pH measurement

Content

WTW a xylem brand

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Applications and meters overview

The pH value is defined in water and predominantly aqueous solutions and is one of the three most common parameters measured in the laboratory after weighing and temperature measurement. It has great importance for biological, chemical and biochemical processes, as well as for the properties of different products.

✓ yes
● yes

✓ recommended
✓ recommended for some applications
– not recommended

	Digital			Analogue			Digital			Analogue					
	Benchtop pH meters						Portable pH meters								
	inoLab® IDS			inoLab®			MultiLine® IDS			ProfiLine					
	Multi 9630	Multi 9620	Multi 9310	pH/ION 7320	pH 7310	pH 7110	Multi 3630	Multi 3620	Multi 3510	Multi 3320	pH/Cond 3320	pH/ION 3310	pH 3310	pH 3110	pHotoFlex® pH
2 parameters simultaneously	✓	✓		✓			✓	✓		✓	✓				
3 parameters simultaneously	✓						✓								
pH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
ORP	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
ISE (pH/ION function)	●	●		●						●	●	●			
Ion-specific measurement programs	●	●		●											
Additional parameters	●	●	●				●	●	●	●	●				●
Routine measurements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Routine measurements with documentation	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	✓	✓	–	✓
AQA with documentation	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	✓	✓	–	✓
R&D High resolution and precision	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	✓	✓	–	✓
Control measurements	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	✓	✓	–	✓
LIMS connection	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	✓	✓	–	✓
Quality assurance	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓	✓	✓	–	✓
Education	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Service	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory measurements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Field measurements	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
Depth measurements	–	–	–	–	–	–	✓	✓	✓	–	–	–	–	–	–
PC connection	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓
Memory	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓
USB interface	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		
Graphic display			✓	✓	✓				✓	✓	✓	✓	✓		✓
Color graphic display	✓	✓					✓	✓							
Compatible sensor system															
Digital IDS electrodes															
IDS pH electrodes 28	✓	✓	✓				✓	✓	✓						
IDS ORP electrodes 32	✓	✓	✓				✓	✓	✓						
Analogue electrodes															
pH electrodes 65	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special pH electrodes: 67	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ORP electrodes 73	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ion-selective electrodes 81	✓	✓		✓						✓	✓	✓			
	Multi 9630	Multi 9620	Multi 9310	pH/ION 7320	pH 7310	pH 7110	Multi 3630	Multi 3620	Multi 3510	Multi 3320	pH/Cond 3320	pH/ION 3310	pH 3310	pH 3110	pHotoFlex® pH
see page	40	40	41	56	56	57	44	45	46	49	50	32	61	62	145

inoLab® – analogue

All benchtop meters are available in application-oriented sets including sensors and accessories.

inoLab® pH 7110 SET 4

Technical specifications: inoLab® analogue benchtop pH meters

		inoLab® pH/ION 7320	inoLab® pH 7310	inoLab® pH 7110
Measurement ranges/ dissolution	**pH**	-2.000 ... +20.000 pH	-2.0 … 20.0 ±0.1 pH -2.00 … 20.00 ±0.01 pH -2.000 … 19.999 ±0.005 pH	-2.0 … 20.0 ±0.1 pH -2.00 … 20.00 ±0.01 pH -2.000 … 19.999 ±0.005 pH
	mV	±1200.0 mV ± 2500 mV	±1200.0 mV ± 2500 mV	± 1200.0 mV ± 2000 mV
	Temp.	-5 ... +105 °C/0.1 °C	-5.0 … +105.0 °C ±0.1 °C	-5.0 … +105.0 °C ±0.1 °C
	Conc. (mg/l, µmol/l, mg/kg, ppm, %)	0.000…9.999 10.00…99.99 100.0…999.9 1000…999999		
Accuracy (±1 digit)	**pH**	±0.005 pH ±0.01 pH	±0.005 pH ±0.01 pH	±0.005 pH ±0.01 pH
	mV	±0.3 mV, ±1 mV	±0.3 mV, ±1 mV	±0.3 mV, ±1 mV
	Temp.	±0.1 K	±0.1 K	±0.1 K
Calibration			1-, 2-, 3-, 4-, 5-point, WTW techn. buffer, DIN, NIST, as well as additional 20 buffer sets	1-, 2- or 3-point WTW technical buffers or DIN/NIST
		MultiCal® calibration automatic:		
	AutoCal	2-/3-/4-/5 point		
	AutoCal-Tec	2-/3-/4-/5 point		
	ConCal®	1-/2-/5 point		
	ISECal	2 bis 7 points		
		Special functions: Known addition (single) Known subtraction Sample addition Sample subtraction Known addition with blank value correction		

inoLab® pH/ION 7320 – Reliable ISE measurement and documentation

The inoLab® pH/ION 7320 with two pH/mV/ISE inputs is perfectly suited for precision measurement and automatic GLP/AQA compliant documentation in quality laboratories of all industries. Also available with optional built in printer.

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inoLab® pH/ION 7320P
(with built-in printer)

inoLab® pH 7310: Reliable pH documentation

inoLab® pH 7310P (with built-in printer)

- **USB interface for fast data transfer**
- **Data output in *.csv-Format or via optionally installed printer**
- **CMC function for measuring range monitoring**

The inoLab® pH 7310 is perfectly suited for precision measurement and automatic GLP/AQA compliant documentation in quality laboratories of all industries. Also available with optionally installed printer.

Reliable measurements

- Repeatable measurement results due to active automatic AutoRead function for the detection of stable measured values
- The CMC function visualizes the optimal measuring range for correct measurement
- Graphic display with clear text menus for convenient and safe operation

GLP/AQA compliant documentation

- Alphanumeric input of the electrode serial number
- Transfer of all data in *.csv format via USB interface at the PC, formatted takeover into Excel (MultiLab® Importer)
- Output possible via optionally installed printer

Flexible and high performance:

- 1- to 5-point calibration with calibration timer for all requirements
- 24 pre-programmed buffer sets for easy calibration
- 1- to 5-point calibration with customer-specific buffers
- Backlit graphics display

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SenTix® pH electrodes analogue

WTW SenTix® quality electrodes – measurement convenience and precision in one.

- Low-resistance membrane glasses warranty stable measurement signals even at low temperatures
- Silver ion-free reference electrolyte together with the proven platinum wire junction prevents measurement problems due to precipitating silver compounds
- Functional slider for opening and safe closing of the refill opening with electrodes with liquid electrolyte.
- Connection possibilities: waterproof DIN plug, BNC plug, fixed cable (1 or 3 m) or plug head (S7)

Technical specifications: SenTix® pH electrodes analogue

Models	pH electrodes with gel electrolyte							pH electrodes with liquid electrolyte							
SenTix® ...	20	21	21-3	22	41	41-3	42	51	52	60	61	62	81	82	91
Measurement Range pH	0 ...14 pH				0 ...14 pH			0 ...14 pH		0 ...14 pH			0 ...14 pH		0 ...14 pH
Application area temp.	0 … 80 °C				0 … 80 °C			0 … 80 °C		0 ...100 °C			0 ...100 °C		0 ...100 °C
Reference electrolyte	Gel							KCl 3 mol/l, Ag^+-free							
Membrane shape	Cylinder				Cylinder			Cylinder		Cone			Cone		sphere
Membrane resistance	<1 GΩ				<1 GΩ			<1 GΩ		<600 MΩ			<600 MΩ		<600 MΩ
Diaphragm	Fibre				Fibre			Ceramics		Platinum			Platinum		Platinum
Shaft material	Plastic				Plastic			Plastic		Glass			Glass		Glass
Shaft length (±2 mm)	120 mm				120 mm			120 mm		120 mm			120 mm		170 mm
Shaft-Ø (±0.5 mm)	12 mm				12 mm			12 mm		12 mm			12 mm		12 mm
Temperature sensor	–				integr. NTC (30 KΩ)			integr. NTC (30 KΩ)		–			integr. NTC (30 KΩ)		integr. NTC (30 KΩ)
Connection	①	②	②	②	②	②	②	②	②	①	②	②	②	②	②
Electrode cable	③*	④	⑤	④	④	⑤	④	④	④	③*	④	④	④	④	④
Electrode plug	⑥/⑦	⑥	⑥	⑦	⑥+⑧	⑥+⑧	⑦+⑧	⑥+⑧	⑦+⑧	⑥/⑦	⑥	⑦	⑥+⑧	⑦+⑧	⑥+⑧

Models	pH electrodes for special applications									
SenTix® ...	H	HW	HWD	SP	SP-DIN	Sur	Mic	Mic-D	Mic-B	RJD
Measurement Range pH	0 … 14 pH	0 … 14 pH	0 … 14 pH	2 … 13 pH		2 … 13 pH	0 … 14 pH	0 … 14 pH		2 … 13 pH
Application area temp.	0 ... 80 °C	0 ... 60 °C	-5 ... 100 °C	0 ... 80 °C		0 ...50 °C	0 ... 100 °C	-5 ... 100 °C		0 ... 80 °C
Reference electrolyte	KCl 3 mol/l, Ag^+-free			Polymer			KCl 3 mol/l, Ag^+-free			Polymer
Membrane shape	Cylinder	Cylinder	Sphere	Spear		Flat	Cylinder	Cylinder		Calotte
Membrane resistance	< 2 GΩ	< 800 MΩ	< 600 MΩ	< 400 MΩ		< 1 GΩ	< 700 MΩ	< 1 GΩ		< 600 MΩ
Diaphragm	Split ring	Split ring	Split ring	Hole		Split ring	Ceramics	Platinum		Split ring
Shaft material	Glass	Glass	Glass			Glass	Glass	Glass		Glass
Shaft length (±2 mm)	170 mm	170 mm	170 mm	65/25 mm		120 mm	40/80 mm	96 mm **		120 mm
Shaft-Ø (±0.5 mm)	12 mm	12 mm	12 mm	15/5 mm		12 mm	12/5 mm	3 mm		12 mm
Temperature sensor	–	–	integr. NTC (30 KΩ)	–		–	–	–		integr. NTC (30 KΩ)
Connection	①	①	②	①	②	①	①	②	②	②
Electrode cable	③*	③*	④	③*	④	③*	③*	④	④	④
Electrode plug	⑥/⑦	⑥/⑦	⑥+⑧	⑥/⑦	⑥	⑥/⑦	⑥/⑦	⑥	⑦	⑥+⑧

* not contained in the scope of delivery
** from grinding upper edge

①: Plug head, ②: Fixed cable,
③: AS/DIN, AS/DIN-3 or AS/BNC, ④: Cable length 1 m, ⑤: Cable length 3 m,
⑥: DIN plug, ⑦: BNC plug, ⑧: Banana plug