pH - What is it & why is it Important?

It is a measure of how acidic or basic a solution. The pH scale goes from 0 to 14 with 7 being neutral and anything below 7 is considered acidic and anything above considered basic or alkaline. It is a measurement of the concentration of hydrogen ions. There are a couple of important things that pH affects one being corrosivity, which can severely damage plumbing and water appliances such as dishwashers and water heaters. This can manifest itself as bluish green staining from the copper being dissolved. Another thing to consider is pH will significantly impact how water can be treated affectively.

Is pH Regulated?

The EPA regulates pH as a secondary contaminant, which means it is more of a guideline than an enforceable level. The EPA recommends pH to be between 6.5 and 8.5 standard pH units.

Measuring pH

When water is exposed to the atmosphere, it has a tendency to take in carbon dioxide, some of which can react with water and in turn forms carbonic acid and H^+, and lowers the pH level, thus it is important to measure pH immediately after sample collection.

Colorimetric Test Methods

There are a couple of ways for determining pH levels. Many utilize pH indicators to get a general idea of the pH level. Indicators are chemicals added to the solution, which produce a color change, which is related to the level of pH. Unfortunately color is very subjective which can lead to imprecise reading of pH levels.

Electrode Test Method & Proper Calibration

If a more accurate pH level is needed, one should consider a pH meter. pH meters utilize a glass probe, which produces a certain voltage based upon the pH level of the solution being measured. It is important to properly calibrate your pH meter to ensure a high level of accuracy. Meters should be calibrated based upon their usage. If used frequently, like in a laboratory it should be calibrated more frequently than is if it used less often. It should be calibrated using at least two buffers if not three. A buffer solution with a pH level of 7 is commonly used along with one of 10 if the solution is suspected to be basic or a buffer with a pH of 4 if the solution is suspected to be acidic. If you are unsure of the general pH level it is best to calibrate using all three buffer solutions. Using all three buffers is the best method to ensure your meter is reading accurately over the full scale. To calibrate, place the probe alternately in two solutions until the meter obtains an accurate reading, most modern meters will only need a single immersion to get an accurate reading. Eventually the life of the electrode will diminish and you may need to adjust the meter when using the buffer solutions. After the meter is calibrated, the probe should be rinsed using deionized or distilled water and blotted dry with a clean tissue, then quickly immerse into the sample.

Electrode Maintenance and Replacement.

Most pH probes are designed to be stored in an electrode storage solution when not in use. If the electrode dries out continually, this can significantly reduce the life of the probe. In a pinch, if you do not have storage solution on-hand you can use the pH 4 buffer, but I would not recommend this for very long because the color in the buffer solution can have a detrimental affect on the probe. This would be acceptable if you forgot solution and you were in the field for a couple hours. Another option would be to use distilled or reverse osmosis water saturated with salt. You saturate the purified water by adding salt until it no longer dissolves. Also it's very important to use salt that contains NO iodine. This can be used for a couple of days until you get the proper solution. Do not ever store the electrode in distilled or reverse osmosis as this can destroy the electrode. If you are diligent about ensuring your meter is stored with solution and properly calibrating on a regular basis your meter should last about a year.

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