

HI 1000
S E R I E S

ISO 9001:2000 CERTIFIED

INDUSTRIAL pH/ORP ELECTRODES



FLAT-TIP TECHNOLOGY

HANNA[®]
instruments
With Great Products, Come Great Results™



Industrial Challenges and Hanna Solutions

INDUSTRIAL CHALLENGES

Process applications present some major challenges to the pH measurement system. The most common are long distances, temperature extremes, electrical interferences, high pressure, junction poisoning or fouling and chemical/physical breakage. For each of these common problems, HANNA has developed specific electrodes for excellent performance in all types of process applications.

PH MEASUREMENT OVER LONG DISTANCES

Due to the high resistance of the glass membrane inside a pH electrode, conventional pH measuring systems utilize high impedance signal transmission. Poor insulation of the electrode connectors and cables results in high susceptibility to electrical leakage/noise and humidity which tends to give erroneous pH readings. As a result, particular care has to be taken in connecting the electrode to the metering system. For this conventional system, the cable length is restricted to typically less than 33' (10 m). A high impedance meter is required and it is necessary to provide for high insulation at all connections.

With HANNA's AmpHel™ electrodes, there is an amplifier built into the electrode. Problems associated with high impedance have been isolated. The high impedance circuitry is encapsulated at the top of the electrode. As a result, you now have low output impedance signals from the electrode to the metering system. A high impedance meter is no longer necessary. This means standard connections with long, unshielded cables up to 165' (50 m) can be used with an ordinary meter. For greater distances up to 990' (300 m), it is recommended that you use a HANNA 2-wire transmitter.

HIGH AND LOW TEMPERATURE EXTREMES

As we have mentioned, the pH glass membrane is sensitive to the temperature of the solution. Prolonged use and/or exposure to temperatures above 35°C (95°F) will accelerate the aging and increase chemical attack to the glass membrane which will shorten the overall service life of an ordinary sensor.

With advanced sensor glass formulation and construction, HANNA has developed electrodes that will perform consistently in high and low temperature extremes. These new sensors will deliver a useful life comparable to a standard electrode under optimum conditions.

INDUSTRIAL APPLICATIONS UP TO 87 PSI (6 BAR)

Standard electrodes are not suitable to perform measurements in pressurized systems over 44 psi (3 BAR). An electrode not engineered for high pressure applications could cause a major leak in the process and even be dangerously projected from the system. HANNA's high pressure electrodes have been constructed to operate reliably in pressurized systems up to 87 psi (6 BAR).

REFERENCE POISONING AND JUNCTION FOULING

One of the most common causes of electrode failure is fouling of the junction. The junction becomes physically clogged due to either solids in the sample solution or by precipitation (of AgCl for instance). To overcome this problem, Hanna has increased the physical size of the junction with the result of increasing the life of the electrode when introduced into applications that would normally quickly clog the junction. Hanna's glass sensors are thicker and the composition has been formulated to offer greater chemical resistance and an increased impedance range.

Reference fouling was a common problem before the introduction of double junction technology. Poisoning ions will actually plate onto the sensor of the reference compartment when the positive flow of electrolyte is reversed in a single-junction system. In a double-junction system, the reference electrode is not in direct contact with the sample. The problem of reference poisoning is nearly eliminated.

PHYSICAL BREAKAGE

Normal maintenance is usually the main cause of electrode breakage. The delicate sensor must be treated with extreme care. A bulbous electrode in a process stream will also become dirty with deposits such as silicate or phosphate. These deposits may not be visible but the electrode will become sluggish or exhibit a dramatic change in the slope value. Hanna's flat-tip process electrodes have shown significantly less breakage than bulbous electrodes. Flat-tip electrodes also experience less abrasion in a flow application and nearly eliminate deposits.



GROUND LOOP MATCHING PIN

Fluctuation of readings and short electrode life can be related to a ground loop current problem. The solution to this problem is an electrode with ground loop matching pin. HANNA's pH 500, pH 502, HI 504, mV 600, mV 602, HI 21 & HI 22 controllers now come with differential input to prevent such problems. With this new technology, the life of the electrodes are greatly extended.

PVDF BODY MATERIAL

Aggressive chemicals and high temperature are common aggressors of pH and ORP probes. For those applications, HANNA has developed a complete line of sensors with PVDF body.

