

How to Use A Single Drop to Measuring pH Value with Micro Sample?

When do you need to test pH value with micro sample?

In the laboratory or manufacturing process, samples are sometimes small volumes or expensive ,for example: body fluids (including blood, tissue fluid, sweat, etc.). In order to avoid sample contamination and not affect the following operation of manufacture and raw materials, we always just take a little sample out for testing, sometimes just only a few microliters.



How to test pH value with micro sample?

Traditional pH value test use general glass electrode. It needs a lot of sample, about 20mL. There is special small glass electrode for micro sample pH value test on the market. But the price of these special electrode is up from hundreds of dollars. And you need to maintain and store these glass electrode carfully. Another option is to use pH test paper which can roughly detect pH value with single drop of sample. But if you need accurate measurement result or continuously pH detection is required, electrochemcial single use micro-sample pH strip electrode is also a good third choice. It is low price and no need to maintain. The most important, pH strip electrode just need a few microliter sample for test. The principle of single use micro-sample pH strip electrode is thas no inner reference electrode makeing the pH sensor smaller to the size below 3 mm. Even the volume of sample is just a few microliters, that also can provide the pH test with accuracy of ± 0.1 pH. It is enough to meet the demand of large parts of the pH measurement.



Product/Item	рн 7.10		
Operability	Difficult	Easy	Easy
Accuracy	High	High	Low
Calibration	Needed	No Needed	No Needed
Sample Volume	More(5~10 mL)	Less(10~20 µL)	Less(10~20 µL)
Maintenance	Difficult	Easy	Easy
Cross-contamination	Possible	No Needed	No Needed

The principle of detecting pH value with glass pH electrode

According to Nernst Equation, the H⁺ ion exchange through the glass membrane to produce the inner and outer potential E1 & E2. By measuring the boundary potential (Eb) you will get relation between Eb and pH. <u>Click here to Learn more about Nernst Equation</u>



The principle of detecting pH value with strip pH electrode

The principle of micro pH strip electrode is similar to pH glass electrode. By measuring the potential different, the concentration of the hydrogen ion can be measured and transfered to pH value via Nernst Equation. The diameter of the acid-base detection film of strip pH electrode is below 3 mm. So it just needs very little sample to contact with the sensing layer and gets accurate measurement of the pH value. Even the volum of sample is so small, the accuracy of pH measurement can be ± 0.1 , sensitity can be 0.01. The specification of strip pH electrode is as good as expensive high-end pH glass electrode in the market.



What is the difference between glass pH electrode and micro strip

pH electrode in use and maintenance?

Traditional glass pH electrodes- need calibration

After a period of use, the membrane of the pH glass electrode may be block or be scratched or aging. These will cause the potential shifting, so you need to calibrate the pH system according to the user guide by use frequency and accuracy requirement. Although there are many types of pH meters, most of their calibration methods use a two-point calibration method. Two-point calibration method need two standard pH buffer, one is pH7 standard buffer, the second one is pH10 standard buffer or pH4 standard buffer. First, we use pH7 standard buffer to get first calibration point. And then the second standard buffer is selected according to the sample you will test later. If the sample is acidic, the second standard buffer solution should be pH 4. If the sample is alkaline, choose the standard buffer pH10 to get second calibration point.

How to use pH glass electrode?

1. Remove the pH glass electrode from the storage solution, and check whether there is scratch or bubbles on the surface or in the electrode. If the appearance is OK, wash the salt from the electrode surface with distilled water or the sample liquid, and then blot it dry.

Make two-point calibration for the pH electrode according to the instructions.
Immerse the glass pH electrode and the temperature sensing electrode completely in test liquid , which usually requires 5-20mL of sample.

4. Gently shake the beaker so that the liquid can fully contact the surface of the whole glass pH electrode.

5. If the pH meter has the function of automatic displaying the result, you can get the result when meter show the test is finished. If the meter does not have this function, read the value about 1 minute after the displayed result does not change.

How to maintain and store glass pH electrode?

1. Do not touch the glass electrode surface with your hand. The oil film or scratches on the surface will affect the accuracy of the measurement. The electrode surface should be checked if the surface is scratched or the electrode wire is damaged or not every time before using the glass electrode.

2. Before use, the glass electrode should be thoroughly cleaned with deionized water. Do not wipe the electrode with toilet paper or swab paper, which will cause electrode scratches.

3. The electrodes should be covered and kept moist when you are not using it. It can be stored in saturated potassium chloride solution

4. When glass electrode bulb is contaminated and cause the response time of the electrode get longer. At this time, CCI4 or soap can be used to remove the dirt, and then immersed in distilled water for a day and night for continue use. When the pollution is serious, it can be soaked in 5% HF solution for 10-20 minutes, immediately washed with water, and then continue to immerse it in 0.1 mol/L HCI solution for a day and night.



Micro strip pH electrodes - calibration free

Because of the different principle, the solid electrode is used as reference electrode of strip pH electrode. So the test potential will be stable and be affected by the electrolyte concentration . Therefore, manufacturer can calibrate the strip pH electrode in the factory and then stored in the drying vials for preservation. When you want to use, just take it out of the vial and use directly without calibration. Because of the disposable design, there is also no need to worry about contamination of the electrodes. <u>Recommended reading:</u> Never need to calibrate your pH electrode after reading this article

How to use pH strip electrode?

It is very simple to use the strip electrode to measure pH. Take out the strip from the vial and you can choose following ways to use:

Method 1: Insert strip pH electrode into the meter, drop sample on the strip.

Method 2: Use strip to dip in the sample, and then take it out, insert into the meter and start test.

Method 3: Use cable to connect strip electrode and meter, insert the strip into the port and have a continues test.



Take the pH strip electrode out from the vial.



Measuring method 1 Test by directly dropping samples onto the strip



method 2 Put the pH strip electrode into the sample solution.

How to maintain and store strip pH electrode?

This single-use pH strip electrode could be discard after each test and no need to clean and maintaine. Just place the unused electrode in the vial and keep dry.

