The 3110 handheld meters provide reliable measurements under difficult conditions both in the Lab and in the field.

- Robust silicone keypad with sealed surface – 100 % waterproof and easy to clean
- Tangible button click - for ease of use
- Built-in calibration timer - for accurate measurements

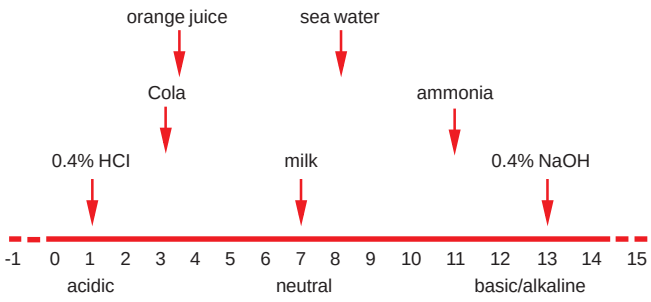
pH-Value

The water molecule has the property of dissociating into two ionic components in aqueous solutions.

$$H_2O \leftrightarrow H^+ + OH^-$$

The H^+ ion is termed hydrogen ion or proton, the OH^- ion hydroxide ion.

The pH value describes the activity of hydrogen ions in aqueous solutions on a scale of -1 to 15. Based on this scale, liquids are characterized as being acidic, alkaline or neutral: a solution which is neither acidic or alkaline is neutral. This corresponds to a value of 7 on the scale. Acidity indicates a higher activity of hydrogen ions and a pH value lower than 7. Alkaline solutions are characterized by a lower hydrogen ion activity or higher hydroxide ion activity, respectively and a pH value above 7. The graph below uses examples to illustrate the pH scale.



The pH scale is logarithmic. A difference of one pH unit represents a tenfold, or ten times increase or reduction of hydrogen ion activity in the solution. This explains how a solution's aggressiveness increases with the distance from the neutral point.
The pH value can be measured using electrochemical measuring systems, litmus paper, indicators and colorimeters. Of these methods, electrochemical sensors provide the most accurate results.
The pH electrode is an electrochemical sensor which consists of a measuring electrode and a reference electrode. The measuring electrode is made of special glass which, due to its surface properties, is particularly sensitive to hydrogen ions. It is filled with a buffer solution which has a pH value of 7.

Technical data

Dimension	approx. 180 x 80 x 55 mm
Weight	approx. 0.4 kg
Type of protection	IP 67
Electrical safety	Protective class III
Test certificates	CE
Storage temperature	-25 °C .... +65 °C
Operation temperatur	-10 °C .... +55 °C
Power supply	Four 1.5 V AA batteries
Battery life time	2500 hours
Sensor input resistance	> 5 x 10^{12} Ohm
Sensor input current	< 1 x 10^{-12} A

Measuring ranges, resolution

Variable	Measuring range	Resolution
pH	-2.0...+20.0	0.1
pH	-2.00...+20.00	0.01
pH	-2.000...+19.999	0.001
U [mV]	-1200.0...+1200.0	0.1
U [mV]	-2000...+2000	1
T [°C]	-5.0...+105.0	0.1
T [°F]	23.0...+266	0.1

Manual temperature input

Variable	Range	Increment
T_{manual} [°C]	-25...+130	1
T_{manual} [°F]	-13...+221.0	1

Accuracy (± 1 digit)

Variable	Accuracy	Temp. of test sample
pH / range*		
-2.0...+20.0	±0.1	+15 °C...+35 °C
-2.00...+20.00	±0.01	+15 °C...+35 °C
-2.000...+19.999	±0.005	+15 °C...+35 °C
U [mV] / range		
-2000...+2000	±1	+15 °C...+35 °C
-1200.0...+1200.0	±0.3	+15 °C...+35 °C
T [°C] / temp. sensor		
NTC 30	±0.1	
PT 1000	±0.1	

** when measuring in a range of ± 2 pH around the calibration point*

When placing the pH electrode into a test solution, the change in voltage is measured by the electrode by comparing the measured voltage to the stable reference electrode. This change is recorded by the meter and converted into the pH value displayed.