1 litre Colored red
7007/1L	pH- buffer solution 7.01pH	1 litre Colored Green
7010/1L	pH- buffer solution 10.01pH	1 litre Colored violet
70004P	pH- buffer solution 4.01pH	Disposable bags (25st/fp)
70007P	pH- buffer solution 7.01pH	Disposable bags (25st/fp)
70010P	pH- buffer solution 10.01pH	Disposable bags (25st/fp)

Cleaning Solutions

Article number	Article	Packaging
7061L	cleaning solution-for regular cleaning	500 ml
7073L	cleaning solution for the albuminoidal substances	500 ml
7074L	cleaning solution-inorganic medium	500 ml
7077L	cleaning solution-for oils	500 ml
70630L	cleaning solution-for-food	500 ml

Storage Solution

Article number	Article	Packaging
70300L	Storage solution	500 ml

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