

**What is pH?**

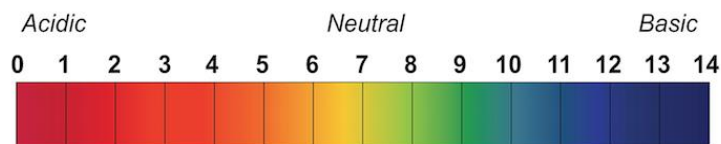
The pH of a solution is a measure of hydrogen ion concentration, or pH is an indicator of the acidity or basicity of a water. The intensity of Acidic and basic character of a solution is indicated by pH or hydrogen ion at a given temperature.

pH stands for the “power of hydrogen”. The numerical value of pH is determined by the molar concentration of hydrogen ions [H<sup>+</sup>]. This is done by taking the negative logarithm of the H<sup>+</sup> concentration -log[H<sup>+</sup>].

**pH= -log<sub>10</sub> [H<sup>+</sup>]**

[H<sup>+</sup>] = the hydrogen ion concentration in moles per liter

For example, if a solution has a H<sup>+</sup> concentration of 10<sup>-3</sup> M, the pH of the solution will be -log [10<sup>-3</sup>], which equals 3. The pH scale is 0 to 14, with 7 being neutral. Below 7 indicates acidic, and numbers higher than 7 mean it is alkaline.



The pH values for water site will depend on the **geology, soil, and vegetation of your area**. The origin of the air masses that precipitate into your water body may affect the pH of the water. Most lakes and streams have **pH** values that

range between 6.5 and 8.5. **Pure water not in contact with the air has a neutral pH value of 7.0. Naturally occurring basic waters** are found typically in areas where the surrounding geology is rich in minerals such as **calcite** or **limestone**.

### **Methods of pH determination.**

#### **1. Using litmus paper.**

It is quick and easy to use and compared to pH meters its less expensive. Initially, litmus paper is either red or blue. The blue paper changes to red, indicating acidity ( $\text{pH} < 7$ ). Red litmus paper can indicate alkalinity with a change to blue ( $\text{pH} > 7$ ). When the pH is neutral ( $\text{pH} = 7$ ) then the dye is purple.

#### **2. Colorimetric method.**

means to measure color. In the colorimetric method, chemicals are added to the water sample and those chemicals react with the water to produce a color change. The color indicates the pH of the water. The color can be measured visually or electronically. The colorimetric method does not work when the water is already colored. Colorimetric test kits are inexpensive and can cover a wide range of pH values.

#### **3. pH meter.**

The most common method is a pH meter, which involves a pH-sensitive electrode (usually made of glass) and a reference electrode. It is also called a “potentiometric pH meter” because it measures the variation in electrical potential between a pH electrode and a reference electrode. Before taking a pH measurement, the meter must be "calibrated."

## **Calibration of pH Meter.**

To achieve highly accurate measures the pH meter must be calibrated before each measurement.

1. First, make sure the correct measurement mode is selected in pH meter.
2. Then wash the electrode with distilled water and don't wipe the electrodes, otherwise it will generate an electrostatic charge on the electrodes.
3. All standards and samples are brought to 25 C° before use.
4. Now immerse the electrodes within the standard buffer solution or calibration solution (pH 4/pH 7).
5. Now enter in pH calibration mode by pressing the CAL/MEAS key. The CAL sign will be displayed.
6. Wait until the pH values get stabilized.
7. After stabilization confirm the calibration by pressing the HOLD/ENTER key.
8. Now the pH meter is calibrated to the current buffer solution.
9. Finally, wash the electrodes with distilled water and placed it into the buffer solution.

## **Procedure:**

1. Calibrate the electrodes with two standard buffer solutions of pH.
2. Immerse the electrodes into the sample of water (whose pH is to be determined) and wait up to one minute for steady reading.
3. The reading is observed after the indicated value becomes constant.