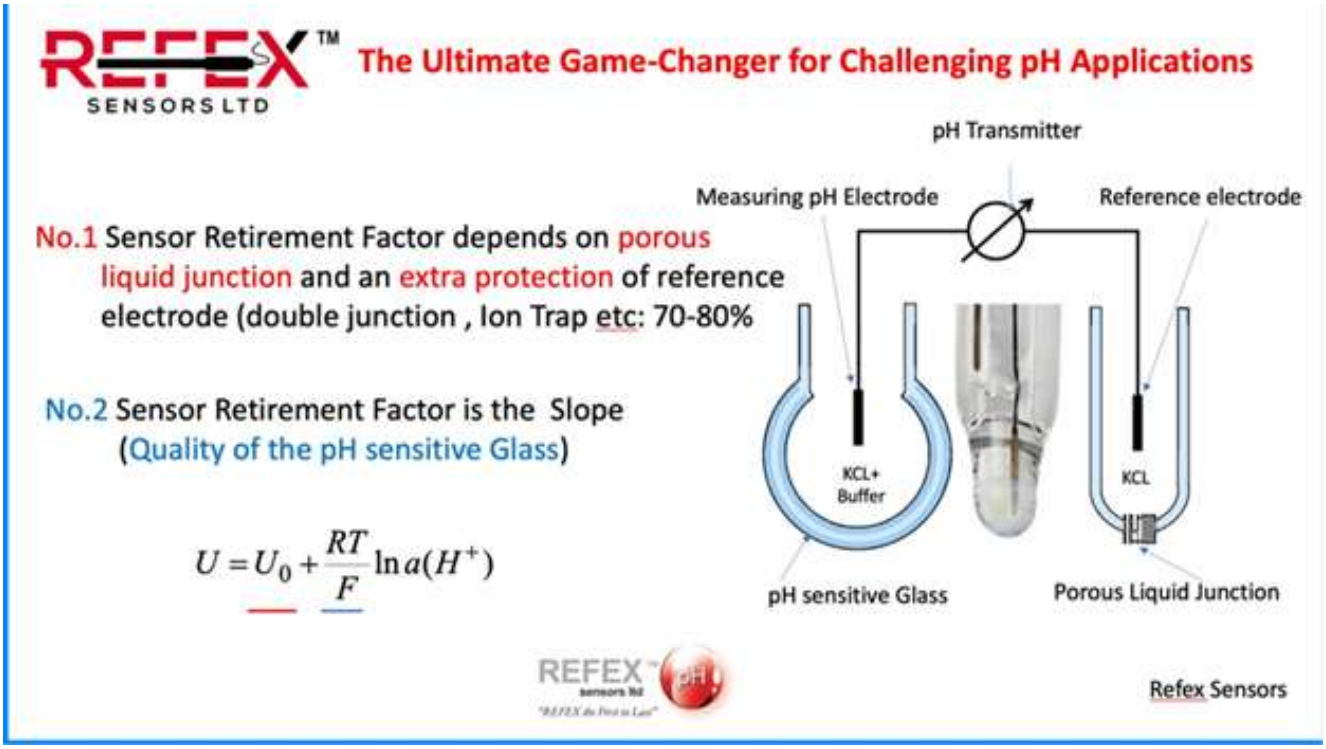


From Permanent Headache(pH) to long-lasting accurate and reliable Power of Hydrogen (pH) Measurement and Control .

Refex Sensors revolutionize pH measurement by eliminating a dominant retirement factor—porous liquid junctions. Their non-porous technology ensures unmatched reliability, minimal maintenance, and superior performance in industries like oil refineries, petrochemicals, mining, WWTPs, UPW, and more.

pH is a critical parameter in many scientific, industrial, and environmental processes, as it indicates the acidity or alkalinity of a solution. The measurement of pH is rooted in fundamental principles of chemistry and Electrochemistry, and it provides valuable insights into chemical properties and reactions.

What is pH?

pH is a measure of the hydrogen ion (H+) concentration in a solution. It is expressed on a logarithmic scale ranging from 0 to 14:

- **pH < 7:** Indicates an acidic solution.
- **pH = 7:** Represents a neutral solution, such as pure water.

- **pH > 7:** Signifies a basic (alkaline) solution.

The pH is defined mathematically as:

Where is the molar concentration of hydrogen ions.

The Role of pH Sensors

pH sensors measure the electrical potential difference between two electrodes to determine the pH of a solution. These sensors typically consist of:

1. **Measuring Electrode:** Often a glass electrode sensitive to hydrogen ions.
2. **Reference Electrode:** A stable electrode with a known and constant potential.

The difference in potential between the two electrodes corresponds to the hydrogen ion activity in the solution, which is used to calculate the pH.

Key Components of a pH Sensor

1. **Glass Membrane:** The core of the measuring electrode, selectively permeable to hydrogen ions, allowing it to generate a potential proportional to the pH.
2. **Reference Junction:** Connects the reference electrode to the solution being measured, maintaining a stable reference potential.
3. **Internal Electrolyte:** Ensures proper ion exchange within the electrodes.

The Nernst Equation

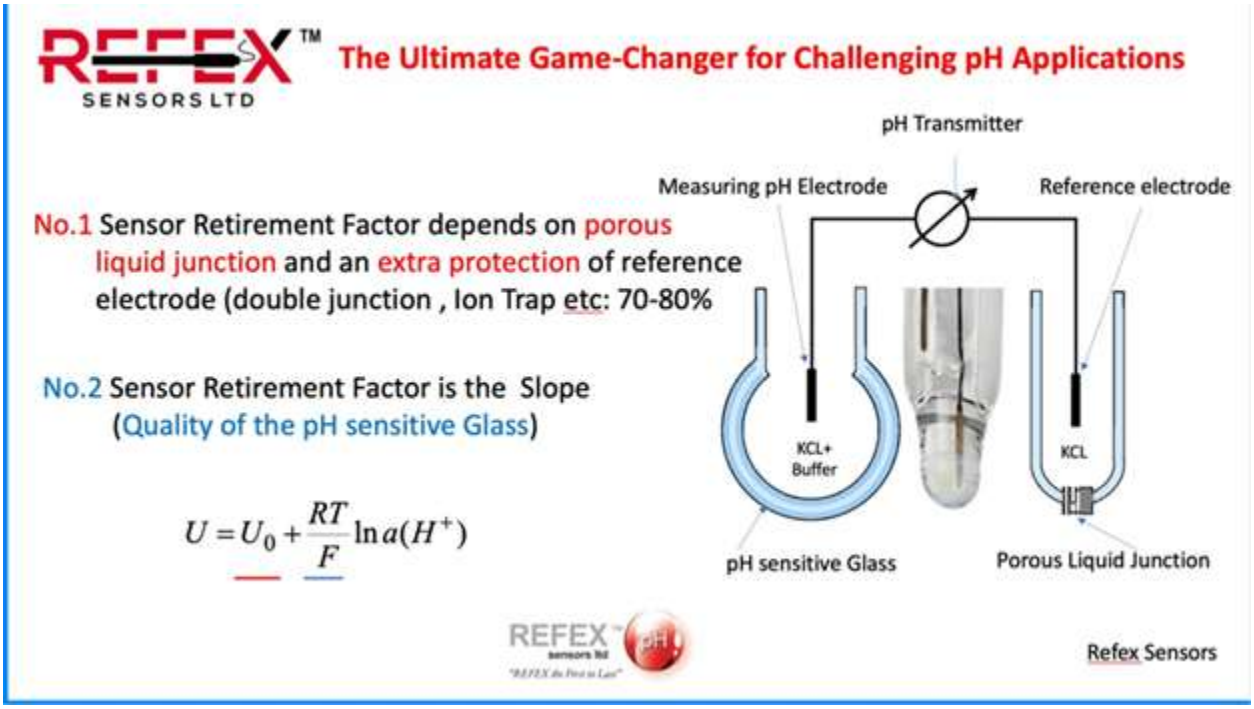
The relationship between the potential difference and the hydrogen ion concentration is described by the Nernst equation:

Where:

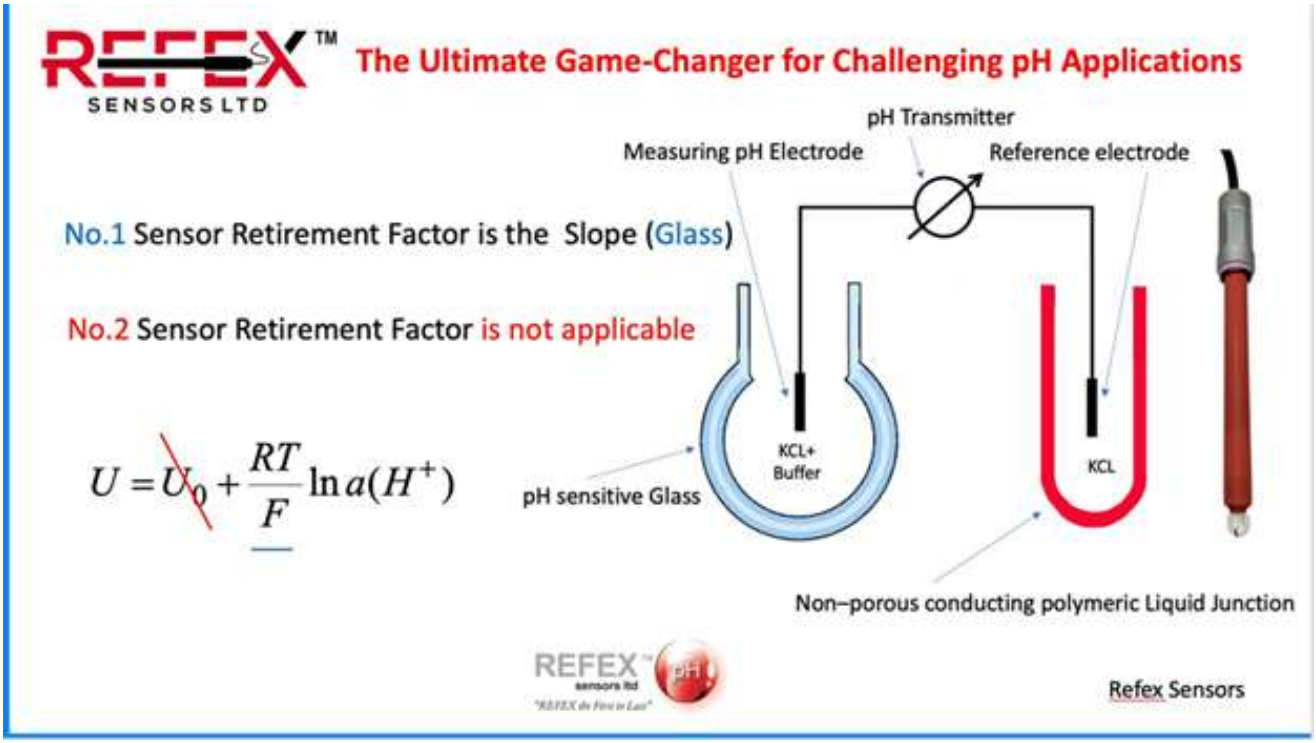
- is the measured potential.
- is the standard electrode potential.
- is the universal gas constant.
- is the temperature in Kelvin.
- is the Faraday constant.

This equation highlights the temperature dependency of pH measurement and the need for temperature compensation in pH meters.

The lifespan, accuracy, stability, and reliability of pH sensors—as well as their frequent need for calibration and cleaning—pose a persistent challenge with traditional designs. These issues are **especially pronounced in sensors featuring porous components** like ceramic, PTFE, open apertures, externally pressurized references, double or triple junctions, ion traps, and even wood. **What's the root cause of these problems?**



The primary issue lies in the porosity of the liquid junction. Historically, most advancements in pH sensor technology have focused on improving the porous liquid junction or enhancing the protection of the reference electrode. However, these efforts inherently acknowledged the fundamental limitation of the porous design.



Refex Sensors have revolutionized this approach by developing a non-porous, conductive polymeric liquid junction. This innovative junction offers a significantly larger surface area while maintaining chemical compatibility properties similar to PVDF.

According to the Nernst equation, two key factors determine the **"retirement"** of pH sensors:

1. **Slope:** Dependent on the quality of the glass and its ability to maintain sensitivity under challenging process conditions.
2. **Offset:** Determined by the millivolt (mV) signal, which relies on the quality of the liquid junction and the internal system protecting the reference electrode.

Crucially, the offset accounts for 70-80% of pH electrode failures. By addressing this primary limitation with a non-porous design, Refex Sensors set a new standard for reliability and performance in pH measurement.

Conclusion:

Refex Sensors deliver unparalleled advantages in demanding applications across industries such as oil refineries, petrochemical plants, wastewater treatment plants (WWTPs), mining operations, Chlorine, Chlor-alkali and Chlorinated Brines, Recycled Brines, Ultrapure water (UPW), boiler feed water, and more. Their unique non-porous technology ensures durability, reduced maintenance, and exceptional performance, making them a transformative solution for critical pH measurement challenges.

90-Day Try or Buy To make the transition to REFEX sensors even easier, we offer a **90-day try or buy** guarantee, allowing you to experience the superior performance and reliability firsthand without commitment.

This proven success story highlights the unparalleled performance of REFEX pH sensors in industrial environments. If REFEX sensors can exceed the rigorous demands of the plant, they are the ultimate solution for any business seeking reliability, precision, and value in their pH measurement systems.

Fill an Application Form and Get You Most Reliable pH Sensor on the Market!

REFEX™ sensors ltd
"REFEX the First to Last"

Process pH/ORP Equipment Application Questionnaire

Contact Person: ..... Date: ..... / ..... / .....

Telephone: ..... Fax: .....

E-mail: .....

Address: .....

.....

1. Existing Sensor Model: _____ Existing Analyzer Model: _____

2. Analyzer Type: ☐ AC Line Powered ☐ 2 Wire 24 VDC ☐ Portable

3. Application pH :monitoring ☐ Control ☐ Lab analysis ☐ Reporting ☐ Corrosion ☐ Spill

Industry: _____ Other: _____

Type of Stream: ☐ Industrial ☐ WWTP: Inlet/Outlet/aeration Tank/Final Effluent/Other _____

Range	☐ pH	☐ ORP(mV)	Normal:		High:		Low:	
Temperature	☐ °C	☐ °F	Normal:		High:		Low:	
Pressure	☐ kPa	☐ PSIG	Normal:		High:		Low:	
Pure Water	(µS/cm)		Normal:		High:		Low:	

Buffer Activity (resistance to pH change) ☐ Strong ☐ Moderate ☐ Slight

4. Cleaning Process: Chemicals used: _____

Temperature: _____ Pressure: _____ CIP: ☐ SIP: ☐ Duration: _____ Frequency : _____

5. Sample Details; Flow Rate, Viscosity or Flow-ability, Entrained Solids:

Flow Velocity Past Sensor: ☐ m/s ☐ ft/s Normal: _____ High: _____ Low: _____

☐ Water ☐ Syrup ☐ Paste ☐ Slurry %Solids: _____ Size of Lumps: _____

FIBER: None Present ☐ or Entrained Fiber: _____ Typical Fiber Length: _____

6. Are substances present that: ☐ Film ☐ Impact ☐ Abrade ☐ Scale ☐ Biological Growth ☐ None

Describe: _____

7. pH is measured in: ☐ Sample Line ☐ Submerged in Open Tank ☐ In pipe/fitting / Closed Tank ☐ Open Stream or Sewer

8. Sensor Removal: ☐ Pressure can be reduced to zero for removal ☐ Sensor withdrawn under pressure

9. Does solution measured contain:

			Liquid Analysis (Best if available) Component	Concentration
Solvents	☐ Yes	☐ No		
Ultra Pure	☐ Yes	☐ No		
Oils	☐ Yes	☐ No		
High Sodium	☐ Yes	☐ No		

10. Are electrodes subject to:

Temperature Shocks	☐ Yes	☐ No		
Steam sterilizing	☐ Yes	☐ No		
Wet-dry Conditions	☐ Yes	☐ No		
Pressure Shocks	☐ Yes	☐ No		

11. Sensor cable length: _____ ☐ meters ☐ feet

12. Extension/interface cable length from analyzer to J-box/VP connector: _____ ☐ meters ☐ feet

13. Mounting interface needed: ☐ Yes ☐ No, (thread size, thread type - e.g. 1" MNPT): _____

14. Connector Type: ☐ BNC ☐ Direct ☐ Variopin Other: _____

15 .The current lifetime of the sensor _____ The desired life span : _____

16. Failure Mechanism: _____

17. Frequency of Sensor Cleaning: _____

18. Frequency of Calibration: _____ Desired Frequency: _____

19. Buffer pH/ORP Values: _____

20.Comments: _____

#SmartpHSensors #AdvancedpHSolutions #ChallengingApplicationspH #InnovativeTechnologypH #HighPerformancepHSensors #ChemicalIndustrypH #DurablepHSensors #StableReadingspH #pHMeasurementMadeEasy #NextGenpHSensors #HarshEnvironmentpHSensors #PrecisionpHControl #RefexInnovation #UltimatepHSensors #FutureReadypHSolutions #AccurateReadingspH #LowDowntimepH #EfficientpHMonitoring #ProcessOptimizationpH #GameChangerpHSensors

🌐 Website: https://refexsensors.com