

pH tips and tricks September 2021

You know how to run these tests, but for improved accuracy here are some tips

pH tips and tricks

Store and maintain the probe per the manufacturer specifications (storing them dry or in DI water etc. will shorten the lifetime and require re-conditioning before using again).

Calibrate each time. While the pH meter/probe seem stable from day to day this is required per the method and to achieve accurate results.

Use fresh buffers. Do not re-use buffers or pour the buffers back into the original container. Buffers in cubitainers are best because they are not opened and exposed to air (CO₂ will cause the buffers to be inaccurate -especially the 10 buffer).

Make sure the inside and outside of the probe is cleaned when results take longer than recommended to equilibrate (~30sec). If you refill the inside because the filling solution evaporates, what can happen is that because just the water part of the solution evaporates, you end up with a salt saturation, and crystals forming. Take DI water and rinse out the electrode through the hole, shaking it after wards like a thermometer (repeat). Then add a little electrode solution, also shaking that out. Then refill it with new electrode solution. Make sure there are no bubbles.

For the outside, it can get dirty as well. Placing it in 10% nitric solution for an hour will help clean off the gunk that has stuck to the outside from the samples and the buffers – but also follow your manufacturer's instructions. Typically they will say DO NOT wipe with a paper towel.

Remember the hole needs to be unplugged during readings. These types of electrodes need flow. Also stir everything at a slow but constant rate.

For calibration bracket range of the sample can help accuracy. Labs will always use a 7, so then you want to pick the other buffer that brackets the sample. If the pH of the sample is always <6, using 4 is best. It is also ok to use all 3 (4, 7, 10) as long your pH meter/probe is capable of a 3 point calibration. You need at least a 2 point calibration.

While ATC probes help with temperature compensation, there is about a 5°C limitation (difference between the buffers and the sample). So keeping everything close to the same temperature is still best. Otherwise a cold sample will make the filling solution in the electrode cold and it keeps trying to adjust, which takes time and also adds inaccuracy. Once the sample is not too cold, then analyze the sample (as soon as you can and definitely within the same day as collection).

If buffers are outside of 0.1 pH units when they are checked, there is likely a problem. Either with the buffers or the equipment. You also need to record the slope to show you meet the slope range required of your equipment (some are 102-108, some are 95-105%, etc).

If there is no ATC then these really need to be very close in temperature.

Here is a trick that can be used as well:

- Set the pH meter to read mV.
- Put the probe in fresh 7 buffer. That is neutral, this should read 0 mV (+/- 30mV is ok)
- Rinse the probe and place in fresh 4 buffer. That difference should be 171mV from the 7 (+/- 30mV).
- Repeat with 10 buffer, that difference is also 171 mV from the 7. If the 10 buffer goes bad (because of CO₂/exposure to air) then replace it.
- Remember to switch it back from mV.