



pH Background

WaterWatch² Products

APPLICATION INFORMATION

PARTECH PRODUCTS

MONITOR
7300w² Monitor

SENSORS
WaterTechw² pH8000
WaterTechw² PHEVT – Combined pH,
Redox and Temperature

INSTALLATION OPTIONS
Flowcell and Dip

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What is pH?

pH is a measure of acidity or alkalinity. The concentration of hydrogen ions (H⁺) causes a liquid to be either acidic (high concentration of hydrogen ions) or alkaline (low concentration of hydrogen ions). The pH range is from 0-14. Values below 0 or above 14 are possible but rare and cannot be measured with our electrodes. The pH scale is derived from the dissociation constant of water in the following equation:



How does a pH Electrode Work?

A special composition glass senses the H⁺ and a millivoltage is generated (59.2 mV per pH unit at 25°C). A filling solution picks up the signal from the special pH glass. A pure Silver wire dipped in Silver Chloride passes the signal from the solution whose pH is being measured to the electrode's cable or connector.

The reference junction separates the filling solution in the electrode from the sample whose pH is to be measured. The filling solution's constant chloride ion concentration generates a millivoltage at a pure silver wire with silver chloride on it. The silver wire passes the signal from the solution being measured to the electrode's cable or connector.

Single or Double Reference

Chemicals that cause silver to precipitate at the reference junction will contaminate and plug single junctions. These may be such compounds as sulphides, mercaptans, cyanides, iodides, and proteins. Other elements such as silver, lead, mercury, and other heavy metal compounds will react with the chloride in the gel, causing a reduction in the reference output. Selection of the proper chemistry in the lower (Double) junction will prevent or at least minimise the negative effects of these reactive compounds

Temperature Compensation

When measuring pH using a pH electrode the temperature error from the electrode varies based on the Nerst equation as 0.03 pH/10°C/Unit of pH away from pH7. The WaterTechw² pH8000 sensor assemblies include automatic temperature compensation using an integrated temperature sensor.

Calibration of pH Systems

All pH systems need calibration, the frequency of this operation is a function of the importance of the installation, the nature of the application and the preference of the user. This will normally be every 3 months, Partech can provide advice on this once details of the application are understood.

Calibration will be carried out using buffer solutions with typical pH values of 4.01, 7.00 and 10.00. The first calibration point will be 7.00 pH which sets the zero point. The second calibration point will normally be selected to suit the application, i.e. for applications that operate in acidic solutions the 4.01 buffer would be used. If the application moves between acid and alkaline then 3 point calibration should be selected.

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