

## Single Use In-line pH Sensor

### Background:

In downstream bioprocessing operations, monitoring and controlling the pH of a solution is critical to maintaining the stability and efficacy of large biomolecules. A pH sensor is a valuable tool used to determine the acidity or alkalinity of a solution. The electrochemical pH probe is a widely used method for measuring pH in these types of operations.

The electrochemical pH sensor uses two electrodes, a pH sensitive electrode and a reference electrode, and a temperature probe to determine the pH value of a solution. The potential difference between the two electrodes is measured and used to determine the number of hydrogen ions in the solution, which provides the pH value. Real-time measurement of pH is necessary in product purification operations, as solutions are flowing dynamically through a tube. The electrochemical pH probe offers accuracy and rapid response time, making it ideal for capturing rapid shifts in pH due to valve position changes or process changes.

To ensure accurate pH measurements, electrochemical pH sensor must be calibrated with accurately defined buffer standard solutions. Calibration values include both the zero point and the slope of the calibration line. The zero point is the point at which the pH electrode delivers zero potential, and the slope of the calibration line determines the accuracy of the sensor over its measuring range.

### Benefits:

- Provides accurate and reliable pH measurement in downstream bioprocessing operations
- Real-time measurement of pH helps to maintain stability of large biomolecules in a specific pH range
- Rapid response time helps to capture rapid shifts in pH due to process changes
- Calibration values printed on probe for easy entry into pH monitor, eliminating need for calibration with buffers
- Closed system operation is not impacted, as there is no need to expose pH sensor to buffer standards
- It may be re-used, however, in applications where cross contamination is desired to be avoided.

### The sensor/flow cell combination is designed specifically and optimized for in-line measurements:

- It is ideal for processes where cleaning the probe is not practical post use
- Has a rapid response to change in pH conditions

### Key Features:

- Single-use pH sensor combining METTLER TOLEDO InSUS 307 pH probe technology with single use flow cell designed by PendoTECH
- Designed for applications where in-line sensing is necessary
- Two sizes offered as a pre-assembled product
- Compatible with gamma irradiation
- No process calibration required
- Designed for use with existing METTLER TOLEDO transmitters



1/4 inch Hosebarb



3/4 inch Sanitary Flange

## Specifications



Sensor in primary Tyvek pouch



Sensor in secondary package of polybag with certificate enclosed

### The packaging of the pH Sensor is comprised of:

- Polybag
- Tyvek Pouch
- Cardboard Box
- Probe Quality Certificate from Mettler Toledo
- Completed Sensor Certificate of Quality from PendoTECH
- Instruction for use Post Card

## Sensor Performance Specifications

pH Range	pH 3 to pH 10		
Slope (pH 7 to pH 4 buffer)	Min -57.8 mV/pH (98%)		
Zero-point (In pH 7 buffer)	7.20±0.25pH		
Accuracy under defined laboratory conditions	± 0.10 pH for ± 1.50 pH units around the calibration point after 1-point process calibration (adjustment of inline reading to an offline pH measurement of a grab sample)		
Response Time	t90% < 20s between pH 4 to 7		
Operating Temperature Range	5 to 60°C		
Operating Pressure Range	4 Barg at 25°C*	2 Barg at 40°C**	1 Barg at 60°C**
Membrane Glass Resistance	300...900 MOhm		
Glass Type	pH-Sensitive glass membrane		
Temperature Compensation (T.C.)	Via built-in Pt 1000		
Shelf life	12 months PT-PH-S-5-5, PT-PH-S-025 24 months with available coating on the reference system PT-PH-L-5-5, PT-PH-L-025		

\* This specification was determined and validated by PendoTECH. PendoTECH testing and validation data regarding this claim are on file.

\*\*This specification is provided by the original manufacturer (PT-PH1 pH Sensor).

## Ordering Information

MONITOR	
MT-30280773	Dual pH Bench-Top monitor/transmitter for the interface of 2 PendoTECH Single Use pH sensors.
PDKT-UV-PCS	Cable from single wavelength photometer to PendoTECH TFF/DAQ, 2m
PDKT-UV-PMAT	Cable from single wavelength photometer to PMAT analog input, 2m
1406281	M8 3 pin male cordset, 2m, flying leads
MT-58083319	M300 transmitter stand kit 1/2 DIN

PROBES/FLOW CELLS	
PT-PH-S-5-5	PendoTECH Single Use pH In-Line pH Sensor - 3/4 inch sanitary flange, Polysulfone. 1-year Shelf-Life
PT-PH-S-025	PendoTECH Single Use In-Line pH Sensor- 1/4 inch Hosebarb, Polysulfone. 1-year Shelf-Life
PT-PH-L-5-5	PendoTECH Single Use pH In-Line pH Sensor - 3/4 inch sanitary flange, Polysulfone. 2-years Shelf-Life
PT-PH-L-025	PendoTECH Single Use In-Line pH Sensor- 1/4 inch Hosebarb, Polysulfone. 2-years Shelf-Life

CABLES	
MT-52300107	Cable VP6 ST/1m, for Mettler INSUS307 Probe
MT-52300108	Cable VP6 ST/3m, for Mettler INSUS307 Probe
MT-52300210	Cable VP6-ST/1m/BNC-30
MT-52300211	Cable VP6-ST/3m/BNC-30