Lab and Field Instrumentation

pH · ORP · ISE · DISSOLVED OXYGEN · CONDUCTIVITY ·
MULTI-PARAMETER · BOD/RESPIRATION · PHOTOMETRY · TURBIDITY

WTW
a xylem brand

Typical Electrochemistry Applications

Pharmaceutical Water

Conductivity
Flow Measurement
with
inoLab® Cond 7310

see pp. 72

Swimming Pools

pH Control Measurement
with
ProfiLine pH 3110

see pp. 37

Measurement of Ultrapure Water

Conductivity Measurement
with
VARIO® C_{ond}

see pp. 79

Chemical Water

pH/Conductivity
Measurement
with
inoLab® Multi 9420 IDS

see pp. 14

Fish Farming

D.O. Measurement
with
ProfiLine Oxi 3205
and DurOx®
incl. Protection Cap

see pp. 64

Cosmetics/Detergents

pH Measurement
with
VARIO® pH

see pp. 39

Ground Water

D.O./pH/Conductivity
Measurement
with
*Multi 350i/3500i**
and MPP 350

see pp. 22

Semi-conductor Industry

pH/Conductivity
Measurement
with
ProfiLine Cond 3210 + KLE 325

see pp. 76

Surface Water

D.O./pH/Conductivity
Measurement
with
MultiLine® 3430
+ FDO® 925

see pp. 19

Process Technology

D.O./pH/Conductivity
Measurement
with
MultiLine® 3430
+ FDO® 925

see pp. 19

Depths Profiles, Limnology

D.O./pH/Conductivity
Profiles with
Multi 1970i
+ Depth Armatures

see pp. 27

Food and Beverage Industry

pH/D.O. Measurement
with
MultiLine® 3420
+ FDO® 925

see pp. 20

Biotechnology (not autoclavable)

D.O./pH/Conductivity
Measurement
with
MultiLine® 3410
+ FDO® 925

see pp. 20

Wastewater Treatment Plant: Aeration Basin

D.O. Control Measurement
with
MultiLine® 3420 + FDO® 925

see pp. 20

** North American version*

General Technical Data ...

Optical Instruments

Laboratory Meters

	photoLab® Series			Thermo-reactor	Turb®	
	S6	S12	6100 VIS 6600 UV-VIS	CR 2200 CR 3200 CR 4200	550/550IR	555/555IR
Cuvette Size (mm)	16	16, 10, 20, 50	16, 10, 20, 50	16	28	28
Internal Diagnostics	●	●	●	●	●	●
Drain	●	●	●	—	—	—
Display	LCD	LCD	Graphic/ backlit	LCD	LCD	LCD
Keypad	Silicone	Silicone	Foil with Prompts	Foil with Prompts	Foil with Prompts	Foil with Prompts
Choice of Language	●	●	●	●	—	—
Memory: Data Sets	500	1000	1000/ 4 MB	—	●	●
Methods/ User Defined Methods	130/—	150/50	200/100	5;–/5;8/5,8	—	—
Real Time Clock	●	●	●	●	●	●
GLP Supported Functions	●	●	●	●	●	●
AQA	●	●	●	—/●/●	●	●
Identification No.	●	●	●		—	—
Calibration Protocol	●	●	●	●	●	●
Calibration Interval Selectable	●	●	●	—	●	●
Password Protection	●	●	●	—	—	●
Interface	RS 232	RS 232	2 USB 1 RS232	RS 232	RS 232	RS 232
PC Connection	●	●	●	●	●	●
PC Software MultiAchat II	—	optional	●	—	—	—
Alarm Function	—	—	●	●	—	—
Method Update via Internet	●	●	●/USB	—	—	—
Dimensions mm (in.) (H x W x D)	140x270 x260 (5.51x10.63 x10.24)	140x270 x260 (5.51x10.63 x10.24)	404x197 x314 (15.91x7.76 x12.36)	185x256 x315 (7.28x10.08 x12.40)	100x252 x290 (3.34x9.92 x11.42)	100x252 x290 (3.34x9.92 x11.42)
Weight kg (lb.)	2.3 (5.07)	2.3 (5.07)	4.1 (9.04)	3/4/4 (6.61/8.82/8.82)	1 (2.20)	1 (2.20)
Universal Power Supply	—	—	●	Switch-able	●	●
Rechargeable Batteries	optional	optional	Yes/12 V	—	—	—
Certificates	CE	CE	CE/UL/ CUL	CE/ ETLus/cETL	CE/UL/ CUL	CE/UL/ CUL
Warranty	2 Years	2 Years	2 Years	2 Years	2 Years	2 Years

Portable Meters

	pHotoFlex® Series			Turb®	
	pHotoFlex® STD	pHotoFlex® pH	pHotoFlex® Turb	Turb® 430 IR/T	Turb® 355T/IR
Cuvette Size (mm)	16, 28	16, 28	16, 28	28	25
Internal Diagnostics	●	●	●	●	●
Waterproof Housing	IP 67	IP 67	IP 67	IP 67	—
Display	Graphic/ backlit	Graphic/ backlit	Graphic/ backlit	Graphic/ backlit	LCD
Temperature Display	—	●	●	—	—
pH/Turbidity	—/—	●/—	●/●	—/●	—/●
Keypad/ Acoustic Prompts	Silicone/●	Silicone/●	Silicone/●	Silicone/●	Foil with Prompts
User Selectable Languages	●	●	●	●	—
Memory: Data Sets	100	1000	1000	1000	—
Real Time Clock	●	●	●	●	—
GLP Supported Functions	●	●	●	●	—
Identification No.	●	●	●	●	—
Calibration Protocol	—	●	●	●	—
Calibration Interval	—	●	●	●	—
Interface	RS 232	RS 232	RS 232	RS 232	—
PC Connection	●	●	●	●	—
LabStation for Lab Use incl. Rech. Batt.	optional	optional	optional	optional	—
PC Software Support Optional	●	●	●	●	—
Alarm Function	●	●	●	●	—
Clock/Timer	●/●	●/●	●/●	●/—	—
Method Update via Internet	●	●	●	●	—
Firmware Update via Internet	●	●	●	●	—
Dimensions mm (in.) (H x W x D)	117x86 x236 (4.61x3.39 x9.29)	117x86 x236 (4.61x3.39 x9.29)	117x86 x236 (4.61x3.39 x9.29)	117x86 x236 (4.61x3.39 x9.29)	48x70 x165 (1.89x2.76 x6.50)
Weight kg (lb.)	0.6 (1.32)	0.6 (1.32)	0.6 (1.32)	0.6 (1.32)	0.420 (0.93)
Battery Operated	●	●	●	●	●
Rechargeable Batteries	—	optional	optional	optional	—
Certificates	CE/ ETLus/ cETL	CE/ ETLus/ cETL	CE/ ETLus/ cETL	CE/ ETLus/ cETL	CE
Sets	—	●	●	●	●
Warranty	2 Years	2 Years	2 Years	2 Years	2 Years

IDS System

INTELLIGENT DIGITAL SENSORS

Laboratory measurements with IDS

NEW

up to 3 channels – all parameters simultaneous

pH Cond O2

inoLab® Multi 9420 IDS and 9430 IDS see page 14.

Multi 3410 IDS see page 18 as well as on pages 34, 60 and 74.

1 channel – all parameters

O2 Cond pH

Cond pH O2

up to 3 channels – all parameters simultaneous

Multi 3420 IDS and Multi 3430 IDS see page 18.

Cond pH O2

1 channel – all parameters

inoLab® Multi 9310 IDS see page 16 as well as on pages 30, 56 and 70.

Field measurements with IDS

NEW

Depth measurements with IDS

Multi-parameter probe more information on request

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NEW

Accurate. Compliant. Secure.

inoLab® at its best

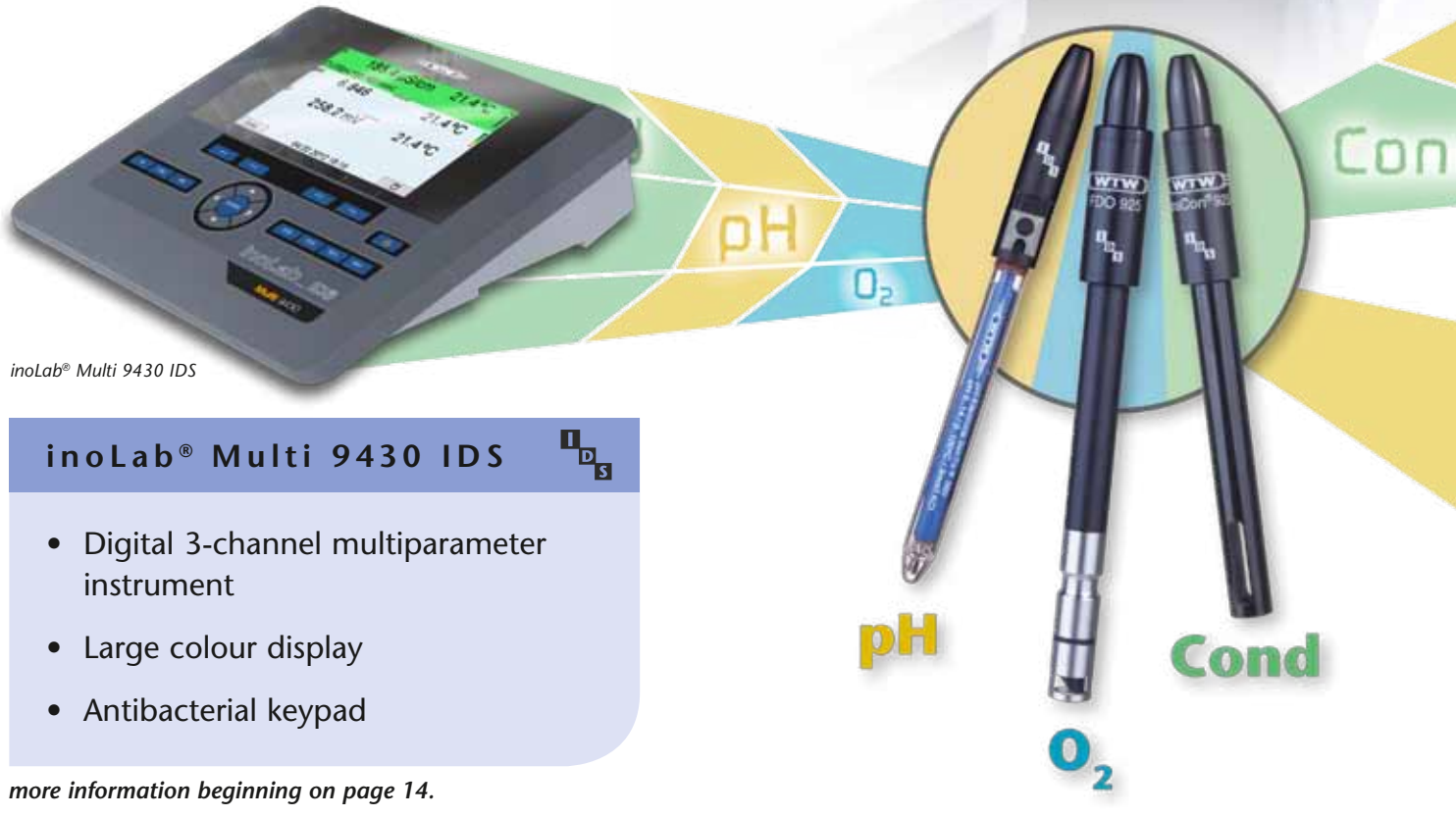
inoLab® series

- Accurate measurements
- Compliant documentation
- Securely traceable

The new inoLab® family for measuring pH, conductivity and dissolved oxygen …

Advanced safety as well as complete documentation combined with the unique IDS sensors is presented by the new inoLab® Multi IDS series. A variety of instruments with one, two or three universal Digital measuring channels support the measurement of user defined parameters in any combination throughout any quality assurance laboratory.

For one focussing on a great variety of application specific conventional sensors, can definitely rely on the new instruments oft the inoLab® 7110 and inoLab® 7310 series.



inoLab® Multi 9430 IDS

inoLab® Multi 9430 IDS

- Digital 3-channel multiparameter instrument
- Large colour display
- Antibacterial keypad

more information beginning on page 14.

inoLab® Multi 9420 IDS

- Digital 2-channel multiparameter instrument
- Large color display
- High-quality housing

more information beginning on page 14.

inoLab® Multi 9420 IDS

inoLab® Multi 9310 IDS

inoLab® Multi 9310 IDS

- Multiparameter measuring system with IDS sensors
- Digital sensor recognition
- Intelligent sensor evaluation (QSC)

more information on page 16 as well as on pages 30, 56 and 70.

NEW

Compliant documentation...

... with the inoLab® 7310 series.

inoLab® 7310 series

- USB interface
- Data output in csv format
- Optional integrated printer

inoLab® Cond 7310

inoLab® Cond 7310P

more information on pages 32, 58 and 72.

Securely traceable...

... with the inoLab® 7110 series.

inoLab® 7110 series

- Automatic Auto Read function
- Calibration timer
- Easy handling

more information on pages 32 and 72.

inoLab® pH 7110 IDS

All instruments are available in application sets with sensors and are supplied with power supply and sensor stand.

NEW

Optical D.O. measuring with Oxi 3315 and FDO® 925

ProfiLine Oxi 3315

- Optical IDS D.O. measuring
- Robust and waterproof
- With data storage and USB interface

more information beginning on page 60.

pHotoFlex® STD

for Water Analysis and Environmental monitoring

pHotoFlex® STD is the latest member of the pHotoFlex® series providing water analysis and environmental monitoring for river and lake protection. All available test kits for the photoFlex® series can be used - not including pH and turbidity measurements. For all requiring advanced testing of turbidity, ammoniac and carbon dioxide, the pHotoFlex® pH and pHotoFlex® Turb are an excellent choice.

more information beginning on page 117.

pHotoFlex® STD

- Portable
- 200 test programs/methods
- 100 data sets
- 10 user defined programs

New test kits for water analysis and environmental monitoring

The range of economic cell and powder pillow tests for water analysis and environmental monitoring

has been enhanced: the test can be used with pHotoFlex® and photoLab® 6000 series now:

- Ammonium
- Chlorine
- COD
- Iron
- Manganese
- Molybdenum
- Nitrate
- Nitrite
- Phosphate
- Nitrogen total
- Sulphate

2 new ISO compliant COD cell tests for the most frequent and highest measurement range:

- Model 01796 for 5-80 mg/l COD
- Model 01797 for 5.000-90.000 mg/l COD

Field and Process

	Digital				Conventional				
	Multi 3410	Multi 3420	Multi 3430	Oxi 3315	pH/Cond 340i	pH/Oxi 340i	Multi 340i	Multi 350i	pH/ION 340i
pH/ORP	All SenTix® 9xx, SensoLyt® 900, and conventional electrodes with S7 plug head via ADA S7/IDS				All SenTix® electrodes with DIN plug			All SenTix® electrodes with DIN plug and combined ISE electrodes of the 800 series	All SenTix® electrodes with DIN plug and ISE electrodes
Dissolved oxygen	FDO® 925-x			FDO® 925-x		CellOx® 325	CellOx® 325	CellOx® 325, DurOx® 325, ConOx	
Conductivity	TetraCon® 925, LR 925/01				TetraCon® 325		TetraCon® 325	All state-of-the-art WTW conductivity cell, ConOx	
Multi-parameter probes								ConOx, MPP 350-x	
Routine measurements	❍			❍	❍			❍	❍
Routine measurements with documentation	●			●	●			●	●
AQS/GLP	●			●	●			●	●
High precision	●			●	—			●	●
Control measurements	●			●	●			●	●
LIMS connection	●			●	❍			●	❍
Quality Assurance	●			●	●			●	●
Training	❍			❍	●			❍	❍
Service	●			●	●			●	●
Laboratory measurements	❍			❍	❍			❍	❍
Field measurements	●			●	●			●	●
Depth measurements	●			●	—			●	—
Measurements acc. to pharmacopoeia (conductivity/D.O.)	— / ●			●	— / ❍			● / ❍	—
PC interface	●			●	●			●	●
External control	—			—	●			—	●

Laboratory Measurements

	Digital		
	inoLab® Multi 9310	inoLab® Multi 9420	inoLab® Multi 9430
pH/ORP	All SenTix® 9xx and conventional electrodes with S7 plug head via ADA S7/IDS, 9420/9430 additionally via retractable DIN/BNC adapter also conventional electrodes can be connected		
Dissolved oxygen	FDO® 925		
Conductivity	TetraCon® 925, LR 925/01		
Routine measurements	❍		
Routine measurement with documentation	●		
AQS/GLP	●		
High precision	●		
Control measurements	●		
LIMS connection	●		
Quality Assurance	●		
Training	❍		
Service	—		
Laboratory measurements	●		
Field measurements	❍		
Depth measurements	—		
Measurements acc. to pharmacopoeia (conductivity/D.O.)	— / ●		
PC interface	●		
External control	—		

pH 3110	pH 3210	pH 3310	Oxi 3205	Oxi 3210	Oxi 3310	Cond 3110	Cond 3210	Cond 3310
All SenTix® electrodes with DIN plug								
			CellOx®, DurOx®					
						KLE 325, TetraCon® 325	All state-of-the-art WTW conductivity cell	
●	●	❍	●	●	❍	●	●	❍
—	—	●	—	—	●	—	—	●
—	—	●	—	—	●	—	—	●
—	●	●	—	●	●	—	●	●
—	●	●	—	●	●	—	●	●
—	—	●	—	—	●	—	—	●
—	❍	●	—	❍	●	—	❍	●
●	❍	❍	●	❍	❍	●	❍	❍
●	●	●	●	●	●	●	●	●
—	—	❍	—	—	❍	—	—	❍
●	●	●	●	●	●	●	●	●
—	—	—	—	—	—	—	—	—
—	—	—	—	●	●	—	●	●
—	—	●	—	—	●	—	—	●
—	—	—	—	—	—	—	—	—

Conventional

inoLab® pH 7110	inoLab® pH 7310	inoLab® Oxi 7310	inoLab® Cond 7110	inoLab® Cond 7310	inoLab® pH/ION 7320
All SenTix® electrodes with DIN or BNC plug					All SenTix® electrodes with DIN or BNC plug and ISE electrodes
		CellOx® 325, StirrOx® G			
			All state-of-the-art WTW conductivity cells		
●	❍	❍	●	❍	❍
—	●	●	—	●	●
—	●	●	—	●	●
—	●	●	—	●	●
—	●	●	—	●	●
—	●	●	—	●	●
—	●	●	—	●	●
●	❍	❍	●	❍	❍
—	—	—	—	—	—
●	●	●	●	●	●
—	—	—	—	—	—
—	—	—	—	—	—
—	—	❍	●	●	—
—	●	●	—	●	●
—	—	—	—	—	—

Multi-parameter Measurements

... redefined

IDS

The IDS concept from WTW: intelligent, digital sensors for the standard parameters pH, conductivity and dissolved oxygen.

The IDS system consists of two components: digital sensors and the matching field and laboratory instruments.

New: measuring values are now processed directly in the sensor and not by the instrument.

IDS advantages

- The sensitive measuring signals are converted into interference-free data in the sensor.
- All sensor, instrument, and user data are available for automatic documentation.
- Calibration data are independently stored in the sensor and cannot go lost.
- Besides the measuring and calibration data further additional information can be transmitted.

Proven sensor technology

Based on the thousandfold proven sensors of SenTix®, SensoLyt® and the TetraCon® series, the IDS sensors provide additional precision and reliability for almost any application.

I **Intelligent:**

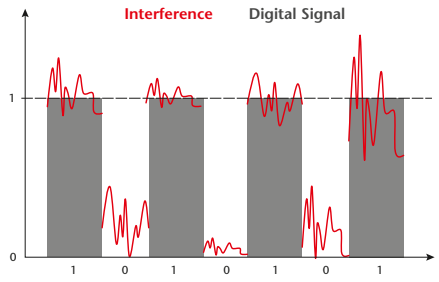
Intelligent sensors always store their identification data

- Every sensor is identified uniquely
- Automatic login to the meter
- Calibration values are stored directly in the sensor

D **Digital:**

Digital signal processing and transmission

- No interference with digital signal transmission
- Long cable lengths do not affect signal
- High accuracy through digital signal processing directly in the sensor



S **Sensor:**

Sensors for every application

- Application-specific IDS sensors for every parameter
- Built upon proven WTW technology
- Special pH electrodes can be connected by using an adapter

MultiLine® and inoLab® IDS

Not only for the field but also for the laboratory: Besides the modern portable MultiLine® meters Multi 3410, 3420 and 3430 there is a new generation of laboratory benchtop meters: the inoLab® IDS series with the inoLab® Multi 9310 IDS, the inoLab® Multi 9420 IDS and the inoLab® Multi 9430 IDS.

The common feature: all meters work with the IDS sensors. The portable meters are waterproof and robust and are equipped with one, two or three measuring channels. The brilliant color display with menu control allows to display important additional information. Via the two USB interfaces a memory stick, an external printer or a PC can be connected for documentation.

The inoLab® Multi 9310 IDS is a digital single-channel meter at an outstanding price/performance ratio. It is ideal for all applications in quality assurance.

The inoLab® Multi 9420 IDS and inoLab® Multi 9430 IDS are digital high-performance dual- or triple-channel laboratory meters with a glass shielded color display, high-quality zinc die-casting lower case and antibacterial keypad. Any parameters can be measured simultaneously and documented.

Unique and Distinctive: IDS Sensors

The new IDS sensors – intelligent, digital sensors – represent the next generation of WTW electrochemical sensor technology. Equipped with innovative measurement electronics, IDS sensors automatically store their unique serial number and calibration data. IDS sensors not only store data, but also process signals providing superior data integrity. This enables effective evaluation of the sensor quality by means of the Quality Sensor Control (QSC) function.

IDS pH/ORP Electrodes

pH/ORP electrodes are the most commonly used electrochemical sensors. At the same time, they provide the most sensitive measuring signals and must be serviced and calibrated on a routine basis. The concept of IDS sensors precisely takes effect here.

IDS pH/ORP Electrodes

- Fail-safe measuring signal
- Calibration status in the electrode
- Proven reliability and accuracy

Interference-free measurements

The conversion of the measuring signal into an interference-proof digital signal takes place directly in the electrode. This also means a pH measurement with long cables is now possible.

Calibration data in the sensor

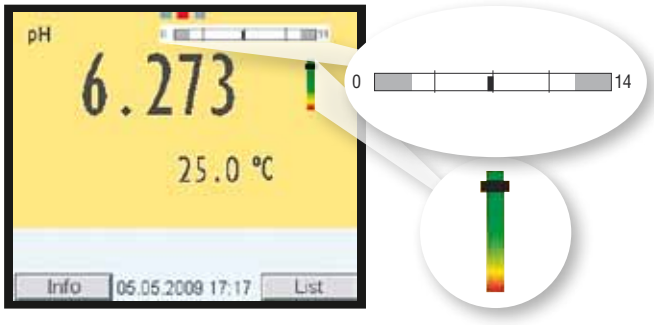
The calibration data are stored in the electrode itself, transmitted to the meter and displayed. In addition to the proven CMC function for the visual presentation of the calibration point, the new QSC function provides a graphic assessment of the actual electrode quality for IDS pH electrodes.

Proven electrodes

The technology of the new IDS pH/ORP electrodes is built on the proven, high quality electrodes of the SenTix® and SensoLyt® series. Measurement and maintenance of the electrodes remain unchanged: the only difference is in the electrode head.

CMC function:

The CMC function graphically supports the continuous monitoring of the measuring range. The measuring range is displayed as a graphic bar with the calibration points as vertical lines. Each calibration point includes a confidence range of ± 2 pH. A moving cursor shows the current measured value and indicates if the measurement range is within the range or whether the calibration should be adjusted to match the giving measuring requirements.



QSC function

QSC (Quality Sensor Control) is a system to monitor the condition of the IDS pH electrode. An initial calibration is performed and thereafter the sensor status is monitored over time. The result is displayed as a graphical symbol. For the MultiLine® and inoLab® Multi 9420/9430 IDS meters this is a green to red shaded bar, for the inoLab® Multi 9310 IDS it is a black and white scale element.

ADA S7/IDS

The ADA S7/IDS® connects special electrodes such as penetration, split ring or surface electrodes. The S7 plug head can be easily connected to a MultiLine® or inoLab® IDS instrument.

IDS pH/ORP Electrodes

Model	SenTix® 940	SenTix® 940-3	SensoLyt® 900-6	SensoLyt® 900-25	SenTix® 950	SenTix® 980	SenTix® ORP 900	SensoLyt® ORP 900-6	SensoLyt® ORP 900-25
Order No.	103 740	103 741	103 742	103 745	103 750	103 780	103 790	103 746	103 747
pH measuring range	pH: 0.000 … 14.000 ± 0.004		pH: 2.000 … 12.000 ± 0.004		pH: 0.000 … 14.000 ± 0.004		mV: ± 1200.0 ± 0.2		
Temperature range	0 … 80 °C (32 … 176 °F)		0 … 60 °C (32 … 140 °F)		0 … 80 °C (32 … 176 °F)	0 … 100 °C (32 … 212 °F)	0 … 100 °C (32 … 212 °F)	0 … 60 °C (32 … 140 °F)	
Reference electrolyte	Gel		Polymer		3 mol/l KCl		3 mol/l KCl	Polymer	
Membrane shape	Cylinder		Cylinder		Cylinder	Cone	—		
Diaphragm	Fiber		Hole		Ceramic	Platinum wire	Ceramic	Hole	
Shaft material	Plastic		Glass		Plastic	Glass	Glass		
Shaft dimensions	Length 120 mm (0.39 ft.) ± 2 mm, Ø 12 mm (0.04 ft.) ± 0.5 mm								
Temp. accuracy	± 0.2 °C						—	± 0.2 °C	
Cable length	1.5 m (4.92 ft.)	3 m (9.84 ft.)	6 m * (19.68 ft.)	25 m * (82.02 ft.)	1.5 m (4.92 ft.)	1.5 m (4.92 ft.)	1.5 m (4.92 ft.)	6 m * (19.68 ft.)	25 m * (82.02 ft.)

* IP 68

FDO® 925 – the Optical Dissolved Oxygen Sensor for Field and Lab

FDO® 925

- Robust and waterproof
- Extremely fast (t_{99} < 60s)
- Free of incident flow with beveled membrane
- Factory calibrated sensor cap with intelligent chip

In laboratory and process applications

The FDO® 925's small dimensions make it suitable for **lab and process**. The flow-free, easy-to-clean, beveled membrane allows it to be used in containers with low sample volumes. Low oxygen concentrations under 1 mg/l can also be detected accurately.

In the field

The fast and flow-free FDO® 925 is perfectly suited for **field measurement**. Accessories such as protective armor made of plastic or stainless steel, make this sensor ideal for use in harsh environments. The Kevlar®-strengthened cables of varying lengths allow reliable measurements in deep lakes or raging rivers.

In the wastewater plant

In the **sewage plant**, FDO® 925 excels at BOD measurement in the Karlsruhe bottle as well as in the monitoring of stationary measurement systems. In connection with the AutoRead function of the MultiLine® devices, its characteristics can be aligned to that of the online sensor FDO® 700 IQ and thus guarantees comparable measured values.

IDS Dissolved Oxygen Sensors	
Model	**FDO® 925**
Order No.	201 300
Concentration measuring range	0.00…20.00 mg/l ± 0.5 % of value
Saturation measuring range	0.0 … 200.0 % ± 0.5 % of value
Partial pressure measuring range	0.0 to 400 hPa ± 0.5 % of value
Temperature	0 … 50.0 °C (32 … 122 °F) ± 0.2 °C
Membrane shape	Beveled
Shaft material	POM, Stainless steel
Shaft dimensions	length, 140 mm (0.46 ft.) ± 1 mm, Ø 15,3 mm (0.05 ft.) ± 0,2 mm
Cable length	1,5 m* (4.92 ft.)

IP 68

**Also available in 3 m, 6 m and 25 m (9.84 ft., 19.68 ft. and 82.02 ft.)*

IDS Conductivity Cells

WTW offers decades of expertise in high quality, rugged conductivity cell technology, and now the new IDS conductivity cells build upon this proven technology including the automatic transfer of the cell constant feature to eliminate operation errors.

IDS Conductivity Cells

- Proven sensor technology
- Easy-to-handle
- Wide range of applications

Two models are available to cover the entire conductivity range:

Medium and high conductivities

are perfectly covered by the dirt-insensitive 4-electrode conductivity measuring cell TetraCon® 925.

Low conductivity

regarding for example measurements in pure water is recorded using the concentric electrode LR 925/01.

TetraCon® 925 *LR 925/01*

IDS Conductivity Cells

Model	TetraCon® 925	LR 925/01
Order No.	301 710	301 720
Type	4-electrode, graphite	2-electrode, stainless steel
Conductivity	10 µS/cm … 2000 mS/cm ± 0.5 % of value	0.01 … 200 µS/cm ± 0.5 % of value
Specific resistance	0.5 Ohm cm ...100 kOhm cm ± 0.5 % of value	5 kOhm cm … 100 MOhm cm ±0.5 % of value
Salinity	0.0 … 70.0 ± 0.5 % of value	—
TDS	0 … 1999 mg/l, 0,0 … 199.9 g/l ± 0.5 % of value	—
Temperature	0 … 100.0 °C (32 … 212 °F) ± 0,2 °C	0 … 100.0 °C (32 … 212 °F) ± 0.2 °C
Cell constant	0.475 cm^{-1} ± 1.5 %	0.1 cm^{-1} ± 2 %
Shaft material	Epoxy	Stainless steel
Shaft dimensions	Length 120 mm (0.39 ft.) ± 1 mm, Ø 15.3 mm (0.05 ft.) ± 0.2 mm	Length 120 mm (0.39 ft.) ± 1 mm, Ø 12 mm (0.04 ft.) ± 0.2 mm
Cable length	1.5 m* (4.92 ft.)	1.5 m (4.92 ft.)

IP 68

**Also available at 3 m, 6 m and 25 m (9.84 ft., 19.68 ft. and 82.02 ft.)*

Accessories: Protective Armor for IDS Sensors

Removable armor for electrode protection in harsh environments or when additional weight is required for depth measurement: Removable armor for the pressure-resistant IDS sensors, type SensoLyt® 900, FDO® 925 and TetraCon® 925. Available with protective shrouds made of plastic or stainless steel.

Ordering Information

		Order No.
A 925/K	Removable plastic armor suitable for IDS FDO® 925, TetraCon® 925 and SensoLyt® 900	903 836
A 925/S	As above, but with stainless steel shroud	903 837

A 925/S *A 925/K*

NEW

Laboratory Multi-parameter Instruments

Securely...

... with the state-of-the-art multi-channel instruments inoLab® Multi 9430 IDS and inoLab® Multi 9420 IDS

Cutting edge technology from WTW for demanding laboratory applications. Two digital inoLab® multi-parameter instruments for IDS sensors for parallel measuring of one identical or varying parameters. Up to three sensors (inoLab® Multi 9430 IDS) can be connected. A large glass shield protects the graphic display and supports the presentation of the measuring values and recognition of important information. The innovative and antibacterial keypad helps to protect against microbiological contamination. The solid zinc die-casting lower case gives the meters a safe standing and also protection from the environment. As a special feature, both models can be upgraded with an additional module for conventional pH measurement.

inoLab® Multi 9430/9420 IDS

- Measuring safety without compromises
- Digital sensor recognition
- Antibacterial keypad

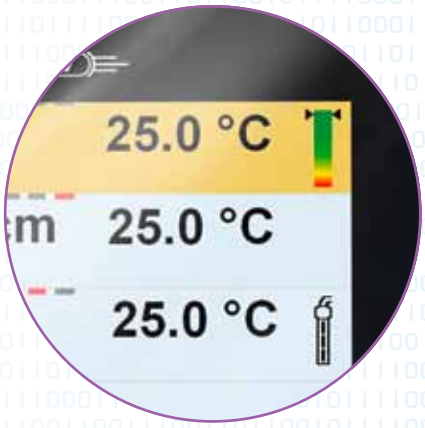
For information visit **www.WTW.com** for a customer care center near you or inside US: call **WTW 800 645 5999**.

Measuring stability

- No errors with the digital signal transmission, calibration data is allocated safely, sensor data is easily transmitted. eliminates errors
- The intelligent sensor evaluation (QSC) gives a status about the condition of the sensor and increases the operational reliability.
- The CMC function visualizes the ideal measuring range and supports correct measuring.
- Visual display of channels for allocation of sensors and parameters

Documentation complying with GLP/AQA

- Automatic, digital collection of all sensor data for unique traceability of measuring values
- User administration can be activated for correct allocation of user and measuring value
- Transfer of all data in .csv format via USB interface to PC and export to Excel (via MultiLab® Importer software, included in the delivery scope or available as download)
- Additional transfer of all stored data in ASCII and .csv format onto USB memory stick.
- Includes 2 printer drivers for external printers

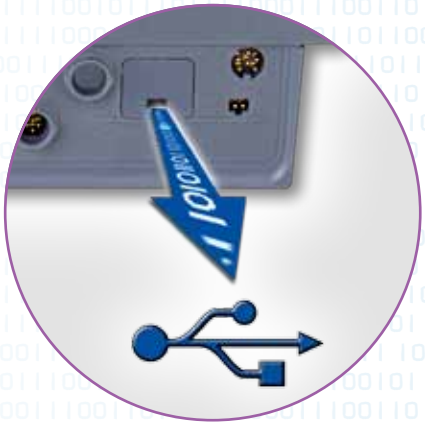


Compatible for conventional pH measurement

- With integrated pH module, compatible for pH and Redox sensors with DIN or BNC plug as well as 4 mm temperature sensor

Flexible and powerful

- Measures pH, ORP, dissolved oxygen and conductivity
- Free combination of identical or varying parameters
- Backlit graphic display CMC-, QSC- and channel display
- Including high-quality stand
- Storage for up to 10,000 data entries
- Exchangeable firmware for special measuring tasks



Securely traceable...

... with the innovative inoLab® Multi 9310 IDS

The new inoLab® Multi 9310 IDS with one digital measuring channel is perfectly suited for entering the digital multi-parameter measuring with the IDS sensors. The IDS technology enables ideal measurements and efficient documentation in the most easiest and convenient way.

inoLab® Multi 9310 IDS

- A single-channel multi-paramter benchtop meter for IDS sensors
- Digital sensor recognition
- Optional built-in printer

Measuring stability

- Error-free processing of measuring signals in the sensor
- Digital transmission of measuring signals and additional information
- Automatic adoption of calibration data and parameterization

Documentation acc. to GLP/AQA

- Automatic, digital collection of the complete sensor data for unique traceability of measuring values
- User administration of correct allocation of user and measuring value can be activated
- Transfer of all data in .csv format via USB interface to PC, formatted export into Excel also possible (using the MultiLab® Importer software, included in the delivery scope or available as download).
- Output directly via the meter or the optional built-in printer.

Flexible and powerful

- Different IDS sensors can be connected
- Measures pH, ORP, conductivity or dissolved oxygen
- Manual or time-controlled data logger
- Stores up to 5000 entries

Technical data

	inoLab® Multi 9310 IDS	inoLab® Multi 9420 IDS	inoLab® Multi 9430 IDS
Parameter	pH, mV, saturation, concentration, partial pressure, conductivity, special resistance, salinity, TDS, temperature		
Digital/IDS sensor	●	●	●
Universal measuring channels	1	2	3
Analog pH/Redox Sensors	ADA S7/IDS (optional)	ADA S7/IDS (optional)	
Temperature compensation	all except ORP	all except ORP	
Calibration points **pH** **dissolved oxygen** **conductivity**	 1–5 1 1	 1–5 1 1	
Calibration storage	max. 10	max. 10	
Calibration timer	1 – 999 days	1 – 999 days	
Data storage	manual: 500 data sets/ automatic: 5.000 data sets	manual: 500 data sets/ automatic: 10.000 data sets	
Logger	●	●	
Interface	Mini USB	USB-A, Mini USB	
GLP/AQA supported	●	●	
Display	graphic, SW	color display	
Printer option	yes	external	
Others	CMC, QSC	antibacterial keypad, QSC, CMC	
Power supply	Universal power supply, Battery (4 x 1,5 V AA Type)	Universal power supply	

Ordering Information

inoLab®		Order No.
inoLab® Multi 9310	Digital multiparameter benchtop meter for IDS sensors, for measurements/documentation according GLP/AQA. With single channel input for pH/mV, dissolved oxygen and conductivity. Single instrument with universal power supply, stand and operation manual, software and USB cable.	1FD350
inoLab® Multi 9310P	Same as 1FD350, but with integrated thermal printer.	1FD350P
inoLab® Multi 9310 SET K	Same as 1FD350, in set with IDS sensors: digital IDS pH electrode SenTix® 980, buffer 4, 7 and 10.01, 3 mol/l KCl, optical IDS DO senor FDO® 925, digital IDS conductivity cell TetraCon® 925, 0.01 mol/l KCl, conductivity standard.	1FD35K
inoLab® Multi 9420	Professional digital multiparameter benchtop meter for IDS sensors, for measurements/documentation according GLP/AQA. With dual channel input for pH/mV, dissolved oxygen and conductivity. Single instrument with universal power supply, stand and operation manual, software and USB cable.	1FD460
inoLab® Multi 9420 SET B	Same as 1FD460, in set with IDS sensors: digital IDS pH electrode SenTix® 980, buffer 4, 7 and 10.01, 3 mol/l KCl, optical IDS DO senor FDO® 925.	1FD46B
inoLab® Multi 9420 SET C	Same as 1FD460, in set with IDS sensors: digital IDS pH electrode SenTix® 980, buffer 4, 7 and 10.01, 3 mol/l KCl, digital IDS conductivity cell TetraCon® 925, 0.01 mol/l KCl, conductivity standard.	1FD46C
inoLab® Multi 9420 SET E	Same as 1FD460, in set with IDS sensors: digital IDS pH electrode SenTix® 980, buffer 4, 7 and 10.01, 3 mol/l KCl, digital IDS conductivity cell LR 925/01.	1FD46E
inoLab® Multi 9420 SET K	Same as 1FD460, in set with IDS sensors: digital IDS pH electrode SenTix® 980, buffer 4, 7 and 10.01, 3 mol/l KCl, optical IDS DO senor FDO® 925, digital IDS conductivity cell TetraCon® 925, 0.01 mol/l KCl, conductivity standard.	1FD46K
inoLab® Multi 9430	Professional digital multiparameter benchtop meter for IDS sensors, for measurements/documentation according GLP/AQA. With triple channel input for pH/mV, dissolved oxygen and conductivity. Single instrument with universal power supply, stand and operation manual, software and USB cable.	1FD470
inoLab® Multi 9430 SET B	Same as 1FD470, in set with IDS sensors: digital IDS pH electrode SenTix® 980, buffer 4, 7 and 10.01, 3 mol/l KCl, optical IDS DO senor FDO® 925.	1FD47B
inoLab® Multi 9430 SET C	Same as 1FD470, in set with IDS sensors: digital IDS pH electrode SenTix® 980, buffer 4, 7 and 10.01, 3 mol/l KCl, digital IDS conductivity cell TetraCon® 925, 0.01 mol/l KCl, conductivity standard.	1FD47C
inoLab® Multi 9430 SET E	Same as 1FD470, in set with IDS sensors: digital IDS pH electrode SenTix® 980, buffer 4, 7 and 10.01, 3 mol/l KCl, digital IDS conductivity cell LR 925/01.	1FD47E
inoLab® Multi 9430 SET K	Same as 1FD470, in set with IDS sensors: digital IDS pH electrode SenTix® 980, buffer 4, 7 and 10.01, 3 mol/l KCl, optical IDS DO senor FDO® 925, digital IDS conductivity cell TetraCon® 925, 0.01 mol/l KCl, conductivity standard.	1FD47K
ADA 94pH/IDS DIN	Integrable pH/mV module for inoLab® Multi 9420/9430 IDS for pH/ORP electrodes with DIN- and 4 mm banana plug. Including mounting accessories.	108 131
ADA 94pH/IDS BNC	Integrable pH/mV module for inoLab® Multi 9420/9430 IDS for pH/ORP electrodes with BNC- and 4 mm banana plug. Including mounting accessories.	108 132

CE cETLus **3 Year Warranty**

Portable Multi-parameter Instruments

Multi-parameter portable meters are precise measuring instruments for mobile applications in the field and operation where more than just one parameter hast o be measured. They are available in the versions for intelligent digital IDS sensors but also for operation with conventional electrodes. The advantage is not limited to the solid design, covering the functions of up to three conventional meters, it is also the convincing excellent cost/performance ratio. All meters are available in functional sets with sensors and accessories for immediate operation.

MultiLine® INTELLIGENT DIGITAL SENSORS

MultiLine® IDS Digital multi-parameter portable meters

The intelligent digital sensors give new opportunities for multi-parameters measurements. The measuring signal is not processed in the instrument, it is generated directly in the sensor and transmitted to the meter with additional information. For documentation purposes and traceability, all measuring values are completed with instrument and sensor data; on demand also with user information. The digital signal transmission for pH measurements with IDS pH sensors enables an error-free usage of long cables.

Quality at a Glance

Housing
MultiLine® instruments feature a waterproof housing and are equipped with rubber armor in all sets. The silicon mat keypad is also fully waterproof, and the large keys, with defined pressure points, ensure reliable operation, even while wearing gloves and in rough conditions.

Display
The brilliant, high-resolution graphic display guarantees excellent readability under adverse lighting conditions. The color coding icons on the display clearly differentiate the parameters being measured simultaneously. Important maintenance and measuring functions are excellently visualized.

Connector jack panel
All MultiLine® connector panels are injection molded and fully waterproof, including the two USB interfaces. The Mini-USB interface is used to transmit data to a PC or to update the firmware. The devices also have a USB-A interface that enables data to be transmitted directly to a USB stick or a selected printer without needing a PC.

The waterproof, color coded connector jacks with locking system are simple and secure. Color coding is clearly visible on the display and directly correlates with the sensor connected. The locking system ensures proper electrode connection.

One – Two – Three …

Measure every parameter sequentially or simultaneously:

Three…

… with the Multi 3430

Three galvanically isolated measuring channels, user defined combination of one parameter or varying parameters. Simultaneous multi-measuring without compromises.

Multi 3430

- Three universal measuring channels
- Clearly structured display
- Simultaneous recording of all measuring values

Two...

... with the Multi 3420

Two galvanically isolated measuring channels, user defined combination of one parameter or varying parameters. Economic multi-parameter instrument for many applications where two parameters have to be simultaneously measured and / or stored.

Multi 3420

- Two universal measuring channels
- Clearly structured display
- Simultaneous recording of all measuring values

One...

... with the Multi 3410

One measuring channel for different parameters: for measuring mainly one parameter, but with occasional need to measure a second or third parameter.

Multi 3410

- One universal measuring channel
- Large display giving additional information
- Sensor exchange made easy

Immediately ready to measure...

... with a single parameter set Multi 3410 SET 4 and the Multi 3430 SET F

Immediately ready to measure: MultiLine® sets for measuring on location. Depending on the number of sensors, sets come complete with the meters and accessories conveniently packaged in a carry case.

Single parameter set – Multi 3410 SET 4 with optical dissolved oxygen sensor FDO® 925 in a handy carry case with accessories.

Multi 3430 SET F with IDS pH sensor SenTix® 940, optical dissolved oxygen sensor FDO® 925, IDS conductivity cell TetraCon® 925 in field case with accessories.

General Features

Model	**MultiLine®**
Data storage	manual: 500 data sets/ automatic: 10.000 data sets
Data logger	manual/time scheduled
Interface	USB-A and Mini USB
Power supply	unit with charge function or 4 x 1.2 V NiMH battery pack

Ordering Information

MultiLine®		Order No.
Multi 3410	Professional digital multi meter for portable field measurement, with single channel input, color graphic display incl. data logger and USB interfaces. Single instrument with short instruction manual, CD-ROM, rechargeable batteries, driver software for USB, cable and universal power supply.	2FD450
Multi 3410 SET 4	Same as 2FD450, but in multi case set with optical DO probe FDO® 925, stand, beaker and accessories.	2FD454
Multi 3410 SET C	Same as 2FD450, but in multi case set with IDS sensors: digital pH electrode SenTix® 940, digital conductivity 4-electrode cell TetraCon® 925, QSC Kit, stand, beaker and accessories.	2FD45C
Multi 3420	Professional digital multi meter for portable field measurement, with dual channel input, color graphic display incl. data logger and USB interfaces. Single instrument with short instruction manual, CD-ROM, rechargeable batteries, driver software for USB, cable and universal power supply.	2FD460
Multi 3420 SET C	Same as 2FD460, but in multi case set with IDS sensors: digital pH electrode SenTix® 940, digital conductivity 4-electrode cell TetraCon® 925, QSC Kit, stand, beaker and accessories.	2FD46C
Multi 3430	Professional digital multi meter for portable field measurement, with triple channel input, color graphic display incl. data logger and USB interfaces. Single instrument with short instruction manual, CD-ROM and rechargeable batteries, driver software for USB, cable and universal power supply.	2FD470
Multi 3430 SET F	Same as 2FD470, but in multi case set with IDS sensors: digital pH electrodes SenTix® 940, digital conductivity cell TetraCon® 925, optical DO probe FDO® 925, QSC Kit, stand, beaker and accessories.	2FD47F
Multi 3430 SET G	Same as 2FD470, but in multi case set with IDS sensors: digital pH electrode SenTix® 940-3, digital conductivity cell TetraCon® 925-3, optical DO probe FDO® 925-3, QSC Kit, stand, beaker and accessories.	2FD47G

IP 67 CE cETLus 3 Year Warranty

Conventional multi-parameter portable instruments

Multi 350i/3500i*

- Multi-functional, high degree of accuracy
- Flexible
- All parameters simultaneously displayed

Multi 350i/3500i* –
Compact precision without compromises

pH, mV, ISE, dissolved oxygen, conductivity: The new Multi 350i/3500i* can measure all of these parameters. If desired, pH, DO, conductivity and temperature can be measured simultaneously: In the laboratory using the **combined conductivity/DO probe ConOx**, or in the field with the multi-parameter probe **MPP 350**. All current WTW pH, combination ISEs, DO and conductivity probes can be connected.

High resolution, high precision, simple, menu-driven operation. Even in poor lighting conditions the backlit graphics display provides clearly readable values. With a data logger, memory for 1,800 data sets and a real-time clock support GLP requirements.

Includes built-in NiMH rechargeable battery for up to 1,000 hours of continuous measurements, and appropriate AC adaptor.

MultiLine®

The new digital MultiLine® multi-parameter measuring instruments
see page 18

** North American version*

ConOx

- Slender
- Convenient
- Measures conductivity, dissolved oxygen and temperature simultaneously

Conductivity and dissolved oxygen measurement with fully automatic salinity correction.

The ConOx sensor is a combination probe that allows for the simultaneous measurement of conductivity, dissolved oxygen, and temperature, and features automatic salinity correction as well. The conductivity portion of the sensor incorporates a proven 4-electrode system which helps to prevent inaccurate readings sometimes caused by difficult or dirty samples. The DO portion of the probe is a galvanic sensor that allows for immediate use after cleaning – eliminating the required "warm-up" time associated with other probes. The ConOx requires little maintenance and is suitable for all water analysis applications, whether in the laboratory or field environments.

MPP 350

- pH, conductivity, dissolved oxygen and temperature at the same time
- For all areas of application in surface waters and 2 inch boreholes
- Depth measurement up to 100 m (330 ft)

An all-new Multi-parameter probe, perfect probe for use with the Multi 350i/3500i*:

The MPP 350 is designed for use with the Multi 350i/3500i* with a diameter of 41.5 mm (1.6 in.) and a length of 290 mm (11.42 in.), providing versatility for a wide range of applications. The MPP 350 allows for the simultaneous measurement of pH, dissolved oxygen and conductivity suitable for use in lakes, rivers, saltwater, brackish water, ground water or spring water, or for measurements in boreholes down to a maximum depth of 100 m (330 ft.). The special pH sensor SensoLyt® MPP-A (sold separately) provides reproducible measurement values even at low conductivity levels. The conductivity cell, with proven 4-electrode measurement technology, has a range of 1 µS/cm to 2 S/cm. The MPP 350 is available with 8 different cable lengths up to 100 m (330 ft).

** North American version*

Technical Data Multi 350i/3500i*

	pH measurement	Dissolved oxygen measurement	Conductivity measurement
Range/ Resolution	pH: -2...20.000 -2.00...20.00 mV: -999.9 ... +999.9 -2000 ... +2000 Conc.: 0.01 ... 2000 mg/l Temp.: -5.0 °C ... 105.0 °C (23.0 ...221.0 °F)	O_2 Conc.: 0.00 ... 20.00 mg/l (19.9 mg/l**) 0.0 ... 90.0 mg/l (90 mg/l**) O_2 saturation: 0.00 ... 200.0% (200%**) O_2 part. pressure: 0.0 ... 200.0 mbar (200 mbar**) 0.0 ... 1250 mbar Temp.: 0.0 °C ... 50.0 °C (32.0 ... 122.0 °F)	0.0 µS/cm ... 2000 mS/cm in 5 ranges in AutoRange mode additional: 0.00 µS/cm ... 20.00 µS/cm (K=0.1 cm^{-1}) 0.000 µS/cm ... 2.000 µS/cm (K=0.01 cm^{-1}) Temp.: -5.0 °C ... +105.0 °C Salinity: 0.0 ... 70.0 TDS: 0 ... 2000 mg/l Spec. resistivity: 0.00 ... 2000 MOhm
Accuracy (±1 digit)	pH: ± 0.004 pH. ± 0.01 pH mV: ± 0.2 mV. ± 1 mV	O_2 Conc.: ±0.5% of value O_2 saturation: ±0.5% of value O_2 part. pressure: ±0.5% of value	LF: ±0.5% of value
Temperature compensation	Automatic -5 ... +105.0 °C (23 ...221 °F) Manual -20 ... +130 °C (-4 ... 266 °F) NTC 30 kOhm: ± 0.1 K Pt 1000: ± 0.1 K	0 °C ... 50 °C (32 ... 122 °F) (on ambient temperature 5...30 °C/41 ... 86 °F) <2% at 0 ... +40 °C (32 ... 104 °F) Temperature: ±0.1 K	-5.0 ... 100 °C (23 ... 212 °F) • Linear and non-linear function for ultrapure and natural waters to EN 27 888 • Linear comp. from 0.01% ... 3.00%/K • Compensation can be switched off NTC 30 kOhm: ± 0.1 K Pt 1000: ± 0.1 K
Air pressure compensation	—	Automatic with built-in pressure sensor (500 ... 1100 mbar)	—
Salinity correction	—	Automatic or manual	—
Reference temperature	—	—	20 °C/25 °C (68 °F/77 °F) selectable
Cell constants	—	—	Fixed 0.01 cm^{-1}, Freely selectable 0.090 ...0.110 cm^{-1}, 0.250 ... 25.000 cm^{-1} With calibration 0.450 ... 0.500 cm^{-1}, 0.800 ... 1.200 cm^{-1}

Technical Data ConOx

Electrode material	Graphite
Shaft material	Epoxy/POM
Shaft length	145 mm (5.7 in.)
Cell constant	K=0.475 cm^{-1}
Diameter	15.3 mm (0.60 in.)
Range	1 µS/cm ... 2 S/cm
Temperature range	0...50 °C (32 ... 122 °F)
Dissolved oxygen sensor	Galvanic sensor
Working time	6 months with 1 electrolyte filling, zero current free

Technical Data MPP 350

Range	pH: 4 ... 12 O_2: 0 ... 600% Cond.: 1 µS/cm ... 2 S/cm Temp.: 0...50 °C (32 ... 122 °F)
Dimensions	Diameter 41.5 mm (1.6 in.)
Weight/Length	Approx. 290 mm (11.42 in.) to 410 mm (16.14 in.) (depends on special accessories) approx. 700 g (1.54 lb.)
Materials	POM, Stainless steel 1.4571 (additional weight), PVC (Cable)

Ordering Information

Portable Multi-parameter SET		Order No.
Multi 350i/3500i* SET 5	Robust and waterproof portable multi-parameter instrument with data logger and serial interface, including SenTix® 41-3 and ConOx-3, NiMH batteries and battery charger, PC communication package, professional case and accessories	2F40-114B0E
ConOx-3	Combined conductivity-DO-probe with 3 m (9.8 ft) cable and accessories	401 010
MPP 350-3	pH/DO/conductivity probe without pH electrode, with 3 m (9.8 ft) cable and accessories	401 100
SensoLyt® MPP-A	Armored pH electrode for MPP 350	401 152
SensoLyt® MPP-A Pt	Armored ORP electrode for MPP 350	401 153
A 325/S	Stainless steel armor for ConOx and CellOx®	903 831
SK 325	Protective hood suitable for A 325/S	201 580

Multi 350i/3500i:*

IP 66 IP 67 CE cETLus 3 Year Warranty

** North American version*

*** also valid for DurOx®*

Multi 340i/3400i*

- Waterproof
- Robust
- GLP compliant

The rugged, versatile Multimeter
This waterproof (IP 66) instrument with battery or optional line adaptor also meets the requirements of IP 67 and is optimally suited for use in the field, in laboratories or at production sites. Simultaneous connection of a pH/ORP electrode and a dissolved oxygen sensor or conductivity cell allows up to three parameters (including temperature) to be measured at the same time.

Additional features include:
- Up to 2500 hours continuous operation
- Easy-to-use
- Complete set available

Multi 340i/3400i* SET
- Multi-parameter instrument Multi 340i/3400i*
- Professional case with built-in measuring set-up, two STH 320 stands, two beakers, SM 325 protective armor and carrying strap with two cases
- Calibration and maintenance supplies, operating instructions

pH/Oxi 340i/3400i*, pH/Cond 340i/3400i*

- Waterproof
- Robust
- GLP compliant

Multi-parameter instruments pH/Oxi 340i/3400i* and pH/Cond 340i/3400i*

WTW portable multi-parameter instruments stand for precise multi-parameter measuring technology. The pH/Oxi 340i/3400i* for the determination of pH, dissolved oxygen and temperature and the pH/Cond 340i/3400i* for the determination of pH, conductivity and temperature, are alternatives to the single parameter instruments for applications that require the measurement of several parameters. The instruments are waterproof and also meet the requirements of IP 67. They are extremely robust and optimally suited for use in the field, in laboratories or at production sites.

Additional features include:
- Up to 2500 hours continuous operation
- Easy-to-use
- Complete set available

pH/Oxi 340i/3400i* SET
Kit includes:
Professional case with sample beakers included, pH/Oxi 340i/3400i*, pH electrode and dissolved oxygen, STH 320 stand and calibration and maintenance supplies

pH/Cond 340i/3400i* SET
Kit includes:
Professional case with sample beakers included, pH/Cond 340i/3400i*, pH electrode and conductivity cell, STH 320 stand and calibration and maintenance supplies

** North American version*

Protective Armor

For safe in-the-field use

① **SM 325** *Shock-absorbing, rubber protective armor with support handle and sensor cable management.*

② **TG/ML** *Sleeve set, suitable for SM 325 protective armor, consisting of 2 sensor sleeves, holding device and additional carrying strap for field use. Can also be used for storing the sensor.*

③ **FM/ML** *Field armor, specially designed for rough use in-the-field and in industry, is extremely robust and shock-resistant. With 2 sensor sleeves, carrying handle and additional carrying strap with holding device, sensor cable management and folding support for laboratory measurements.*

Technical Data

Model	pH/Oxi 340i/3400i*, pH/Cond 340i/3400i*, Multi 340i/3400i*	pH/Oxi 340i/3400i*, Multi 340i/3400i*	pH/Cond 340i/3400i*, Multi 340i/3400i*
	pH measurement	**Dissolved oxygen measurement**	**Conductivity measurement**
Range/ Resolution	pH: -2.00 … +19.99 mV: -1999 …+1999	O_2 concentration: 0.00 … 19.99 mg/l 0.0 … 90.0 mg/l O_2 saturation: 0.00 … 19.99% 0.0 … 600%**	1 µS/cm … 500 mS/cm in 4 ranges Salinity: 0.0 … 70.0
Accuracy (±1 digit)	pH: ± 0.01 pH mV: ± 1 mV	±0.5% of value	±1% of value
Temperature compensation	Automatic -5 … +105.0 °C (23 … 221 °F) Manual -20 … +130 °C (-4 … 266 °F)	Automatic via IMT Compensation from 0 … 40 °C (32 … 104 °F)	Non-linear function for ultrapure and natural waters to EN 27 888
Reference temperature	—	—	20/25 °C (68/77 °F) selectable
Calibration	1-2 point calibration with technical buffers	Automatic calibration	Automatic calibration

Ordering Information

Portable Multi-parameter instrument SETs		Order No.
pH/Oxi 340i/3400i* SET 2	Robust and waterproof portable multi-parameter instrument with data logger and serial interface for battery operation, including SenTix® 41-3, CellOx® 325-3, professional case and accessories	2D30-101B20
pH/Cond 340i/3400i* SET 2	Robust and waterproof portable multi-parameter instrument with data logger and serial interface for battery operation, including SenTix® 41-3, TetraCon® 325-3, professional case and accessories	2E30-101B02
Multi 340i/3400i* SET B	Robust and waterproof portable multi-parameter instrument with data logger and serial interface for battery operation, including SenTix® 41-3, CellOx® 325-3, TetraCon® 325-3, professional case and accessories	2F30-104B22
Universal power supply	100 V - 240 V, 50-60 Hz; for 340i/3400i* series	902 867

IP 66 IP 67 CE cETLus 3 Year Warranty

For other electrodes/sensors in SET, see WTW Product Details.

** North American version* *** depending on sensor and/or sample*

Portable Multi-parameter Field Meter

The WTW ProfiLine Multi 1970i, supplied with integrated powerful NiMH rechargeable batteries, is both waterproof (IP 66) and submersible (IP 67). With its RS 232 output, real-time clock and 500 data file data logger, this rugged meter conforms to all GLP requirements. It allows the simultaneous connection of pH, conductivity and dissolved oxygen probes. The parameter to be measured is set in the display via the "M" function key and can then be measured or stored. Comes equipped with a handle and carrying strap.

ProfiLine Multi 1970i

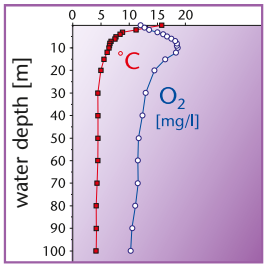
- Robust, shockproof
- Waterproof, submersible
- Most versatile multi for depth measurements

The Multi 1970i has a built-in preamplifier and is therefore suitable in combination with the WTW depth armatures for single-parameter operation at depths down to 100 m (330 ft).

Up to three depth armatures can be simultaneously connected using the adapter ADA/TA 197 pH.

Measurement at depth profiles

Dissolved oxygen, pH and conductivity: Depth armatures with integrated temperature measurement sensors, up to 100 m (330 ft) of cable with a waterproof plug (IP 67), VA 1.4571 steel armor and protective hood, pressure resistant to max. 10 bar, suitable for small boreholes (2" diameter).



From left to right:
DO depth armature TA 197 Oxi and battery-powered stirrer BR 325,
pH depth armature TA 197 pH,
4-electrode depth measuring cell TA 197 LF

Technical Data ProfiLine Multi 1970i

Model	pH measurement	Dissolved oxygen measurement	Conductivity measurement
Range/ Resolution	pH: -2.00 … +19.99 mV: -1999 …+1999	O_2 concentration: 0.00 … 19.99 mg/l 0.0 … 90.0 mg/l O_2 saturation: 0.00 … 19.99% 0.0 … 600%*	1 µS/cm … 500 mS/cm in 4 ranges Salinity: 0.0 … 70.0
Accuracy (±1 digit)	pH: ± 0.01 pH, mV: ± 1 mV	±0.5% of value	±1% of value
Temperature compensation	Automatic -5 … +105.0 °C (23 … 221 °F) Manual -20 … +130 °C (-4 … 266 °F)	Automatic via IMT compensation from 0 … 40 °C (32 … 104 °F)	Non-linear function for ultrapure and natural waters to EN 27 888
Reference temperature	—	—	20/25 °C (68/77 °F) selectable
Calibration	1-2 point calibration with technical buffers	Automatic calibration	Automatic calibration

Ordering Information

Portable Multi-parameter Field Meter		Order No.
ProfiLine Multi 1970i	Robust, waterproof, submersible multi-parameter instrument	3F30-110

IP 66 IP 67 CE cETLus 3 Year Warranty

** depends on DO sensor and medium*

For sensors, depth armatures and accessories, see WTW Product Details.

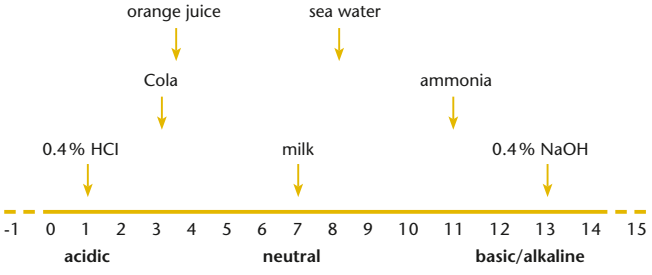
pH Value

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

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

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 that 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. 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. With modern IDS sensors the signal processing is performed inside the sensors providing better signal quality and additional documentation features.

Application Range pH Measurement

● Recommended by WTW ❍ Conditionally applicable – Not recommended

Application range	inoLab®				ProfiLine pH 1970i	VARIO® pH	Portable meters				
								ProfiLine			
	Multi IDS	pH 7110	pH 7310	pH/ION 7320			MultiLine® IDS	pH 3110	pH 3210	pH 3310	pH/ION 340i
Routine measurement	❍	●	❍	❍	❍	●	❍	●	●	❍	❍
Routine measurement with documentation	●	–	●	●	●	–	●	–	–	●	●
AQA with documentation	●	–	●	●	●	–	●	–	–	●	●
R&D high resolution and precision	●	–	●	●	●	–	●	–	●	●	●
Control measurements	●	–	●	●	●	●	●	–	●	●	●
LIMS connection	●	–	●	●	❍	–	●	–	–	❍	❍
Quality assurance	●	–	●	●	●	–	●	–	❍	●	●
Training	❍	●	❍	●	❍	●	❍	●	●	❍	❍
Service	–	–	–	–	●	●	●	●	●	●	●
Laboratory measurements	●	●	●	●	●	●	❍	–	–	❍	❍
Field measurements	–	–	–	–	●	–	●	●	●	●	●
Depth measurements	–	–	–	–	●	–	●	–	–	–	–
External control/	–	–	–	–	●	–	–	–	–	–	●
PC connection/	●	–	●	●	●	–	●	–	–	●	●
PC control	–	–	–	–	–	–	–	–	–	–	–
pH/ISE function	–	–	–	●	–	–	–	–	–	–	●
Ion-specific measurement programs	–	–	–	●	–	–	–	–	–	–	–
see page	*30*	*33*	*32*	*49*	*38*	*39*	*34*	*37*	*36*	*35*	*51*

** North American version*

For pH measurement with multi-parameter instruments, see pages 14 and 18

Application range electrodes	Conventional			Digital		
	Gel electrode	Liquid electrolyte	Special electrode	Gel electrode	Liquid electrolyte	Special electrode with adapter
Chemical solutions	❍	●	●	❍	●	●
Ultrapure water (Pharmacopeia)	–	❍	●	–	❍	●
Ground water	●	❍	–	●	❍	–
Surface water	●	❍	–	●	❍	–
Depth measurements (barrages)	–	–	●	–	–	–
Laboratory measurements	❍	●	●	❍	●	●
Food industry	❍	●	●	❍	●	●
Swimming pools	●	–	–	●	–	–
Cosmetics/detergents	–	●	●	–	●	●
Semi-conductor industry	–	❍	●	–	❍	●
Paint/varnish (water-soluble)	❍	●	●	❍	●	●
Galvanic	●	❍	–	●	❍	–
applicable instruments	*all conventional instruments*			*all MultiLine® IDS and inoLab® IDS*		

NEW

Laboratory pH Meters

Along with weight and temperature measurements, pH is the most commonly measured parameter in the laboratory. With inoLab®, WTW offers a family of laboratory instruments that meet all application requirements from routine measurements to research applications.

inoLab®

pH measurements with the new digital multi-parameter benchtop meters inoLab® IDS
see page 14

INTELLIGENT DIGITAL SENSORS

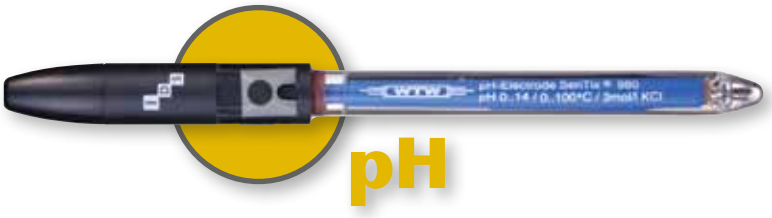
Measuring pH securely...

... with the innovative inoLab® Multi 9310 IDS

The new inoLab® Multi 9310 IDS is ideal for pH measurements in the laboratory. The IDS technology enables exceptional measuring quality and efficient documentation in the easiest way.

inoLab® Multi 9310 IDS

- Optimum measuring quality
- Digital sensor recognition
- Intelligent sensor rating



Measuring safety

- The digital signal transmission eliminates interferences, calibration data is allocated correctly, sensor data is easily transmitted.
- The intelligent sensor evaluation (QSC) gives information about the current condition of the electrode and therefore improves the operational reliability.
- The CMC function visualizes the optimal measuring range and supports a correct measuring.

GLP/AQA documentation

- Automatic, digital recording of all sensor data for traceability of measuring values
- User administration can be activated for allocation of user and measuring results
- Transfer of all data in .csv format via USB interface to PC, on demand formatted transfer into Excel (MultiLab® Importer, included in the delivery scope or as download).
- Data output via optional built-in printer possible.

Compatible for conventional pH measurements

- With the adapter ADA S7/IDS special pH electrodes with S7 plug head can be connected easily to the inoLab® Multi 9310 IDS.

Flexible and powerful

- 1- to 5-point calibration with calibration timer for all measuring tasks
- 22 stored buffer sets for easy calibration
- 1- to 5-point calibration with customized buffers
- Backlit graphic display with CMC and QSC display

Technical Data

Model	**inoLab® Multi 9310 IDS**
Measuring channel	1 (universal)
Display	LCD graphic, backlit
CMC/QSC	Yes/Yes
Data storage	Manual: 500 data sets/ Automatic: 5000 data sets
Logger	Manual/time-controlled
Interface	Mini USB
Printer (optional)	Thermo printer, width 58 mm
Power supply	**Universal power supply** 100 to 240 V, 50/60 Hz, 4 x 1,5 V AA or 4 x 1.2 V NiMH akku

Ordering Information

Digital inoLab® multi-parameter SETs		**Order No.**
inoLab® Multi 9310 IDS SET 1	Digital multi-parameter benchtop meter, set including IDS sensor, for measurements/documentation according GLP/AQA. With single channel input for pH/mV, dissolved oxygen and conductivity. Meter with universal power supply, stand and operation manual, digital IDS pH electrode SenTix® 940, buffer 4, 7 and 10.01, 3 mol/l KCl, software and USB cable.	1FD351
inoLab® Multi 9310 IDS SET 2	Meter see above, set with digital IDS pH electrode SenTix® 980.	1FD352

IP 43 CE cETLus 3 Year Warranty

For other SETs or electrodes in SET, see WTW Product Details

Reliable pH documentation...

... with the inoLab® pH 7310

The new inoLab® pH 7310 is the ideal instrument for precision measurements and automatic documentation complying with GLP/AQS in quality laboratories throughout all industries. Optional built-in printer available on demand.

inoLab® pH 7310

- USB interface for fast data transfer
- Data output in .csv format or via optional built-in printer
- CMC-function for monitoring the measuring range

Measuring reliability

- Repeatable measuring results provided by the active, automatic AutoRead function with recognition of stable end values
- The CMC function visualizes the optimal measuring range and supports correct measuring
- Graphic display with plain text menu for convenient and secure operation

GLP/AQA documentation

- Alphanumeric entry of electrode serial number
- Transfer of all data in .csv format via USB interface to PC, on demand formatted transfer into Excel (MultiLab® Importer, included in the delivery scope or as download).
- Data output via optional built-in printer possible

Flexible and powerful:

- 1- to 5-point calibration with calibration timer for all measuring duties
- 22 stored buffer sets for easy calibration
- 1- to 5-point calibration with customized buffers
- Backlit graphic display with CMC

Measuring pH precisely...

... with the inoLab® pH 7110

The new inoLab® pH 7110 is ideal for routine measurements in the laboratory where automatic documentation is not the priority.
With a smooth and easily cleaned surface.

inoLab® pH 7110

- Active AutoRead function
- Easy calibration with adjustable calibration timer
- Intuitive operation with clearly arranged keypad

Measuring reliability

- Repeatable measuring results provided by the active, automatic AutoRead function with recognition of stable end values
- Safe operation: Automized functions reduce the number of keys
- An adjustable timer recalls the next calibration and so with improves the measuring accuracy

Easy and reliable:

- 1- to 3-point calibration with calibration timer
- MultiCal® calibration system
- Automatic temperature compensation
- Large multi-functional display for pH value and temperature

Technical Data

Model		inoLab® pH 7110	inoLab® pH 7310
Range/ Resolution	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 ±0.3) mV	±(1200.0 ±0.3) mV
	Temperature	±(2000 ±1) mV	±(2500 ±1) mV
Accuracy (±1 digit)	pH	±0.005 pH ±0.01 pH	±0.005 pH ±0.01 pH
	mV	±0.3 mV, ±1 mV	±0.3 mV, ±1 mV
	Temperature	±0.1 K	±0.1 K
Calibration		1, 2 or 3-point calibration WTW technical buffers, DIN/NIST buffers	1, 2, 3, 4, 5-point calibration WTW technical buffers, DIN/NIST buffers plus 20 additional buffer sets

Ordering Information

inoLab® Labor-pH-Meter SETs		❑ Order No.	▲ Order No.
inoLab® pH 7110 SET 7/SET 2	Easy-to-operate basic pH/mV benchtop meter for routine measurement. Meter with universal power supply, stand and operation manual. Combined pH electrode SenTix® 42/41, buffer 4, 7 and 10.01, 3 mol/l KCl	1AA127	1AA112
inoLab® pH 7310 SET 4	Convenient, menu controlled pH/mV benchtop meter for measurements/documentation according GLP/AQA. Set including combined pH electrode. Meter with universal power supply, stand and operation manual. Combined pH electrode SenTix® 81, buffer 4, 7 and 10.01, 3 mol/l KCl, software and USB cable.	na	1AA314
inoLab® pH 7310P	Convenient, menu controlled pH/mV benchtop meter for measurements/documentation according GLP/AQA, with integrated thermal printer. Single meter with universal power supply, stand and operation manual. CD-ROM including software and USB cable.	1AA320P	1AA310P

IP 43 CE cETLus 3 Year Warranty

❑ with BNC plug ▲ with DIN plug

For other SETs or electrodes in SET, see WTW Product Details

NEW

Portable pH Meters

pH is a parameter that is also very important for on-site measuring. The application range reaches from determination of pH value in surface waters to process measurements in chemical factories.

MultiLine®

Measuring pH with the new MultiLine® multi-parameter portable meter

see page 18

MultiLine®

Determining pH securely...

... with the versatile Multi 3410

The single channel multi-parameter measuring instrument Multi 3410 is perfectly suited for portable pH measurements under all conditions in the field and during operation process. The IDS technology enables optimal measurements and efficient documentation in the easiest way. The Multi 3410 also allows measurements using additional sensors and parameters.

Multi 3410 IDS

- Measuring safety without compromises
- Digital sensor recognition
- Trouble-free pH measurements

Measuring safety

- The digital signal transmission eliminates interferences, calibration data is allocated correctly. Measurements with long cables for inaccessible locations are no problem.
- The intelligent sensor evaluation (QSC) gives information on the current condition of the electrode and improves the operational reliability.
- The CMC function visualizes the optimal measuring range and supports a correct measuring.

GLP/AQA documentation

- Automatic, digital recording of all sensor data for traceability of measuring values.
- User administration can be activated for correct allocation of user, measuring location and measuring results.
- Transfer of all data in .csv format via USB interface to PC or USB memory stick, on demand formatted transfer into Excel (MultiLab® Importer, included in the delivery scope or as download).

General Features

Model	**Multi 3410 IDS**
Data storage	Manual: 500 data sets/ Automatic: 10.000 data sets
Data logger	Manual/time-controlled
Interface	USB-A and Mini-USB
Power supply	Universal power supply with charging function or 4 x 1.2 V NiMH rechargeable batteries

Ordering Information

MultiLine® IDS		Order No.
Multi 3410 Set 1	Professional digital multi meter for portable field measurement. Case set with digital IDS pH electrode SenTix® 940, QSC Kit, short instruction manual, stand, beaker, CD-ROM, driver software for USB, rechargeable batteries, cable, universal power supply and accessories.	2FD 451

IP 67 CE cETLus **3 Year Warranty**

For other electrodes in Set see WTW Product Details

ProfiLine pH portable meters

Reliable pH documentation...

... with the ProfiLine pH 3310

The pH 3310 is an elegant combination of a robust portable meter and a data logger for storing measuring batches and processing those in the following via PC.

ProfiLine pH 3310

- Waterproof USB interface for fast data transfer
- Data output in .csv format
- Data logger for up to 5000 recordings

Measuring safety

- Repeatable measuring results provided by the active, automatic AutoRead function with recognition of stable end values
- The CMC function visualizes the optimal measuring range and supports correct measuring.
- Graphic display with plain text menu for convenient and secure operation

GLP/AQA documentation

- Transfer of all data in .csv format via USB interface to PC, on demand formatted transfer into Excel (MultiLab® Importer, included in the delivery scope or as download).

Flexible and powerful

- 1- to 5-point calibration with calibration timer for all measuring duties
- 22 stored buffer sets for easy calibration
- Backlit graphic display with CMC

Measuring pH precisely...

... with the ProfiLine pH 3210

The ProfiLine pH 3210 is a convenient pH/mV all-rounder for many applications.

ProfiLine pH 3210

- Graphic display with plain text menu
- 1- to 5-point calibration
- CMC function for monitoring the measuring range

Measuring reliability

- Repeatable measuring results provided by the active, automatic AutoRead function with recognition of stable end values

Measuring values

- The CMC function visualizes the optimal measuring range and supports correct measuring.
- Silicone keypad with tangible key click, optional casing for field operation

Documentation

- Data output via display for occasional documentation

Flexible and powerful

- 1- to 5-point calibration with calibration timer for all measuring duties
- 22 stored buffer sets for easy calibration
- Backlit graphic display with CMC

pH measuring made easy...

... with the ProfiLine pH 3110

The pH 3110 is ideal for all seeking an easy, robust and waterproof instrument for portable pH measuring.

ProfiLine pH 3110

- pH or ORP measurements
- Easy 1- to 3-point calibration with adjustable calibration timer
- Robust and waterproof (IP 67)

Measuring safety

- Repeatable measuring results provided by the active, automatic AutoRead function with recognition of stable end values
- Safe operation: Automized functions reduce the number of keys (6)
- Waterproof DIN-socket enables measurements in humid environments

Easy and reliable:

- High-visibility display for measuring value and temperature
- Silicone key pad with tangible key click, can also be operated with gloves
- For field operation in a case set with proven electrodes

Technical Data

Model		ProfiLine pH 3110	ProfiLine pH 3210	ProfiLine pH 3310
Range/ Resolution Accuracy	pH	-2.000 ... +19.999 ±0.005 pH	-2.000 ... +19.999 ±0.005 pH	
	mV	-1200.0 ... +1200.0 ±0.3 mV	-1200.0 ... +1200.0 ±0.3 mV	
		-2000 ... +2000 ±1 mV	-2500 ... +2500 ±1 mV	
	Temperature	-5.0 ... +105.0 ±0.1 °C (23 ... 221 °F)	-5.0 ... +105.0 ±0.1 °C (23 ... 221 °F)	
Calibration		1, 2 or 3-point calibration WTW technical buffers, DIN/NIST buffers	1, 2, 3, 4, 5-point calibration WTW technical buffers, DIN/NIST buffers plus 20 additional buffer sets	
Memory/Logger		–	Manual 200	Manual 500/5000 automatic
Display		7-Segment LCD, customized	LCD Graphic, backlit	
Continuous operation		Up to 2500 hrs.	Up to 1000 hrs. without/150 hrs. with backlight	

Ordering Information

ProfiLine Portable pH Meter SETs		Order No.
pH 3110 SET 2	Robust and waterproof portable pH meter, for battery operation, in portable case set with SenTix® 41	2AA112
pH 3210 SET 2	Robust and waterproof portable pH meter with data logger, for battery operation, in portable case set with SenTix® 41	2AA212
pH 3310 SET 2	Robust and waterproof portable pH meter with data logger and USB Mini-B interface, for battery operation, in portable case set with SenTix® 41	2AA312

IP 66 IP 67 CE cETLus 3 Year Warranty

For other electrodes in Sets see WTW Product Details

ProfiLine pH Field Meters

All WTW meters in the ProfiLine pH 1970i series are both waterproof (IP 66) and submersible (IP 67). In addition, these units float, a convenient feature when used in field applications at lakes or streams. With GLP memory functions, real-time clock, a display corresponding to the recorder output, 800 data records memory capacity, a carry handle and strap.

ProfiLine pH 1970i

- Robust, shockproof
- Fully waterproof
- Standard pH measurement and pH measurement down to depths of 100 m (330 ft)

The ProfiLine 1970i, supplied with integrated powerful NiMH rechargeable batteries, is a complete pH measuring system. When used with the TA 197 pH Depth Armature, the ProfiLine 1970i, with its built-in preamplifier, is accurate to a depth of 100 m (330 ft).

Depth armature TA 197 pH

Technical Data

Model		ProfiLine pH 1970i
Range/ Resolution	pH	-2.00 ... +19.99 pH,
	mV	-199.9 ... +199.9 mV; -1999... +1999 mV
	Temp.	-5.0 ... +105.0 °C (23 ... 221 °F)
Accuracy (±1 digit)	pH	±0.01 pH,
	mV	±0.5 at +15 °C ... +35 °C (59 ... 95 °F), ±1 at +15 °C ... +35 °C (59 ... 95 °F)
	Temp.	±0.1 K
Calibration		**MultiCal® automatic calibration:** 1,2,3-point calibration, AutoCal, AutoCal-Tec and ConCal®

Ordering Information

ProfiLine pH Field Meter – with universal power supply 100-240 VAC (50/60 Hz) included		Order No.
ProfiLine pH 1970i	Robust, waterproof, submersible pH/mV meter	3A30-110

IP 66 IP 67 · CE · cETLus · 3 Year Warranty

For depth armatures for measurements down to depths of 100 m (330 ft) see WTW Product Details

VARIO®

You notice it immediately: in addition to its ergonomic form, the new VARIO® has no keys. The innovative touch screen allows access to all functions with one-touch simplicity.

VARIO® pH

- Compatible with most electrode types
- One-hand operation
- Twistable display

The VARIO® can operate continuously for 1500 hours on one easily replaced AA (1.5 V) battery.

VARIO® comes standard with a special glass electrode that is protected by a plastic casing. The conical protective cap does not require KCl – this prevents the electrode from dripping and protects it from drying out.

The VARIO® can do even more.

The adapter included in the VARIO® Set allows compatibility with commercially available precision electrodes. The VARIO® measures as accurately and reliably as any portable instrument.

The VARIO® is an essential tool whenever speed is required in the laboratory or in production.

Measuring in no time at all

Simply touch the display – and VARIO® is ready for use. Immersion in the solution starts the measurement automatically. The stable measurement can be read from the large display together with the temperature. Memory has capacity for up to 50 measured values which can be stored for later evaluation.

When the VARIO® is not being used for pH measurements, it can be used as a laboratory clock or timer.

Light, handy, rugged – it finds a place in every laboratory coat without dripping or leaving nasty stains, as it can be stored without KCl.

Technical Data

Model	**VARIO® pH**
pH range	-2.00 ... 16.00
pH accuracy	±0.01 pH
Temperature	-5.0 ... 100.0 °C (23 ... 212 °F)
Automatic buffer recognition	TEC/NIST
Calibration points	3 (MultiCal®)

Ordering Information

VARIO®		**Order No.**
VARIO® SET V	VARIO® in the portable case set, incl. short electrode with built-in temperature probe and technical buffer 4 and 7	2V00-001V

IP 65 CE 3 Year Warranty

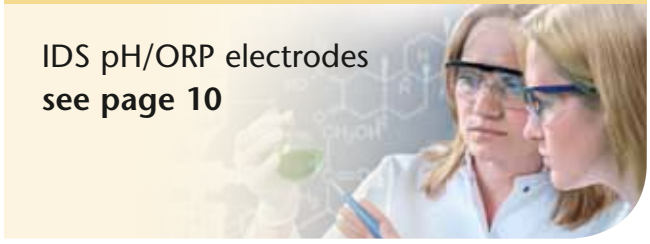
For other electrodes, see WTW Product Details

SenTix® pH electrodes for every application

SenTix® quality electrodes by WTW – convenient measurement and precision.

- Low-resistance glass membranes guarantee stable measuring signals even at low temperatures.
- Silver ion-free reference electrolyte, together with the proven platinum wire diaphragm, prevent measurement problems by precipitating silver compounds.
- Functional slide for accessing the refill opening for electrodes with liquid electrolyte.
- Connectors: Waterproof DIN connector, BNC connector, fixed cable (1 or 3 m, 3 ft. or 9 ft.) or plug head (S7 or SMEK).

Electrodes



IDS pH/ORP electrodes
see page 10

Low-maintenance pH electrodes with gel electrolyte

Ideal for portable measurements, as well as for routine measurements in-the-laboratory. With or without built-in temperature probe all electrodes have robust plastic shafts and a low-maintenance gel reference system.

SenTix® pH Electrodes

Modell	SenTix® 20 103 630	SenTix® 21 103 631	SenTix® 21-3 103 632	SenTix® 22 103 633	SenTix® 41 103 635	SenTix® 41-3 103 636	SenTix® 42 103 637
Measuring range pH	0 ...14 pH				0 ...14 pH		
Operating range °C (°F)	0 … 80 °C (32 … 176 °F)				0 … 80 °C		
Reference electrolyte	Gel				Gel		
Membrane shape	Cylindrical				Zylinder		
Membrane resistance at 25 °C (77 °F)	<1 GΩ				<1 GΩ		
Diaphragm	Fiber				Fiber		
Shaft material	Plastic				Plastic		
Shaft length**	120 mm (4.72 in.)				120 mm (4.72 in.)		
Shaft Ø***	12 mm (0.47 in.)				12 mm (0.47 in.)		
Temperature probe	—				Built-in NTC (30 KΩ)		
Connection **Electrode cable** **Electrode plug**	① ③* ⑥/⑦	② ④ ⑥	② ⑤ ⑥	② ④ ⑦	② ④ ⑥+⑧	② ⑤ ⑥+⑧	② ④ ⑦+⑧

** not included*
*** ±2 mm/±0.08 in.*
**** ±0.5 mm/±0.02 in.*

①: Plug head, ②: Fixed cable, ③: AS/DIN, AS/DIN-3 or AS/BNC, ④: Cable length 1 m (3 ft), ⑤: Cable length 3 m (9 ft), ⑥: DIN plug, ⑦: BNC plug, ⑧: Banana plug

SenTix® Special Electrodes – pH electrodes for unique applications

Special samples need special electrodes.
SenTix® special electrodes can take on the challenges associated with measuring the pH value of surfaces, solids, suspensions, emulsions, low ionic samples, smallest volumes and more. For those who require a non-glass electrode: The SenTix® FET can be used with every WTW pH meter.

SenTix® pH Electrodes

Model	SenTix® 51 103 651	SenTix® 52 103 652	SenTix® 60 103 639	SenTix® 61 103 640	SenTix® 62 103 641	SenTix® 81 103 642	SenTix® 82 103 643	SenTix® 91 103 695	SenTix® 92 103 696	SenTix® L 103 655
Measuring range pH	0 ...14 pH		0 ...14 pH			0 ... 14 pH		0 ...14 pH		0 ... 14 pH
Operating range °C (°F)	0 ... 80 °C (32 ... 176 °F)		0 ...100 °C (32 ... 212 °F)			0 ...100 °C (32 ... 212 °F)		0 ...100 °C (32 ... 212 °F)		0 ...100 °C (32 ... 212 °F)
Reference electrolyte	KCl 3 mol/l, Ag^+-free		KCl 3 mol/l, Ag^+-free			KCl 3 mol/l, Ag^+-free		KCl 3 mol/l, Ag^+-free		KCl 3 mol/l, Ag^+-free
Membrane shape	Cylindrical		Conical			Conical		Spherical		Spherical
Membrane resistance at 25 °C (77 °F)	<1 GΩ bei 25 °C (77 °F)		<600 MΩ at 25 °C (77 °F)			<600 MΩ at 25 °C (77 °F)		<600 MΩ at 25 °C (77 °F)		< 600 MΩ at 25 °C (77 °F)
Diaphragm	Ceramics		Platinum			Platinum		Platinum		Platinum
Shaft material	Plastic		Glass			Glass		Glass		Glass
Shaft length**	120 mm (4.72 in.)		120 mm (4.72 in.)			120 mm (4.72 in.)		120 mm (4.72 in.)		425 mm (46.73 in.)
Shaft Ø***	12 mm (0.47 in.)		12 mm (0.47 in.)			12 mm (0.47 in.)		12 mm (0.47 in.)		12 mm (0.47 in.)
Temperature probe	Built-in NTC (30 KΩ)		–			Built-in NTC (30 KΩ)		Built-in NTC (30 KΩ)		Built-in NTC (30 KΩ)
Connection **Electrode cable** **Electrode plug**	② ④ ⑥+⑧	② ④ ⑦+⑧	① ③ * ⑥/⑦	② ④ ⑥	② ④ ⑦	② ④ ⑥+⑧	② ④ ⑦+⑧	② ④ ⑥+⑧	② ④ ⑦+⑧	① ⑨ * ⑥+⑧/⑦+⑧

** not included*
*** ±2 mm/±0.08 in.*
**** ±0.5 mm/±0.02 in.*

①: Plug head, ②: Fixed cable, ③: AS/DIN, AS/DIN-3 or AS/BNC, ④: Cable length 1 m (3 ft), ⑤: Cable length 3 m (9 ft), ⑥: DIN plug, ⑦: BNC plug, ⑧: Banana plug

Specialists for any event – pH electrodes for special applications

The consistencies of samples in which pH is measured are very different. Liquid or solid, low-ion medium or highly concentrated, aqueous or non-aqueous phases, with or without suspended solids. In some cases even smallest volumes have to be identified and sometime glass is not acceptable. All of this can be tackled using the specialists of WTW:

For measurements in or on solids, penetration or surface electrodes are recommendable. The split ring electrode with liquid filling is suitable for determining the pH value in low-ion or concentrated solutions and also for emulsions. Samples with suspended solids can be determined the easiest using a polymer electrode. Microelectrodes can help when there are only low volumes available. And when glass is not accepted, for example in the food industry: then the ISFET electrode is the right choice.

SenTix® Special pH Electrodes

Model	SenTix® H 103 644	SenTix® HW 103 650	SenTix® HWS 103 662	SenTix® SP 103 645	SenTix® SP-DIN 103 730	SenTix® Sur 103 646	SenTix® FET-D 103 700	.../-B 103 702
Measuring range pH	0 ...14 pH	0 ...14 pH	0 ... 14 pH	2 ...13 pH		2 ...13 pH	0 ... 14 pH	
Operating range °C	0 ... 80 °C (32 ... 176 °F)	0 ... 60 °C (32 ... 140 °F)	-5 ... 100 °C (23 ... 212 °F)	0 ... 80 °C (32 ... 176 °F)		0 ... 50 °C (32 ... 122 °F)	0 ... 60 °C (32 ... 140 °F)	
Reference electrolyte	KCl 3 mol/l, Ag^+-free			Polymer		Polymer	KCl 3.3 mol/l, Ag^+-free	
Membrane shape	Cylindrical	Cylindrical	Spherical	Spear		Flat	ISFET	
Membrane resistance at 25 °C (77 °F)	< 2 GΩ	< 800 MΩ	< 600 MΩ	< 400 MΩ		< 1 GΩ	—	
Diaphragm	Split ring	Split ring	Split ring	Hole		Split ring	Fritted polyethylene	
Shaft material	Glass	Glass	Glass	Plastic		Glass	Plastic	
Shaft length (±2 mm/±0.08 in.)	170 mm (6.69 in.)	170 mm (6.69 in.)	170 mm (6.69 in.)	65/25 mm (2.56/0.98 in.)		120 mm (4.72 in.)	86 mm (3.39 in.)	
Shaft Ø (±0.5 mm/±0.02 in.)	12 mm (0.47 in.)	12 mm (0.47 in.)	12 mm (0.47 in.)	15/5 mm (0.59/0.02 in.)		12 mm (0.47 in.)	17 ... 13 mm (0.67 ...0.51 in.)	
Temperature probe	—	—	Built-in NTC (30 KΩ)	—		—	NTC (30 KΩ)	
Connection **Electrode cable*** **Electrode plug**	① ③ * ⑥/⑦	① ③ * ⑥/⑦	① ⑨ * ⑥+⑧/⑦+⑧	① ③ * ⑥/⑦	② ④ ⑥	① ③ * ⑥/⑦	② ④ ⑥+⑧	② ④ ⑦+⑧

** not included*
*** (±0.5 mm/±0.02 in.)*
**** from upper edge of ground*

①: Plug head, ②: Fixed cable, ③: AS/DIN, AS/DIN-3 or AS/BNC, ④: Cable length 1 m (3 ft), ⑤: Cable length 3 m (9 ft), ⑥: DIN plug, ⑦: BNC plug, ⑧: Banana plug, ⑨ AS S/D1 or AS S/D3 or AS S/B1 or AS S/B3, ⑩ AS S/R

SenTix® Special pH Electrodes

	SenTix®							
	Mic	Mic-D	Mic-B	SenTix® RJS	SenTix® pH	SenTix® R	SenTix® B	SenTix® V
Model	103 647	103 660	103 661	103 663	103 667	103 668	103 669	103 690
Measuring range pH	0 … 14 pH			2 … 13 pH	0 … 14 pH	–	–	0 … 14 pH
Operating range °C (°F)	0 … 100 °C (32 … 212 °F)	-5 … 100 °C (23 … 212 °F)		0 … 80 °C (32…176 °F)	0 … 80 °C (32…176 °F)	-5 … 100 °C (23 … 212 °F)	-5 … 100 °C (23 … 212 °F)	0 … 80 °C (32 … 176 °F)
Reference electrolyte	KCl 3 mol/l, Ag+-free			Polymer	–	KCl 3 mol/l, Ag+-free	Double electrolyte system	Gel
Membrane shape	Cylindrical			Calotte	Spherical	–	–	Flat
Membrane resistance at 25 °C (77 °F)	< 700 MΩ	< 1 GΩ		< 600 MΩ	< 600 MΩ	–	–	< 500 MΩ
Diaphragm	Ceramic	Platinum		Split ring	–	Platinum	Split ring	Fiber
Shaft material	Glass			Glass	Glass	Glass	Glass	Noryl
Shaft length (±2 mm/±0.08 in.)	40/80 mm (1.57/3.15 in.)	96 mm (3.78 in.) ***		120 mm (4.72 in.)	120 mm (4.72 in.)	120 mm (4.72 in.)	103 mm (4.06 in.) ***	31/20 mm (1.22/0.79 in.)
Shaft Ø **	12/5 mm (0.47/0.02 in.)	3 mm (0.12 in.)		12 mm (0.47 in.)	12 mm (0.47 in.)	12 mm (0.47 in.)	12 mm (0.47 in.)	17/19 mm (0.67/0.75 in.)
Temperature probe	—			Built-in NTC (30 KΩ)	–	–	–	NTC (30 KΩ)
Connection Electrode cable* Electrode plug	① ③ * ⑥/⑦	② ④ ⑥/⑦		① ⑨ * ⑥+⑧/⑦+⑧	① ③ * ⑥/⑦	① ⑩ * ⑧	① ⑩ * ⑧	—

** not included*
*** (±0.5 mm/±0.02 in.)*
**** from upper edge of ground*

①: Plug head, ②: Fixed cable, ③: AS/DIN, AS/DIN-3 or AS/BNC, ④: Cable length 1 m (3 ft), ⑤: Cable length 3 m (9 ft), ⑥: DIN plug, ⑦: BNC plug, ⑧: Banana plug, ⑨ AS S/D1 or AS S/D3 or AS S/B1 or AS S/B3, ⑩ AS S/R

Calibration and Maintenance Supplies

All WTW Technical Buffers are certified accurate and are NIST/DIN traceable.

(see page 150, Services).

Buffer bottles from WTW

- Easy-to-dispense
- Easy-to-clean
- Reliable calibration

QSC (Quality Sensor Control):

The QSC kit, consisting of three precision DIN buffers including pH 4.01, pH 6.87 and pH 9.18 with a deviation of ± 0.01 pH at 25 °C allows an initial calibration of the IDS pH electrodes. Ideal for quality control: All subsequent calibrations are compared with this calibration and therefore deliver the precise current state of the sensor.

Applicable buffers

	PL 4/7/9 DIN/NIST	STAPL 4/7/9 DIN/NIST	TEP 4/7 Trace	TEP 10 Trace	TEP 10	TPL 4/7 Trace	TPL 10 Trace	TPL 10
inoLab®, Multi 350i/3500i*	●	●	●	●	–	●	●	–
VARIO® pH	●	●	●	●	–	●	●	–
pH 3110, pH 3210, pH 3310, pH 315i/3150i*, 330i/3300i*, 340i/3400i*, pH/ION 340i/3400i*, pH 197i/1970i	●	●	●	●	–	●	●	–
pH/Cond 340i/3400i*, pH/Oxi 340i/3400i*, Multi 340i/3400i*, Multi 3410, 3420, 3430, Multi 197i/1970i	● **	● **	●	●	–	●	●	–
inoLab® Level 1, 2, 3/pH 197	●	●	●	–	●	●	–	●

For ordering information for calibration and maintenance supplies, see WTW Product Details

** North American version*

*** not Multi 340i/3400i*, Multi 197i/1970i*

Applications for SenTix® Electrodes

● Recommended by WTW ❍ Conditionally applicable * Only recommended for specified model

	SenTix® V	SenTix® 20 21-..., 22	SenTix® 41, 41-3, 42, RJS, 940	SenTix® 51, 52 950	SenTix® 60, 61 62	SenTix® 81, 82 980	SenTix® 91, 92, L	SenTix® H	SenTix® HW, HWS	SenTix® Sp, Sp-DIN	SenTix® Sur	SenTix® Mic, MIC-D, MIC-B	SenTix® FET	SenTix® ORP, ORP 900, PtR, Ag, Au
Acids					●	●	●		❍					Au, ORP*
Ammonia					❍	❍	❍	●						
Aquarium water	●	●	●	●	❍	❍	❍							ORP, PtR*
Beer				●	●	●			●					
Beverages				●	●	●	●	❍	❍				❍	
Bleach solution					❍	❍	❍	●	❍					
Boiler feedwater					❍	❍	❍		●					
Bread										●			●	
Cheese										●			●	
Coffee extract				❍	●	●	●		●				●	
Condensate									●					
Cosmetics	❍								●				●	
Demineralized water									●					
Developer			RJS*		❍	❍	❍	●	❍					
Dispersion colors	❍		RJS*						●					
Distilled water									●					
Drinking water	❍	❍	❍	●	●	●	●		❍					
Electroplating baths	❍		RJS*	●	●	●	●		❍					
Electroplating wastewater	●	●	●	❍	❍	❍	❍		❍					❍
Extracts					❍	❍	❍		●					
Fixing baths			RJS*	❍	❍	❍	❍	●	●					ORP, PtR*
Fruit										●			●	
Fruit juice	❍			●	●	●	●		❍				❍	
Ground water		●	●	❍	❍	❍	❍		❍					PtR*
Household cleaners	❍	❍	❍	❍	●	●	●	●	❍					
Juice	❍			●	●	●	●		❍				❍	
Leather	❍										●			
Lemonade				●	●	●	●		❍				❍	
Lyes								●						
Margarine										●			●	
Meat										●			❍	
Milk									●				❍	
Mineral water				❍	●	●	●		❍				❍	
Non-aqueous liquids				❍	❍	❍	❍		❍					
Oil/water emulsions			RJS*						●					
Paint, water-soluble	❍		RJS*						●				●	
Paper	❍										●			
Paper extract					●	●	●							
Protein-containing liquids					●	●	●		●			MIC-D/-B*		
Rainwater					❍	❍	❍		●					
Saliva	●										●	❍		
Salt solutions	❍	❍	❍	❍	●	●	●	❍	●					
Saltwater				❍	❍	❍	❍	❍	●					
Sausage										●			●	
Shampoo	❍								●				●	
Skin	❍										●			
Soil extract					●	●	●		●					
Solids (penetration)										●			❍	
Solids (surface)	❍										●			
Sulfide-containing liquids			RJS*						●					PtR*
Surface water	❍	●	●	●	●	●	●		❍					
Suspensions			RJS*						●					
Swimming pool water	●	●	●	●	❍	❍	❍							
Tap water	❍	❍	❍	●	●	●	●		❍					
Tris buffer solutions					●	●	●		●					
Vegetable juice					●	●	●		❍				❍	
Vegetables										●			●	
Wastewater	❍	●	●	❍	❍	❍	❍							PtR*
Wine				●	❍	●	●							
Yogurt					●	●	●		●	●			●	
	SenTix® V	SenTix® 20 21-..., 22	SenTix® 41, 1-3, 42, RJS 940	SenTix® 51, 52 950	SenTix® 60, 61 62	SenTix® 81, 82 980	SenTix® 91, 92, L	SenTix® H	SenTix® HW, HWS	SenTix® Sp, Sp-DIN	SenTix® Sur	SenTix® Mic, MIC-D, MIC-B	SenTix® FET	SenTix® ORP, ORP 900, PtR, Ag, Au

*** for ORP Measurement see page 46***

ORP Measurements

Reduction and oxidation are two central chemical terms that describe the ability of chemical agents to accept (reduction) or donate electrons (oxidation). In aqueous solutions, the Oxidation-Reduction Potential (ORP) voltage can be measured using a standard hydrogen electrode as reference. The reducing or oxidizing properties of a solution first are a matter of the reactants. By using an ORP electrode this change in potentials would be recorded as a positive or negative voltage.

ORP measurements monitor chemical reactions such as checking the denitrification of wastewater and disinfectant effect of detergents or the strength of plating baths.

Measurement of ORP voltage is carried out using ORP combination electrodes. Similar to pH electrodes, these consist of a measuring electrode and a reference electrode. A metal electrode (normally a precious metal like gold, silver or platinum) is used in ORP combination electrodes in place of a glass membrane for carrying out the measuring function. The tendency for the chemical agents to accept or donate electrons determines the potential of the metal and thus the electrical potential of the combination electrode. ORP combination electrodes in use today contain a silver/silver chloride reference electrode, the indicated potential refers to this potential. Conversion to the standard hydrogen electrode system (UH) and that of the silver/silver chloride reference electrode is easily possible.

$$U_H = U_{Meas} + U_{Ref}$$

SenTix® ORP reference electrode potential against the standard hydrogen electrode

Temperature in °C (°F)	Potential in mV
0 (32)	+ 224
5 (41)	+ 221
10 (50)	+ 217
15 (59)	+ 214
20 (68)	+ 210
25 (77)	+ 207
30 (86)	+ 203
35 (95)	+ 200
40 (104)	+ 196
45 (113)	+ 192
50 (122)	+ 188
55 (131)	+ 184
60 (140)	+ 180
65 (149)	+ 176
70 (158)	+ 172

ORP measurements can be perfomed using any WTW pH/mV meters.

See the new digital inoLab® IDS laboratory benchtop meters starting on page 14.

See the inoLab® pH/mV laboratory benchtop meters starting on page 30.

The digital MultiLine IDS portable meters start on page 18.

The proven ProfiLine pH/mV portable meters start on page 34.

You can find an overview showing the different meters as a selection guide on pages 6/7.

Electrodes

IDS pH/ORP electrodes, **see page 10**

SenTix® ORP

SenTix® Ag

SenTix® Au

SenTix® PtR

SenTix® ORP Electrodes

Model	SenTix® ORP 103 648	SenTix® Ag* 103 664	SenTix® Au 103 665	SenTix® PtR 103 666
Working range °C (°F)	0 … 100 °C (32 … 212 °F)	-5 … 100 °C (23 … 212 °F)	-5 … 100 °C (23 … 212 °F)	-5 … 100 °C (23 … 212 °F)
Reference electrolyte	KCl 3 mol/l	ELY/ORP/Ag	KCl 3 mol/l	Gel
Sensor	Platinum	Silver	Gold	Platinum
Sensor shape	Round 4 mm (0.16 in.)	Clindrical cap	Clindrical cap	Round 6 mm (0.24 in.)
Diaphragm	Ceramic	Ceramic	Ceramic	Split ring
Shaft material	Glass	Glass	Glass	Glass
Shaft length (±2 mm/±0.08 in.)	120 mm (4.72 in.)	120 mm (4.72 in.)	120 mm (4.72 in.)	120 mm (4.72 in.)
Shaft Ø (±0.5 mm/±0.02 in.)	12 mm (0.47 in.)	12 mm (0.47 in.)	12 mm (0.47 in.)	12 mm (0.47 in.)
Temperature probe	–	–	–	–
Connection	AS DIN/AS DIN-3, AS BNC			

Ordering Informations for Accessories

Testing and maintenance supplies for ORP measurements		Order No.
SORT/RH	Reagents for regenerating ORP electrodes consisting of activation powder (10 g) and clorina powder (30 g)	109 730
RH 28	ORP buffer solution 1 bottle of 250 ml: pH 7, U_H = 427 mV	109 740
ELY/ORP/AG	Electrolyte with 2 mol/l KNO_3 +0.001 mol/l KCl for combined ORP electrode with silver electrode	109 735

** for argentometric analysis*

ORP measurements can be perfomed using any WTW pH/mV meters.

Ion-selective Measurements

Ion-selective measurement is a method for determining the concentration of dissolved ions. Potassium ions, sodium ions, fluoride or chloride are examples of such cations and anions that are directly measured in solutions. Indirect methods such as titration allow the determination of aluminum, nickel ions, or sulfate.

Measurement with ISEs, like the measurement of pH, is a potentiometric method. ISEs are in two configurations:

1. Separate ion-selective electrode and reference electrode
2. Combined ion-selective electrode with built-in reference electrode

The ion-selective membrane of the electrode consists of a sparingly soluble salt of the ion to be measured (solid state electrodes), a PVC-membrane, modified by an ion exchanger or ion carrier (matrix electrodes), glass (glass electrode) or a gas-permeable plastic (gas-sensitive electrodes). The activity of the ions to be measured determines the electrode voltage. With increasing activity of the anions the voltage turns more negative; with increasing activity of cations, more positive. A pH/ISE meter uses the electrode signal to calculate the concentration of the sample.

The wide range of possible applications include the measurement of fluoride concentration according to DIN 38405-4. Chloride content determination in concrete samples or nitrate concentration determination in fruit juices are further examples of the ways in which ion-selective measurement technology can be applied.

An introduction to ion-selective measurement technology, as well as application reports, are available on our CD-ROM entitled “Principles of measurement technology”.

Determination of	Application
Lead (Pb^{2+})	Soil samples
Bromide (Br^{-})	Wine, plants
Cadmium (Cd^{2+})	Soil samples
Calcium (Ca^{2+})	Dairy products
Chloride (Cl^{-})	Drinking water, food
Cyanide (CN^{-})	Electroplating baths
Fluoride (F^{-})	Toothpaste, cement
Iodide (I^{-})	Saltwater
Potassium (K^{+})	Wine, fertilizer
Copper (Cu^{2+})	Electroplating baths
Sodium (Na^{+})	Wine, boiler feed water
Nitrate (NO_3^{-})	Baby food, fertilizer, wastewater
Silver (Ag^{+})	Electroplating baths
Sulfide (S^{2-})	Proteins, sediments

Application Range Ion-selective Measurements		
● Recommended by WTW ❍ Suitable		
Application Range	**inoLab®** **pH/ION 7320**	**Portable meters** **pH/ION 340i/3400i*, Multi 350i/3500i***
Occasional, simple ISE measurement	❍	●
Routine and standard measurement	●	❍
Advanced methods and procedures	●	–
see page	*49*	*22, 51*

Laboratory ISE Benchtop Meters

Reliable documentation of ISE measurements...

... with the inoLab® pH/ION 7320

The new inoLab® pH/ION 7320 is ideal for precision measurements and automatic documentation acc. to GLP/ AQA in quality laboratories for all branches. Optional available with built-in printer.

inoLab® pH/ION 7320**

- 2-channel instrument for simultaneous measuring of pH, ISE or Redox
- Data transfer via USB interface
- For fast data transfer in .csv format or via the optional integrated printer
- CMC function for monitoring the measuring range for pH and ISE measurements

** North American version*

*** available in Q4/2012*

Measuring stability

- Repeatable measuring results through active, automatic and stable measuring values
- The CMC function for pH and ISE visualizes the ideal measuring range and supports correct measuring.
- Graphic display with text menu for convenient handling

Documentation acc. to GLP/AQA

- Alphanumeric entry of electrode serial number
- Transfer of all data in .csv format via USB interface to PC, a formatted transfer to Excel is also possible (MultiLab® Importer software, included in the delivery scope or available as download).
- Data can be printed directly from the instrument via the optional integrated printer.

Flexile and high-performing:

- 1 to 5 point calibration for pH
- 1 to 7 point calibration for ISE, also non-linear
- Blank value correction, increment methods: known addition, known subtraction, sample addition, sample subtraction, double known addition
- Value of concentration for different units
- Selectable AutoRead criterion
- DIN- or BNC model
- Backlit graphic display with CMC

Technical Data

Model		pH/ION 7320
Range/ Resolution	pH	-2.000 ... +20.000 pH
	mV	-999.9 ... +999.9 mV -2000 ... +2000 mV
	Temperature	-5 ... +105 °C/0,1 °C (23.0 ... 221 °F)
	Concentration	0.000 ... 10.000 mg/l 0.00 ... 100.00 mg/l 0.0 ... 1000.0 mg/l 0 ... 2000 mg/l
Accuracy (±1 digit)	pH	±0.004 pH ±0.01 pH
	mV	±0.2 mV, ±1 mV
	Temperature	±0.1 K
Calibration		**MultiCal® automatic calibration:**
	AutoCal	2-/3-/4-/5-point
	AutoCal-Tec	2-/3-/4-/5-point
	ConCal®	1-/2-point
	ISECal	2- bis 7-point
		Special functions: Known addition (single) Known subtraction Sample addition Sample subtraction Blank value addition Known addition with Blank value correction

Ordering Information

inoLab® Laboratory ISE Meter SETs		❑ Order No.	▲ Order No.
inoLab® pH/ION 7320	Precise and convenient pH/mV/ISE benchtop meter for measurements/ documentation according GLP/AQA, with dual channel input. Single instrument with universal power supply, stand and operation manual, software and USB cable.	1GA340	1GA330
inoLab® pH/ION 7320P	Precise and convenient pH/mV/ISE benchtop meter for measurements/ documentation according GLP/AQA, with dual channel input, with integrated thermal printer. Single instrument with universal power supply, stand and operation manual, software and USB cable.	1GA340P	1GA330P

IP 43 CE cETLus 3 Year Warranty

❑ *with BNC plug* ▲ *with DIN plug*

Portable ISE Meter

pH/ION 340i/3400i*

- Handy, waterproof
- Up to 1500 hours continuous operation
- GLP

pH, mV and ISE measurements in one hand

The pH/mV and ISE meter pH/ION 340i/3400i* offer the highest degree of flexibility possible. For pH measurements the instrument can be calibrated manually or automatically and offers simultaneous display of pH and temperature. For measurements with ion-selective electrodes the pH/ION 340i/3400i* offers concentration display in mg/l. Direct display in mV to ±999.9 mV in 0.1 mV steps; and to ±1999 mV in 1 mV steps.

Even in these higher ranges the concentration is calculated from a mV resolution of 0.1 mV. Calibration is carried out with up to three standards (selected from 16 standards in the range of 0.01 to 1000 mg/l).

The instrument can be used in-the-lab or in-the-field, operating on either AC power or rechargeable battery for up to 1500 hours, with convenient "LoBat" warning.

Lightweight and compact, these robust meters are both waterproof and submersible to IP 66/67.

The built-in data logger for up to 500 measurements together with GLP calibration protocol offer a comprehensive system for documenting results. With analog or digital data transfer (RS 232), automatic recognition of stable measurements (AutoRead), electrode evaluation and calibration interval monitoring functions ensure reproducible and comprehensible measurements.

Technical Data

Model		pH/ION 340i/3400i*
Range/ Resolution	pH	-2.000 ... +19.999 pH
	mV	-999.9 ... +999.9 mV
		-1999 ... +1999 mV
	Temperature	-5 ... +105 °C/0.1 °C (23.0 ... 221 °F)
	Concentration	0.01 ... 1999 mg/l
Accuracy (±1 digit)		±0.003 pH
		±0.01 pH
		±0.2 mV, ±1 mV
		±0.1 K
Calibration		MultiCal® automatic calibration:
	AutoCal	2-point
	AutoCal-Tec	2-point
	ConCal®	1-/2-point
	ISECal	2-/3-point

Ordering Information

Portable ISE Meter		Order No.
pH/ION 340i/3400i*	Robust and waterproof portable ISE meter with data logger and serial interface	2G30-100
Universal power supply	100 V - 240 V, 50-60 Hz; for 340i series	902 867

IP 66 IP 67 · CE · cETLus · 3 Year Warranty

** North American version*

Ion-selective Electrodes

WTW offers a complete range of ion-selective electrodes for challenging ISE applications. Choose between two types: the 500 Series half cells, which require a separate reference electrode, or the 800 Series combination electrodes.

500 Series

The 500 Series half cells require a separate reference electrode (exception: the Ammonia electrode NH 500/2 contains an integrated reference electrode).

reference electrode

Half Cells Series 500

Electrode type	Membrane②	Determinable ions	Half cell, reference electrode necessary:		Measuring range	Bridge electrolyte	Ionic strength adjustment solution	Standard solution (Conc. 10 g/l)	pH range
Ammonia (NH_4^+)		Ammonia	NH 500/2	—	0.02...900 mg/l 10^{-6}...5 x 10^{-2} mol/l	—	MZ/NH_3/CN	ES/NH_4	4-12
Lead (Pb^{2+})	S	Lead	Pb 500	R 503/P (2 mm pin plug) or R 503 D (4 mm banana plug)	0.2 ... 20000 mg/l 10^{-6} ... 10^{-1} mol/l	ELY/BR/503	ISA/FK	ES/Pb	4-7
Bromide (Br^-)	S	Bromide	Br 500		0.4 ... 79000 mg/l 5 x 10^{-6} ... 1 mol/l	ELY/BR/503	ISA/FK	ES/Br	1-12
Cadmium (Cd^{2+})	S	Cadmium	Cd 500		0.01 ... 11000 mg/l 10^{-7} ... 10^{-1} mol/l	ELY/BR/503	ISA/FK	—	2-8
Calcium (Ca^{2+})	L	Calcium, Magnesium③	Ca 500①		0.02 ... 40000 mg/l 5 x 10^{-7} ... 1 mol/l	ELY/BR/503	ISA/Ca	ES/Ca	2,5-11
Chloride (Cl^-)	S	Chloride	Cl 500		2 ... 35000 mg/l 5 x 10^{-5} ... 1 mol/l	ELY/BR/503	ISA/FK	ES/Cl	2-12
Cyanide (CN^-)⑤	S	Cyanide	CN 500		0,2 ... 260 mg/l 8 x 10^{-6} ... 10^{-2} mol/l	ELY/BR/503	MZ/NH_3/CN	—	0-14
Fluoride (F^-)	S	Fluoride, Aluminum Phosphate③, Lithium③	F 500		0.02...sat. mg/l 10^{-6}...sat. mol/l	ELY/BR/503	TISAB	ES/F	5-7
Iodide (I^-)	S	Iodide, Thiosulfate Mercury	I 500		0.006 ... 127000 mg/l 10 x 10^{-8} ... 1 mol/l	ELY/BR/503	ISA/FK	ES/I	0-14
Potassium (K^+)⑤	L	Potassium	K 500①		0.04 ... 39000 mg/l 10^{-6} ... 1 mol/l	ELY/BR/503/K	ISA/K	ES/K	2-12
Copper (Cu^{2+})	S	Copper, Nickel③	Cu 500		0.0006 ... 6400 mg/l 10^{-8} ... 10^{-1} mol/l	ELY/BR/503	ISA/FK	ES/Cu	2-6
Sodium (Na^+)⑤	G	Sodium	DX 223 NA		0.05 ... 23000 mg/l 2 x 10^{-6} ... 1 mol/l	–	ISA/Na	ES/Na	>10
Nitrate (NO_3^-)⑤	L	Nitrate	NO 500①		0.4 ... 62000 mg/l 7 x 10^{-6} ... 1 mol/l	ELY/BR/503/N	TISAB/NO_3	ES/NO_3	2,5-11
Silver (Ag^+)⑤	S	Silver	Ag/S 500		0.01 ... 108000 mg/l 10^{-7} ... 1 mol/l	ELY/BR/503	ISA/FK	—	2-12
Sulfide (S^{2-})⑤	S	Sulfide	Ag/S 500		0.003 ... 32000 mg/l 10^{-7} ... 1 mol/l	ELY/BR/503	④	—	2-12

① Exchange measuring head
② S = solid state electrode, L = matrix electrode, G = glass electrode
③ Titration
④ Use according to operating instructions
⑤ Formulations for additionally required solutions are given in the application steps and operating instructions

For ordering information for ISE electrodes and accessories, see WTW Product Details.

800 Series

These combination electrodes with built-in reference are easy-to-use, and offer the option of measuring in small volume samples. Plus, they have an out-standing price performance ratio.

Combined ISE Electrodes Series 800

Electrode type	Membran②	Determinable ions	Built-in reference electrode	Measuring range	Bridge electrolyte	Ionic strength adjustment solution	Standard solution (Conc. 10 g/l)	pH range
Lead (Pb^{2+})	S	Lead	Pb 800	0.2 ... 20000 mg/l 10^{-6} ... 10^{-1} mol/l	ELY/BR/503	ISA/FK	ES/Pb	4-7
Bromide (Br^-)	S	Bromide	Br 800	0.4 ... 79000 mg/l 5×10^{-6} ... 1 mol/l	ELY/BR/503	ISA/FK	ES/Br	1-12
Cadmium (Cd^{2+})	S	Cadmium	Cd 800	0.01 ... 11000 mg/l 10^{-7} ... 10^{-1} mol/l	ELY/BR/503	ISA/FK	—	2-8
Calcium (Ca^{2+})	L	Calcium, Magnesium③	Ca 800①	0.02 ... 40000 mg/l 5×10^{-7} ... 1 mol/l	ELY/BR/503	ISA/Ca	ES/Ca	2,5-11
Chloride (Cl^-)	S	Chloride	Cl 800	2 ... 35000 mg/l 5×10^{-5} ... 1 mol/l	ELY/BR/503	ISA/FK	ES/Cl	2-12
Cyanide (CN^-)⑤	S	Cyanide	CN 800	0.2 ... 260 mg/l 8×10^{-6} ... 10^{-2} mol/l	ELY/BR/503	MZ/NH_3/CN	—	0-14
Fluoride (F^-)	S	Fluoride, Aluminum Phosphate③, Lithium③	F 800	0.02...sat. mg/l 10^{-6}...sat. mol/l	ELY/BR/503	TISAB	ES/F	5-7
Iodide (I^-)	S	Iodide, Thiosulfate Mercury	I 800	0.006 ... 127000 mg/l 10×10^{-8} ... 1 mol/l	ELY/BR/503	ISA/FK	ES/I	0-14
Potassium (K^+)⑤	L	Potassium	K 800①	0.04 ... 39000 mg/l 10^{-6} ... 1 mol/l	ELY/BR/503/K	ISA/K	ES/K	2-12
Copper (Cu^{2+})	S	Copper, Nickel③	Cu 800	0.0006 ... 6400 mg/l 10^{-8} ... 10^{-1} mol/l	ELY/BR/503	ISA/FK	ES/Cu	2-6
Nitrate (NO_3^-)⑤	L	Nitrate	NO 800①	0.4 ... 62000 mg/l 7×10^{-6} ... 1 mol/l	ELY/BR/503/N	TISAB/NO_3	ES/NO_3	2,5-11
Silver (Ag^+)⑤	S	Silver	Ag/S 800	0.01 ... 108000 mg/l 10^{-7} ... 1 mol/l	ELY/BR/503	ISA/FK	—	2-12
Sulfide (S^{2-})⑤	S	Sulfide	Ag/S 800	0.003 ... 32000 mg/l 10^{-7} ... 1 mol/l	ELY/BR/503	④	—	2-12

① Exchange measuring head
② S = solid state electrode, L = matrix electrode, G = glass electrode
③ Titration
④ Use according to operating instructions
⑤ Formulations for additionally required solutions are given in the application steps and operating instructions

For ordering information for ISE electrodes and accessories, see WTW Product Details.

Dissolved Oxygen Measurement

Dissolved Oxygen

Dissolved oxygen is present in virtually every liquid. For example, at a temperature of 20 °C (68 °F) and an atmospheric pressure of 1013 mbar, saturated water contains about 9 mg/l oxygen. Ethanol can contain up to 40 mg/l, whereas glycerol only has about 2 mg/l.

Liquid absorbs oxygen until the partial pressure of oxygen in the liquid is in equilibrium with the air or gas in which it is in contact. The actual concentration of dissolved oxygen depends on a number of factors, such as temperature, air pressure, oxygen consumption by microorganisms in a biodegradation process or oxygen production by algae.

The oxygen concentration is important for the:

- **Living conditions for fish and microorganisms in waters**
- **Degradation processes in wastewater treatment**
- **Corrosion processes in pipelines**
- **Shelf life of beverages, etc.**

The determination of the oxygen concentration was formerly carried out by the WINKLER titration method. Today, electrochemical measurement is a recognized method in numerous standard procedures. During the last years the optical measuring of dissolved oxygen has become more important.

In its simplest form a dissolved oxygen sensor contains a working electrode and a counter-electrode. Both electrodes are located in an electrolyte system which is separated from the sample by a gas-permeable membrane. The working electrode reduces the oxygen molecules to hydroxide ions. In this electrochemical reaction a current flows from the counter-electrode to the working electrode. The more oxygen present in the sample, the larger the current signal. The D.O. meter calculates the concentration of dissolved oxygen in the sample from this signal. As for optical measurements there are no chemical reactions involved. A special fluorescent dye is used instead, which is activated by light in the measuring membrane. In the presence of oxygen the fluorescence changes its character (quenching), this effect is used for the quantitative determination.

Application Range Dissolved Oxygen Meters

● Recommended by WTW ❍ Conditionally applicable – Not recommended

Application Range	inoLab®		ProfiLine Oxi 1970i	MultiLine® IDS	Portable Meters			
	Multi IDS	Oxi 7310			Oxi 3205	Oxi 3210	Oxi 3310	Oxi 3315
Routine measurement	❍	–	–	❍	●	●	–	❍
Routine measurement with documentation	●	●	●	●	–	–	●	●
AQA with documentation	●	●	●	●	–	–	●	●
R&D high precision	●	●	●	●	–	●	●	●
Control measurements	●	●	●	●	❍	●	●	●
LIMS connection	●	●	●	●	–	–	●	●
Quality assurance	●	●	❍	●	–	●	●	●
Training	❍	●	❍	❍	❍	●	❍	❍
Service	–	–	●	●	●	●	●	●
Laboratory measurements	●	●	●	❍	–	–	❍	❍
Field measurements	–	–	●	●	●	●	●	●
Depth measurements	–	–	●	●	–	–	–	●
External control/ PC connection/ PC control	– ● –	● ● –	● ● –	– ● –	–	–	– ● –	– ● –
BOD measurements with self-stirring sensor	–	●	●	–	–	–	–	–
BOD measurements with assessment program	–	–	–	–	–	–	–	–
see page	*56*	*58*	*65*	*60*	*64*	*63*	*62*	*61*

For dissolved oxygen measurement with multi-parameter instruments, see pages 14 and 18

Application Range Sensors

Application Range	FDO® 925	ConOx	DurOx®	CellOx® 325	StirrOx® G	TA 197 Oxi
BOD measurements	●	–	–	❍	●	–
Fish farming	❍	●	●	❍	–	–
Surface waters	●	●	❍	●	–	–
Ground water	●	❍	–	❍	–	●
Control measurements	●	●	●	●	❍	–
Depth measurements	● (25 m/82 ft.)	–	–	–	–	●
Laboratory measurements	●	❍	–	●	❍	–
Pharmaceuticals	●	❍	❍	●	–	–
Biotechnology (non-autoclavable)	●	❍	❍	●	–	–
Wastewater treatment plant: aeration tank	●	❍	●	❍	–	–
applicable instruments: ** North American version*	*Oxi 3315, MultiLine® 3410, 3420, 3430 inoLab® Multi IDS*	*Multi 350i/ 3500i**	*ProfiLine Oxi, Multi 350i/ 3500i**	*all, except MultiLine®, Oxi 3315*	*inoLab® Oxi 7310, 1970i*	*1970i*

NEW

Laboratory Dissolved Oxygen Meters

Dissolved oxygen is one of the most frequently measured parameters in the laboratory. It plays a large role in the degradation of substances and the growth of microorganisms, both in environmental technology and in biotechnology.

inoLab®

Dissolved oxygen measurements with new digital multi-parameter benchtop meters inoLab® IDS
see page 14

Determining dissolved oxygen ...

... with the innovative inoLab® Multi 9310 IDS

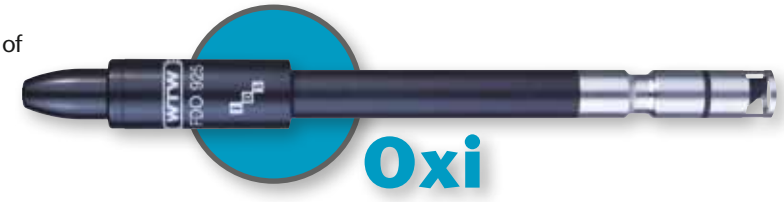
The new inoLab® Multi 9310 IDS is ideal for digital, optical DO measurements in the laboratory. The IDS technology perfectly supports measuring in the easiest way along with efficient documentation. Without self consumption and resistant against air bubbles, carbon dioxide and ethanol the optical DO sensor FDO® 925 is not only recommended for BOD measuring, but also for further applications throughout the laboratory.

inoLab® Multi 9310 IDS

- Measuring safety without compromises
- Digital sensor recognition
- Intelligent sensor rating

Measuring safety

- Through digital transmission of signals the sensor data is easily provided.
- Display of service information for supporting the ideal function
- Maintenance free measuring system without use of chemicals through factory calibrated sensor cap
- Automatic air pressure compensation for precise measuring results



GLP/AQA documentation

- Automatic, digital recording of all sensor data for biunique traceability of measuring values
- User administration can be activated for allocation of user and measuring results
- Transfer of all data in .csv format via USB interface to PC, on demand formatted transfer into Excel (MultiLab® Importer, included in the delivery scope or as download)
- Data output via optional built-in printer possible

Flexible and powerful:

- Adjustable t_{90} for different applications
- Measures partial pressure, concentration and saturation
- Salinity corrections
- Storage for large measuring batches

Technical Data

Model	**inoLab® Multi 9310 IDS**
Measuring channel	1 (universal)
Display	LCD graphic, backlit
CMC/QSC	Yes/Yes
Data storage	Manual 500/5000 automatic
Logger	Manual/time-controlled
Interface	Mini USB
Printer (optional)	Thermo printer, width 58 mm
Power supply	**Universal power supply** 100 to 240 V, 50/60 Hz, 4 x 1,5 V AA or 4 x 1.2 V NiMH rechargeable batteries

Ordering Information

Digital inoLab® multiparameter SETs		**Order No.**
inoLab® Multi 9310 IDS SET 4	Digital multiparameter benchtop meter, set including IDS sensor, for measurements/documentation according GLP/AQA. With single channel input for pH/mV, dissolved oxygen and conductivity. Meter with universal power supply, stand and operation manual, optical IDS DO sensor FDO® 925,software and USB cable.	1FD354

IP 43 CE cETLus 3 Year Warranty

For other SETs or sensors in SET, see WTW Product Details

Reliable DO documentation...

... with the inoLab® Oxi 7310

The new inoLab® Oxi 7310 is the perfect laboratory meter for measuring DO with the proven galvanic DO sensors. With automatic GLP/AQA documentation it supports traceability not only in the environmental laboratory. On demand also available with built-in printer.

inoLab® Oxi 7310

- USB interface for fast data transfer
- Data output in .csv format or via optional built-in printer
- Connection for self-stirring DO sensor StirrOx® G

Measuring safety

- Repeatable measuring results provided by the active, automatic AutoRead function with recognition of stable end values
- Automatic air-pressure compensation
- Graphic display with plain text menu for convenient and secure operation

GLP/AQA documentation

- Alphanumeric entry of electrode serial number
- Transfer of all data in .csv format via USB interface to PC, on demand formatted transfer into Excel (MultiLab® Importer, included in the delivery scope or as download).
- Data output via optional built-in printer possible

Flexible and powerful:

- Measures partial pressure, concentration and saturation
- Salinity corrections
- Storage for large measuring batches

Technical Data

Model	**inoLab® Oxi 7310** All values ±1 digit
Concentration	0.00 … 20.00 mg/l ±0.5 % Mw. 0 … 90 mg/L ±0,5 %
Saturation	0.0 … 200.0 % ±0.5 % v. Mw. 0 … 600 % ±0.5 % v Mw.
Partial pressure	0 … 200.0 hPa, 0 to 1250 hPa
Temperature	-5.0 … 105.0 °C ±0.1 °C
Calibration	1-point air-calibration or versus external standard
Calibration storage	up to 10 calibrations
Display	LCD graphic, backlit
Data storage	manual 500/5000 automatic
Logger	manual/time-controlled
Interface	Mini USB
Printer (optional)	thermal printer, width 58 mm
Power supply	Universal power supply 100 to 240 V, 50/60 Hz, 4 x 1,5 V AA or 4 x 1.2 V NiMH rechargeable batteries

Ordering Information

inoLab® Laboratory Dissolved Oxygen Meter SETs		**Order No.**
inoLab® Oxi 7310 SET 1	Professional dissolved oxygen meter, menu controlled, for measurements/documentation according GLP/ AQA. Set including galvanic DO sensor. Meter with universal power supply, stand and operation manual, galvanical DO sensor CellOx® 325, polishing stripe, electrolyte, cleaning solution, replacement caps, CD-ROM incl. software, USB cable.	1BA301
inoLab® Oxi 7310P SET 4	Professional dissolved oxygen meter, menu controlled, for measurements/documentation according GLP/ AQA, with integrated thermal printer. Set including galvanic DO sensor. Meter with universal power supply, stand and operation manual, self stirring galvanic DO sensor StirrOx® G, polishing stripe, electrolyte, cleaning solution, replacement caps, CD-ROM incl. software, USB cable.	1BA304P

IP 43 CE cETLus 3 Year Warranty

For other SETs or sensors in SET, see WTW Product Details

NEW

Portable Dissolved Oxygen Meters

Dissolved oxygen is an important parameter in environmental analytics. It is therefore commonly used for field operation. Its determination is processed in fish farming as well as in wastewater plants for monitoring the stationary measuring technology.

MultiLine® IDS

Oxygen measurements with the new digital MultiLine® multi-parameter measuring instruments **see page 18**

Not only dissolved oxygen is determined securely...

... with the Multi 3410

The Multi 3410 is a portable single channel multi-parameter instrument for the digital measuring of dissolved oxygen. The IDS technology supports optimal measuring in the easiest way along with efficient documentation. Without self consumption and resistant against air bubbles, carbon dioxide and ethanol the optical DO sensor FDO® 925 is not only recommended for BOD measuring, but also for further applications throughout the laboratory. The Multi 3410 also allows connecting further sensors and parameters.

Multi 3410 IDS

- Measuring safety without compromises
- Digital, optical DO measuring
- Multi-parameter instrument

Measuring safety

- Through digital transmission of signals the sensor data is easily provided.
- Display of service information for supporting the best function
- Maintenance free measuring system without use of chemicals through factory calibrated sensor cap
- Automatic air pressure compensation for precise measuring results

GLP/AQA documentation

- Automatic, digital recording of all sensor data for traceability of measuring values
- User administration can be activated for allocation of user and measuring results
- Transfer of all data in .csv format via USB interface to PC, on demand formatted transfer into Excel (MultiLab® Importer, included in the delivery scope or as download).
- Data output via optional built-in printer possible

Flexible and powerful:

- Adjustable t_{90} for different applications
- Measures partial pressure, concentration and saturation
- Multi-parameter instrument
- Color display
- USB-A socket

General Features

Model	**Multi 3410 IDS**
Data storage	manual 500/10000 automatic
Data logger	manual/time-controlled
Interface	USB-A and Mini USB
Power supply	Universal power supply with charging function or 4 x 1.2 V NiMH akku

Ordering Information

MultiLine® IDS		Order No.
Multi 3410 SET 4	Professional digital multi meter for portable field measurement, with single channel input, color graphic display incl. data logger and USB interfaces. DO case set with optical IDS DO probe FDO® 925, short instruction manual, stand, beaker, CD-ROM, driver software for USB, rechargeable batteries, cable, universal power supply and accessories.	2FD454
Multi 3410 SET 5	Same as 2FD454, but with optical IDS DO probe FDO® 925-3.	2FD455

IP 67 | CE | cETLus | 3 Year Warranty

For other sensors in SET see WTW Product Details

NEW

ProfiLine 3000 Series

Determining dissolved oxygen...

... with the latest ProfiLine Oxi 3315 and the optical IDS oxygen sensor FDO® 925

The new Oxi 3315 is a portable instrument for digital measuring of optical DO. The IDS technology supports ideal measuring in the easiest way along with efficient documentation. Without self consumption and resistant against air bubbles, carbon dioxide and ethanol the optical DO sensor FDO® 925 is not only recommended for BOD measuring, but also for field and process applications.

ProfiLine Oxi 3315

- Digital, optical DO measurements
- Measuring safety without compromises
- Complete documentation

Measuring reliability

- Through digital transmission of signals the sensor data is easily provided.
- Increased solution of measuring concentration 1 mg per 0.001 mg/l for trace measurements
- Maintenance-free measuring system through factory calibrated sensor cap
- Automatic air-pressure compensation

GLP/AQA documentation

- Automatic, digital recording of all sensor data for traceability of measuring values
- Transfer of all data in .csv format via USB interface to PC

Flexible and powerful:

- Adjustable t_{90} for different applications
- Measures partial pressure, concentration and saturation
- Salinity corrections
- Storage for large measuring batches

Technical Data

Model	**Oxi 3315**
Display	LCD graphic, backlit
Calibration	vapor-saturated air, if applicable against external standard
Data storage	manual 500 data records; automatic 5 000 data records
Data output	.csv or ASCII
Measuring channel	1
Logger	manual/time-controlled
Interface	Mini USB
Power supply	4 x 1.5 V AA or 4 x 1.2 V NiMH rechargeable batteries or via USB

Ordering Information

ProfiLine Portable Dissolved Oxygen Meter SET		Order No.
Oxi 3315 SET 1	Professional, field proven DO meter for digital IDS DO sensors with backlit graphic display for portable application including data logger and USB interface. Case set including optical IDS DO sensor FDO® 925, stand, beaker. Including short instruction manual CD-ROM, batteries, driver software for USB, cable.	2BD351
Oxi 3315 SET 5	Meter see above, but with optical IDS DO sensor FDO® 925 and Bev kit (containing panel with meter holder, flow through vessel, tube, tube adapter, meter armor SM Pro), without portable case.	2BD355

IP 66 IP 67 · CE · cETLus · 3 Year Warranty

For other sensors in Sets see WTW Product Details

Reliable DO documentation...

... with the ProfiLine Oxi 3310

The Oxi 3310 is a combination of a robust portable meter and data logger for gathering measuring data automatically and PC supported evaluation.

ProfiLine Oxi 3310

ProfiLine Oxi 3310

- Waterproof USB interface for fast data transfer
- Data output in .csv format
- Calibration versus external standard possible (Winkler-titration)

Complete as SET

Measuring safety

- Repeatable measuring results provided by the active, automatic AutoRead function with recognition of stable end values
- Automatic air-pressure compensation
- Silicone keypad with tangible key click, optional protective armor for field operation

GLP/AQA documentation

- Transfer of all data in .csv format via USB interface to PC, on demand formatted transfer into Excel (MultiLab® Importer, included in the delivery scope or as download).

Flexible and powerful:

- Measures partial pressure, concentration and saturation
- Salinity corrections
- Storage for large measuring batches

Measuring DO precisely...

... with the ProfiLine Oxi 3210

The ProfiLine Oxi 3210: A top-class portable DO measuring instrument - with modern, user-friendly interface.

ProfiLine Oxi 3210

- Convenient user guidance
- Manual storage function
- For galvanic DO sensors

ProfiLine Oxi 3210

Measuring safety

- Repeatable measuring results provided by the active, automatic AutoRead function with recognition of stable end values
- Automatic air-pressure compensation
- Silicone keypad with tangible key click, optional protective armor for field operation

GLP/AQA documentation

- Storage with data output display or occasional documentation.

Flexible and powerful:

- Measures partial pressure, concentration and saturation
- Salinity corrections
- Storage for large measuring batches

Measuring DO easily...

... with the ProfiLine Oxi 3205

The Oxi 3205 is an easy-to-use, reliable measuring instrument for routine measurements.

ProfiLine Oxi 3205

- Suitable for CellOx® or DurOx® sensors
- Backlit graphic display
- Automatic air-pressure compensation

Measuring safety

- Repeatable measuring results provided by the active, automatic AutoRead function with recognition of stable end values
- Safe operation: Automatic functions reduce the number of keys (6).
- OxiCal® air-calibration
- Waterproof 8-pin socket for measurements in the field.

GLP/AQA documentation

- Transfer of all data in .csv format via USB interface to PC, on demand formatted transfer into Excel (MultiLab® Importer, included in the delivery scope or as download).

Flexible and powerful:

- Silicone keypad with tangible key click, can be operated with gloves
- For field operation available in a case set with proven sensors

Technical Data

Model	Oxi 3205	Oxi 3210	Oxi 3310
Range/ Resolution/ Accuracy — O_2 Conc.	0.00 … 20.00 mg/l (20.0 mg/l*) ±0.5 % of value; 0 … 90 mg/l ±0.5 % of value		
O_2 saturation	0.0 … 200.0 % (200 %*) ±0.5 % of value; 0 … 600 % ±0.5 % of value		
O_2 part. pressure	0.0 … 200.0 mbar (200 mbar*) ±0.5 % of value, 0 … 1250 mbar ±0.5 % of value		
Temperature	-5.0 … +105.0 °C ±0,1 °C (23 … 221 °F)		
Temperature compensation	Better than 2% at 0 ... +40 °C (32 … 104 °F)		
Air pressure compensation	Automatic with built-in pressure sensor (500 … 1100 mbar)		
Salinity correction	0 or 35 fixed	Automatic from 0.0 … 70.0, adjustable via display	
Calibration	OxiCal® rapid calibration in OxiCal®-SL or OxiCal®-D		
Memory/Logger	–	Manual 200	Manual 500/5000 automatic
Display	LCD Graphic, backlit		
Continuous operation	Up to 800 hrs. without/100 hrs. with backlight		

Ordering Information

ProfiLine Portable Dissolved Oxygen Meter SETs		Order No.
Oxi 3205 SET 3	Robust and waterproof portable dissolved oxygen meter for battery operation, case set with DurOx® 325 and accessories	2BA103
Oxi 3210 SET 1	Robust and waterproof portable dissolved oxygen meter including memory, for battery operation, case set with CellOx® 325 and accessories	2BA201
Oxi 3310 SET 1	Robust and waterproof portable dissolved oxygen meter including memory, data logger and USB mini B interface, for battery operation, case set with CellOx® 325 and accessories	2BA301

IP 66 IP 67 CE cETLus 3 Year Warranty

For other sensors in SET, see WTW Product Details

** if DurOx® DO sensor is used*

ProfiLine Dissolved Oxygen Field Meters

The WTW dissolved oxygen meter **ProfiLine Oxi 1970i,** supplied with integrated powerful NiMH rechargeable batteries, is both waterproof (IP 66) and submersible (IP 67). This easy-to-use meter conforms to GLP and has an 800 data point data logger and accurate recorder output.

ProfiLine Oxi 1970i

- High-precision, indestructible, waterproof
- Recorder output corresponding to display
- Depths measurement down to 100 m (330 ft)

External control via PC with MultiLab® pilot. They are equipped with a carrying/support handle and carrying strap. The Oxi 1970i is suitable for depth measurements down to 100 m (330 ft) in combination with the TA 197 Oxi depth armature.

TA 197 Oxi

Dissolved oxygen depth armature **TA 197 Oxi** with built-in temperature probe, up to 100 m (330 ft) cable with waterproof plug (IP 67), and pressure-resistant steel armor with screw-off protective hood. Fits into small boreholes (2" dia.).

BR 325

Battery-powered stirrer BR 325 for profile and depth measurements.

Technical Data

Model		ProfiLine Oxi 1970i
Range/ Resolution	O_2 Conc.	0.00 ... 19.99 mg/l (19.9 mg/l*), 0.0 ... 90.0 mg/l (90 mg/l*)
	O_2 saturation	0.0 ... 199.9% (199%*), 0 ... 600%
Accuracy (±1 digit)	O_2 Conc.	±0.5% of value
	O_2 saturation	±0.5% of value
	Temperature	±0.1 K
Air pressure compensation		Automatic with built-in pressure sensor (500 ... 1100 hPa)
Temperature compensation		<2% at 0 ... +40 °C (32 ... 104 °F)
Salinity correction		Automatic from 0.0 ... 70.0, adjustable via display
Calibration		OxiCal® rapid calibration in OxiCal®-SL or OxiCal®-D

Ordering Information

Portable Dissolved Oxygen Field Meter		Order No.
ProfiLine Oxi 1970i	Robust, waterproof, submersible dissolved oxygen meter	3B30-010

IP 66 IP 67 CE cETLus 3 Year Warranty

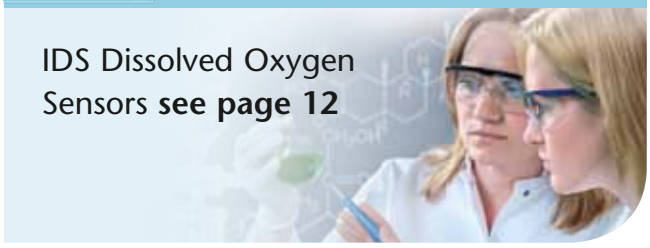
** depends on DO sensor and medium*

Depth armatures for measurements down to depths of 100 m (330 ft) see WTW Product Details

Galvanic Dissolved Oxygen Sensors

WTW offers three types of galvanic dissolved oxygen sensors, none of which require polarization time prior to measurement as is the case with other DO sensors. WTW DO sensors are equipped with preassembled membrane caps preventing sensor prep errors caused by improper membrane installation, and have built-in temperature compensation capabilities.

FDO® 925



IDS Dissolved Oxygen Sensors **see page 12**

Galvanic Dissolved Oxygen Sensors

- Immediately ready for measurement
- Simple air calibration using calibration vessel

DurOx® 325

Only for ProfiLine portable and field meters and Multi 350i/3500i*

Membrane covered galvanic dissolved oxygen sensor

- Membrane lasts up to 6 months
- Low approach flow (measurements obtained with minimal sample flow)
- Waterproof sensor (IP 68 – 2 bar)
- Includes **SK-D** protective sensor guard
- Includes calibration vessel **OxiCal®-D**

** North American version*

StirrOx® G

For all inoLab® Oxi and ProfiLine Oxi 1970i

Self-stirring dissolved oxygen sensor – simultaneous stirring and measurement

- Membrane lasts up to 6 months
- Features membrane leak monitoring
- Sensor includes automatic stirrer
- Waterproof sensor (IP 68 – 2 bar)
- Extremely low self-consumption of oxygen
- Includes calibration vessel **OxiCal®-ST**

CellOx® 325

Membrane covered galvanic dissolved oxygen sensor

- Membrane lasts up to 6 months
- Features membrane leak monitoring
- High signal resolution (prevents weakened signal with longer cable lenghts)
- Rapid measurement response
- Waterproof sensor (IP 68 – 2 bar)
- Includes calibration vessel **OxiCal®-SL**

Accessories

Various calibration and storage vessels are available for dissolved oxygen sensors.

see WTW Product Details

Ordering Information

Dissolved oxygen sensors (The sensor includes accessory case with spare parts and maintenance supplies)		Order No.
StirrOx® G	Self-stirring dissolved oxygen sensor for oxygen determination in Karlsruhe bottles and Winkler bottles, with OxiCal®-ST calibration and storage vessel	201 425
CellOx® 325	Galvanic dissolved oxygen sensor with OxiCal®-SL calibration and storage vessel, waterproof plug, cable length 1.5 m (4.92 ft)	201 533
DurOx® 325-3	Galvanic dissolved oxygen sensor with OxiCal®-D calibration vessel, waterproof plug, cable length 3 m (9.84 ft)	201 570

For calibration and storage vessels and other sensors and accessories, see WTW Product Details

Conductivity Meters – The Electrolytical Conductivity

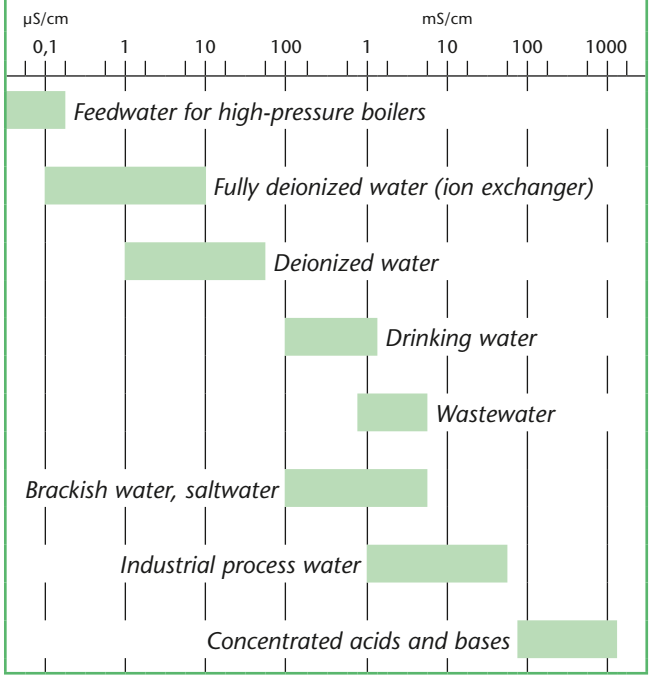
Conductivity is a parameter used to measure electrical properties of a solution. The more salt, acid or alkali in a solution, the greater its conductivity. The unit of conductivity is S/m, often also S/cm.

The scale for aqueous solutions begins with pure water at a conductivity of 0.05 µS/cm (25 °C/77 °F). Naturally occurring waters such as drinking water or surface water have a conductivity in the range 100 – 1000 µS/cm. At the upper end of the chart some acids and bases can be found.

Conductivity measurements are used for applications such as in the production of ultrapure water or determining the salinity of saltwater.

Conductivity is measured by making a measurement of the electrical resistance. The simplest kind of measuring cell used consists of two similar electrodes. An alternating voltage applied to one of the electrodes causes the ions in the solution to migrate towards the electrodes. The more ions in the solution, the greater the current which flows between the electrodes. The instrument measures the current and uses Ohm's law to calculate first the conductance of the solution and then – by taking the cell data into account – the conductivity.

Conductivity of aqueous solutions



Application Range Conductivity Measurements

● Recommended by WTW ❍ Conditionally applicable – Not recommended

Application Range	inoLab®			ProfiLine Cond 1970i	VARIO® C_{ond}	MultiLine® IDS	Portable meters		
	Multi IDS	Cond 7110	Cond 7310				Cond 3110	Cond 3210	Cond 3310
Routine measurement	❍	●	–	–	●	❍	●	●	–
Routine measurement with documentation	●	–	●	●	–	●	–	–	●
AQA with documentation	●	–	●	●	–	●	–	–	●
R&D high precision	●	–	●	●	–	●	–	●	●
Control measurements	●	–	●	●	●	●	–	●	●
LIMS connection	●	–	●	❍	–	●	–	–	●
Quality assurance	●	–	●	●	–	●	–	●	●
Training	❍	●	●	❍	●	❍	●	●	❍
Service	–	–	–	●	●	●	●	●	●
Laboratory measurements	●	●	●	●	●	❍	–	–	❍
Field measurements	–	–	–	●	–	●	●	●	●
Depth measurements	–	–	–	●	–	●	–	–	–
External control/ PC connection/ PC control	– / ● / –	– / – / –	– / ● / –	● / ● / –	– / – / –	– / ● / –	– / – / –	– / – / –	– / ● / –
Salinity/TDS measurement	● / ●	● / ●	● / ●	● / ●	● / ●	● / ●	● / –	● / ●	● / ●
Specific resistance	●	●	●	–	●	●	–	●	●
Suitable for pharmacopeia	–	●	●	●	–	–	–	●	●
Measurement of ultrapure water	●	●	●	●	●	●	–	●	●
Trace conductivity	–	●	●	●	–	–	–	●	●
see page	*70*	*73*	*72*	*78*	*79*	*74*	*77*	*76*	*75*

For conductivity measurements with multi-parameter instruments, see pages 14 and 18

Application Range Sensors	KLE 325	TetraCon®			LR		TA 197 LF	TetraCon® 925	LR 925/01
		325	325/S	DU/T	325/01	325/001			
Chemical water	❍	❍	–	●	–	–	–	❍	–
Ultrapure water (Pharmacopeia)	–	–	–	–	●	●	–	–	●
Ground water	●	●	–	–	–	–	●	●	–
Surface water	●	●	–	–	–	–	–	●	–
Depth measurements (barrages)	–	❍	–	–	–	–	●	❍	–
Laboratory measurements	●	●	–	–	●	●	–	●	●
Food industry (juices)	–	●	–	❍	–	–	–	●	–
Swimming pools	●	●	–	❍	–	–	–	●	–
Pharmaceuticals	❍	●	–	❍	●	❍	–	●	●
Cosmetics/detergents	–	–	●	–	–	–	–	–	–
Semi-conductor industry	–	–	–	–	●	●	–	–	●
Paint/varnish (water-soluble)	–	●	❍	–	–	–	–	●	–
Electroplating	–	●	–	–	–	–	–	●	–
applicable instruments:	①	②	③	③	③	③	④		

① *ProfiLine Cond, 3110, 3210, 3310*
② *all analog instruments except VARIO®*
③ *all analog instruments except VARIO® + Cond 3110*
④ *Cond 197i / 1970i*

only MultiLine® IDS and inoLab® IDS

NEW

Laboratory Conductivity Meters

Conductivity is an important parameter in monitoring water quality. In the laboratory sector this parameter has increased in importance since the introduction of pharmacopeia standards for pharmaceutical water. WTW inoLab® laboratory conductivity instruments meet all the requirements for measurements according to this standard.

inoLab®

Measuring conductivity with the new digital multi-parameter benchtop meter inoLab® IDS
see page 14

Determining conductivity...

... with the innovative inoLab® Multi 9310 IDS

With the new inoLab® Multi 9310 IDS measuring conductivity in the laboratory becomes even more reliable. The IDS technology enables ideal measurements and efficient documentation in the easiest way. The cell constant and other parameter data, such as reference temperature and temperature compensation, are inseparably and distinctively linked to the IDS conductivity cell. Wrong measurements due to inattentiveness with changing the cell are therefore excluded.

inoLab® Multi 9310 IDS

- Measuring consistency without compromises
- Digital sensor recognition
- Complete documentation

Measuring consistency

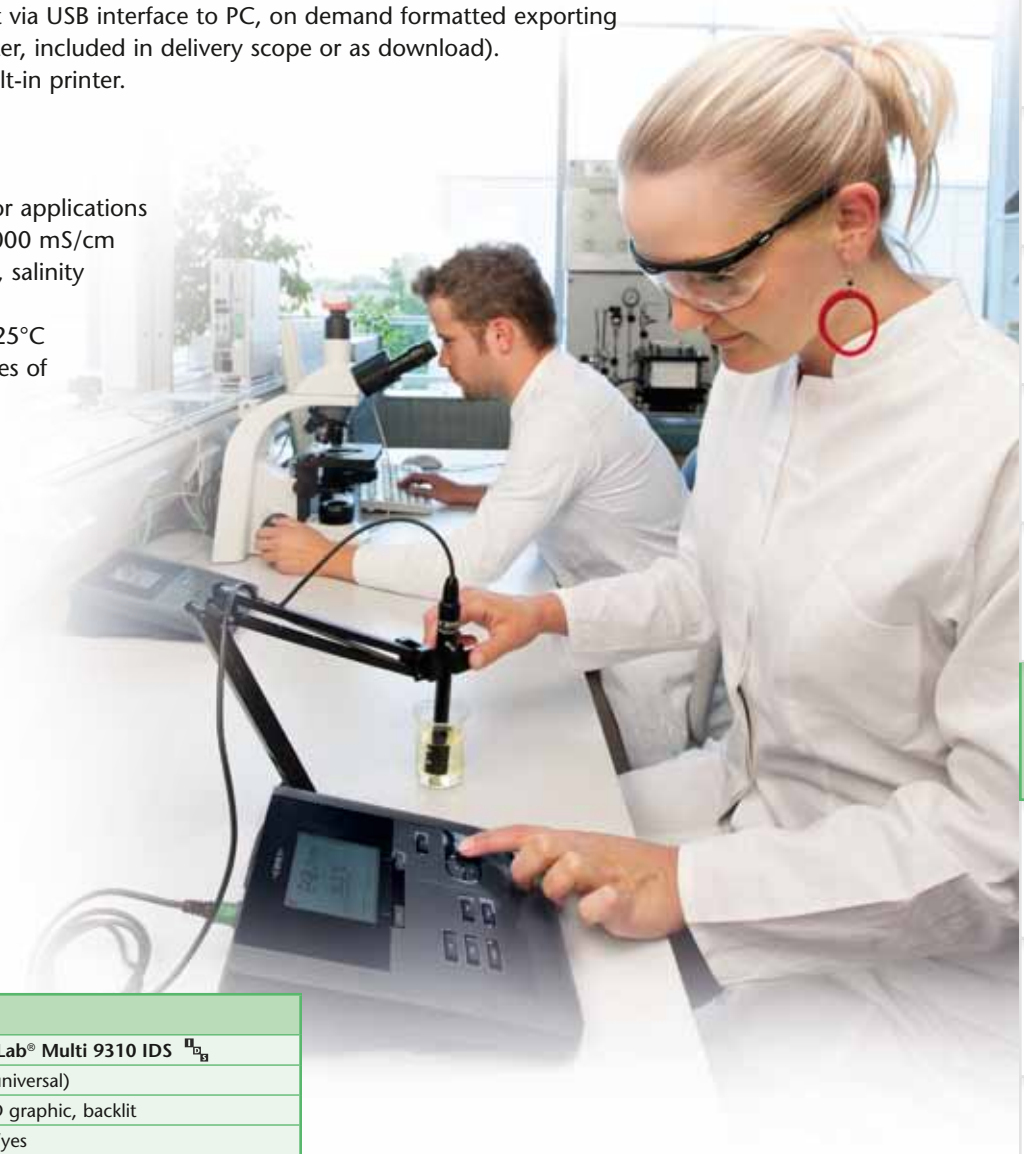
- Error-free measurements through pre-programmed cell constants
- Storage of measuring parameters simplifies application-oriented working
- Proven, high-quality basic sensors to cover all measuring application areas

GLP/AQA compliant documentation

- Automatic, digital recordings of all sensor data for traceability of measuring values
- User administration can be activated, for allocation of user and measuring results
- Export of data in .csv format via USB interface to PC, on demand formatted exporting into Excel (MultiLab® Importer, included in delivery scope or as download).
- Data output via optional built-in printer.

Flexible and powerful:

- Two IDS conductivity cells for applications between 0.01 µS/cm and 2000 mS/cm
- Output of conductivity, TDS, salinity or specific resistance
- Reference temperature 20°/25°C
- Data storage for large batches of measurements



Technical Data

Model	**inoLab® Multi 9310 IDS**
Measuring channel	1 (universal)
Display	LCD graphic, backlit
CMC/QSC	yes/yes
Data storage	manual 500/5000 automatic
Logger	manual /time-controlled
Interface	Mini USB
Printer (optional)	thermo printer, width 58 mm
Power supply	universal power supply 100 up to 240 V, 50/60 Hz, 4 x 1,5 V AA or 4 x 1,2 V NiMH rechargeable batteries

Ordering Information

Digital inoLab® multiparameter SETs		**Order No.**
inoLab® Multi 9310 IDS SET 3	Digital multiparameter benchtop meter, set including IDS sensor, for measurements/documentation according GLP/AQA. With single channel input for pH/mV, dissolved oxygen and conductivity. Meter with universal power supply, stand and operation manual, digital IDS conductivity cell TetraCon® 925, 0.01 mol/l KCl, conductivity standard, software and USB cable.	1FD353
inoLab® Multi 9310P IDS SET 3	Same as 1FD353, but with integrated thermal printer.	1FD353P

IP 43 | CE | cETLus | 3 Year Warranty

For other SETs or measuring cells in SET, see WTW Product Details

Reliable conductivity documentation...

... with the inoLab® Cond 7310

The new inoLab Cond 7310 is ideal for precision measurements in combination with automatic documentation complying with GLP/AQA in quality laboratories of all branches. An optional built-in printer is also available if required.

inoLab® Cond 7310

- USB interface for fast data transfer
- Data output in .csv format or via optional built-in printer
- Battery or AC power operation

Measuring safety

- Repeatable measuring results provided by the active, automatic AutoRead function with recognition of stable end values
- The sensor symbol provides information about the condition of the electrode
- Graphic display with plain text menu for convenient and safe operation

Documentation complying with GLP/AQA

- Alphanumerical input of conductivity cell serial number
- Transfer of all data in .csv format via USB interface onto PC, on demand formatted export into Excel (MultiLab® Importer included in delivery scope or as download).
- Data output via optional built-in printer.

Flexible and powerful:

- For all common WTW conductivity cells
- Measures TDS, salinity and specific resistance
- Backlit graphic display for brilliant visibility
- Suitable for measurement complying with Pharmacopeia

Measuring conductivity precisely...

... with the inoLab® Cond 7110

The new inoLab® Cond 7110 is a routine conductivity measuring meter for the laboratory with a large display and functions, facilitating precise measurements.

Parameters such as salinity, specific resistance and TDS also cover the determination of non-daily measured parameters. As several special cells can be connected, the most diverse applications can be addressed.

inoLab® Cond 7110

- Easy and intuitive operation
- Measuring range up to 1000 mS/cm
- Including stand and sensor holder

Measuring safety

- Repeatable measuring results through automatic AutoRead function
- Calibration timer for scheduled monitoring of the conductivity measuring cells
- Precise recording of measuring data through highest quality electronics

Easy-to-use and reliable:

- Measures conductivity, TDS and salinity
- Connecting special electrodes is possible
- Linear, non-linear (nlf) and temperature compensation can be turned-off

Technical Data

Model	inoLab® Cond 7110 all values ±1 digit	inoLab® Cond 7310 all values ±1 digit
Conductivity	0 µS/cm ... 1000 mS/cm ±0.5 % of value	0 µS/cm ... 1000 mS/cm ±0.5 % of value
Salinity	0.0 ... 70.0 (acc. to IOT) 0.00 ... 20 MOhm cm	0.0 ... 70.0 (acc. to IOT) 0.00 ... 20 MOhm cm
TDS	0 ... 1999 mg/l	1 ... 1999 mg/l, 0 bis 199,9 g/l
Temperature	-5.0 ... 105.0 °C ±0.1 °C (23 ... 221 °F)	-5.0 ... 105.0 °C ±0.1 °C (23 ... 221 °F)
Cell constant	0.450...0.500 cm^{-1}, 0.09 ... 0.110 cm cm^{-1}, 0.800 to 0.880 cm^{-1}, 0.25 ... 2.5 cm^{-1}, fix 0,01 cm^{-1}	Fix 0.01 cm^{-1}, calibration 0.450...0.500 cm^{-1}, 0.800 to 0.880 cm^{-1}, adjustable 0.09 ... 0.110 cm^{-1}, 0.250 ... 25.0 cm^{-1}
Calibration	1-point	1-point
T_{ref}	20 °C/25 °C (68 °F/77 °F)	20 °C/25 °C (68 °F/77 °F)
Temperature compensation	nLF, linear 0.000 to 3.000 %, can be switched-off	nLF, linear 0.000 to 10.000 %, can be switched-off

Ordering Information

inoLab® Laboratory Conductivity Meter SETs		Order No.
inoLab® Cond 7110 SET 1	Easy-to-operate basic conductivity benchtop meter for routine measurement. For AC and battery operation. Set including conductivity cell. Meter with universal power supply, stand and operation manual. Incl. 4-electrode graphite conductivity cell TetraCon® 325, 0.01 mol/l KCl conductivity standard.	1CA101
inoLab® Cond 7310 SET 1	Precise and convenient conductivity meter, menu controlled, for measurements/documentation according GLP/AQA. For AC and battery operation. Set including conductivity cell. Meter with universal power supply, stand and operation manual. Incl. 4-electrode graphite conductivity cell TetraCon® 325, 0.01 mol/l KCl conductivity standard, software and USB cable.	1CA301
inoLab® Cond 7310P SET 6	Meter see above, but with integrated thermal printer, in set with pure water USP Kit 1.	1CA306P

IP 43 CE cETLus 3 Year Warranty

For other SETs or measuring cells in SET, see WTW Product Details

Portable Conductivity Meters

Conductivity is measured for many applications. It serves for checking the value limit compliance of drinking water, determines the quality of ultrapure water and also supports the correct determination of the oxygen concentration in sea and brackish water. Portable conductivity systems from WTW are perfect for precise on-site measurements.

MultiLine® IDS

Conductivity measurements with the new digital MultiLine® multi-parameter portable meters

see page 18

MultiLine® IDS

Measuring conductivity securely...

... with the versatile Multi 3410

The single channel multi-parameter portable meter Multi 3410 IDS is ideal for conductivity measurements under all conditions in the field and on site. The IDS technology enables perfect measurements for conductivity, salinity, TDS, specific resistance and also efficient documentation for all measurements. In addition, the Multi 3410 allows connecting additional sensors and parameters.

Multi 3410 IDS

- Measuring reliability without compromises
- Digital sensor recognition
- Covers the entire conductivity measuring range

Measuring reliability

- The cell constant of the connected measuring cell is automatically transmitted.
- Well-proven basic measuring cells deliver the highest possible precision
- Measuring range between 0.01 µS/cm and 2000 mS/cm

Documentation complying with GLP/AQA

- Automatic digital recording of the complete sensor data for traceability of measuring values
- User administration can be activated for reliable allocation of user, measuring location and measuring result.
- Transfer of all data in .csv format via USB interface onto PC or onto USB memory stick, on demand a formatted export into Excel is possible (MultiLab® Importer, included in the delivery scope or as download)

General Features

Model	**Multi 3410 IDS**
Manual data storage	500 data sets/ automatic: 10.000 data sets
Data logger	manual/time scheduled
Interface	USB-A and Mini USB
Power supply	Universal power supply with charging function or 4 x 1.2 V NiMH rechargeable batteries

Ordering Information

MultiLine® IDS		Order No.
Multi 3410 SET 7	Professional digital multi meter for portable field measurement, with single channel input, color graphic display incl. data logger and USB interfaces. Conductivity case set with digital IDS 4-electrode conductivity cell TetraCon® 925, short instruction manual, stand, beaker, CD-ROM, driver software for USB, rechargeable batteries, cable, universal power supply and accessories.	2FD457
Multi 3410 SET A	Meter see above, but with digital IDS 2-electrode conductivity cell LR 925/01.	2FD45A

IP 67 CE cETLus 3 Year Warranty

For other measuring cells in Sets see WTW Product Details

ProfiLine 3000 Series

Reliable conductivity documentation ...

... with the ProfiLine Cond 3310

The Cond 3310 is a combination of a robust portable meter and a data logger for all who wish to record measuring data automatically and evaluate data on a PC.

ProfiLine Cond 3310

- Waterproof USB interface for fast data transfer
- Data output in .csv format
- Measuring range 0.001 µS/cm up to 1000 mS/cm

Measuring consistency

- Repeatable measuring results provided by the active, automatic AutoRead function with recognition of stable end values
- Automatic temperature compensation, can be switched-off,
- Linear compensation up to 10 %/K
- Silicone keypad with tangible key click, optional casing for field operation

GLP/AQA compliant documentation

- Large storage for 500 manual and 5000 automatically generated recordings
- Transfer of all data in .csv format via USB interface onto PC,
- On demand formatted export into Excel (MultiLab® Importer included in delivery scope or as download).

Flexible and powerful:

- Measures conductivity, salinity, TDS and specific resistance
- Direct data transfer into Excel
- Also suitable for measurements complying with Pharmacopeia

Measuring conductivity precisely...

... with the ProfiLine Cond 3210

The ProfiLine Cond 3210: A portable and convenient conductivity meter for measuring in varying samples with 2- and 4-electrode measuring cells and changing temperature compensation methods.

ProfiLine Cond 3210

- Convenient user guidance
- Manual storage function
- For all common WTW conductivity cells

Measuring consistency

- Repeatable measuring results provided by the active, automatic AutoRead function with recognition of stable end values
- Automatic temperature compensation, can be switched-off
- Silicone keypad with tangible key click, optional casing for field operation

Documentation

- Storage with output via display or for occasional documentation

Flexible and powerful

- Measures conductivity, TDS, salinity and specific resistance
- Special measuring cells can be connected
- Also suitable for measurements complying with Pharmacopeia

Easy measuring of conductivity...

... with the ProfiLine Cond 3110

The Cond 3110 is an easy-to-use, reliable conductivity meter with automatic nlF temperature compensation complying with DIN EN 27888 for routine measurements in natural water and wastewater.

ProfiLine Cond 3110

- Suitable for TetraCon® 325 or KLE 325
- Automatic temperature compensation
- Salinity

Measuring reliability

- Repeatable measuring results provided by the active, automatic AutoRead function with recognition of stable end values
- Safe operation: Automized functions reduce the number of keys (6)
- Water-resistant 8-pin socket enables reliable measurements also in humid environments.

Easy and reliable:

- High-visibility display for measuring value ad temperature
- Silicone keypad with tangible key click, can also be operated with gloves
- For field operation in a case set with the proven electrodes

Technical Data

Model		Cond 3110	Cond 3210	Cond 3310
Range/ Resolution/ Accuracy	Conductivity	0.0 … 1000 mS/cm ±0.5 % of value	0.0 … 1000 mS/cm ±0.5 % of value 0.000 … 1.999 µS/cm (for K=0.01 cm^{-1}) 0.00 … 19.99 µS/cm (for K=0.1 cm^{-1})	
	Temperature	-5.0 °C … +105.0 °C ±0.1 °C (23 … 221 °F)	-5.0 °C … +105.0 °C ±0.1 °C (23 … 221 °F)	
	Salinity	0.0 … 70.0 (nach IOT)	0.0 … 70.0 (according to IOT)	
	TDS	–	0 … 1999 mg/l, 0 … 199.9 g/l,	
	Resistivity	–	0.00 … 999 MΩcm	
Reference temperature		20 °C or 25 °C (68 … 77 °F), selectable	20 °C or 25 °C (68 … 77 °F), selectable	
Cell constant	fixed:	0.475 cm^{-1}	0.475 cm^{-1}, 0.010 cm^{-1}	
	with calibration:	0.450 … 0.500 cm^{-1}, 0.800 … 0.880 cm^{-1}	0.450 … 0.500 cm^{-1}, 0.800 … 0.880 cm^{-1}	
	adjustable:	–	0.090 … 0.110 cm^{-1}, 0.250 … 25.000 cm^{-1}	
Temperature compensation		Automatic	Automatic / manually selectable	
Temperature coefficient		• Non-linear function for natural waters (nLF) to EN 27 888	• Non-linear function for natural waters (nLF) to EN 27 888 and ultrapure water function • Linear compensation from 0.000 … 3.000 %/K • No compensation	• Linear compensation from 0.000 … 10.000 %/K • No compensation
Memory/Logger		–	Manual 200	Manual 200/5000 automatic
Display		7-Segment LCD, customized	LCD Graphic, backlit	
Continuous operation		Up to 1000 hrs.	Up to 800 hrs. without/100 hrs. with backlight	

Ordering Information

ProfiLine Portable Conductivity Meter SETs		Order No.
Cond 3110 SET 1	Robust and waterproof battery-operated portable conductivity meter, including TetraCon® 325, professional case and accessories	2CA101
Cond 3210 SET 1	Robust and waterproof battery-operated portable conductivity meter with data logger, including TetraCon® 325, professional case and accessories	2CA201
Cond 3310 SET 1	Robust and waterproof battery-operated portable conductivity meter with data logger and USB mini B interface, including TetraCon® 325, professional case and accessories	2CA301

IP 66 IP 67 CE cETLus 3 Year Warranty

For other measuring cells in SET, see WTW Product Details

ProfiLine Conductivity Field Meters

The WTW conductivity meter ProfiLine Cond 1970i, supplied with integrated powerful NiMH rechargeable batteries, is both waterproof (IP 66) and submersible (IP 67). Along with an 800 data file data logger, a real time clock and recorder output, the ProfiLine Cond 1970i conforms to all GLP requirements.

ProfiLine Cond 1970i

- Highly precise, indestructible, waterproof
- Large, silicone keys for field use
- Large, easy-to-read display
- Measurement down to depths of 100 m (330 ft)

Convenient handle and carrying strap included.

The Cond 1970i is suitable for depth measurements down to 100 m (330 ft) in combination with the TA 197 LF depth armature.

TA 197 LF

Conductivity depth armature TA 197 LF with built-in temperature probe, up to 100 m (330 ft) cable with waterproof plug (IP 67), pressure-resistant steel armor (material VA 1.4571) with screw-off protective hood, pressure-resistant to max. 10 bar, fits into small boreholes (2“ dia.).

Technical Data

Model		**ProfiLine Cond 1970i**
Range/ Resolution	**Conductivity**	0.0 µS/cm … 500 mS/cm in 5 measuring ranges or AutoRange,, 0.00 … 19.99 µS/cm for K=0.1 cm^{-1}, 0.000 … 1.999 µS/cm for K=0.01 cm-1
	Temperature	-5.0 °C … +105.0 °C (23 … 221 °F)
	Salinity	0.0 … 70.0
	TDS	0 … 1999 mg/l
Accuracy (±1 digit)	**Conductivity**	±0.5% of value
	Temperature	± 0.1 K
Reference temperature		20 °C or 25 °C (68 … 77 °F), selectable
Cell constants		With calibration 0.450...0.500 and 0.800...1.200 cm^{-1}, fixed: 0.01 cm^{-1} freely adjustable 0.25 … 2.5 cm^{-1} and 0.09 … 0.11 cm^{-1}
Temperature compensation		Automatic, can be switched off
Temperature coefficient		• Non-linear function for natural waters to EN 27 888 coefficient and ultrapure water function • Linear compensation from 0.01 ... 2.99%/K • No compensation

Ordering Information

Portable Conductivity Field Meter – with universal power supply 100-240 VAC (50/60 Hz) included		**Order No.**
ProfiLine Cond 1970i	Robust, waterproof, submersible conductivity meter	3C30-010

IP 66 IP 67 · CE · cETLus · 3 Year Warranty

For depth armatures down to 100 m (330 ft), see WTW Product Details

VARIO® Cond

- Touch screen
- Large operating range
- Plug-in cells – no cables

Simple measurement at your fingertips – now also available for conductivity measurement

VARIO® C_{ond} is an outstanding value. This economical meter is ideal for use in process control monitoring or anywhere that a small, accurate meter is needed. The VARIO® is small, light, handy, waterproof and has a robust firm-grip rubber armor.

Miniature precision

The globally renowned measurement cell TetraCon® 325 was modified exclusively for the VARIO® C_{ond}. With an extra ultrapure water cell and flow vessel the VARIO® C_{ond} is uniquely suited for ultrapure water analysis.

With increased precision through the omission of cable connectors, the VARIO® C_{ond} is an appropriate solution for servicing and maintaining water treatment equipment. No matter whether using it for pure water measurement in semi-conductor industry or in cell culture laboratories, the pure water conductivity cell with flow-through vessel always allows a rapid and easy control measurement.

Long lasting power.

VARIO® C_{ond} offers up to 500 hours of continuous operation with just one standard battery. The low-power technology shuts down the device after 10 minutes in standby. Changing the battery is quick and easy.

Technical Data

Model		VARIO® C_{ond}
Range/ Resolution	[µS/cm]	0.00 … 19.99 *(when using module LR01 V)*
		0.0 … 199.9
		0 … 1999
	[mS/cm]	0.00 … 19.99
		0.0 … 199.9
	Resistivity [kΩcm]	0.000 … 1.999
		0.00 … 19.99
		0.0 … 199.9
		0 … 1999
	Resistivity [MΩcm]	0.000 … 1.999
		0.0 … 199.9
		0 … 1999
	SAL	0.0 … 70.0 *according IOT*
	TDS [mg/l]	0 … 1999
	T [°C/°F]	-5.0 … +105.0/23 … 221

The conductivity meter aboard the ISS.

Ordering Information

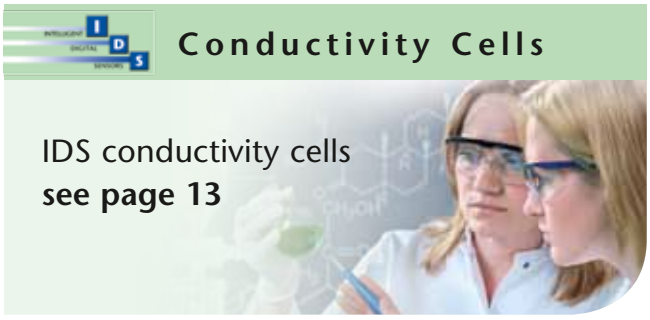
VARIO® C_{ond}		Order No.
VARIO® C_{ond} SET A	VARIO® C_{ond} in the portable case set, incl. 4-electrode cell and KCl solution 0.01 mol/l	2X00-001A
VARIO® C_{ond} SET B	VARIO® C_{ond} in the portable case set, incl. ultrapure water cell and flow-through vessel	2X00-001B

IP 65 CE 3 Year Warranty

For other accessories, see WTW Product Details

Conductivity Cells

The TetraCon® 4-electrode system sets the standard for professional conductivity measurements. When compared to conventional 2-electrode conductivity cell, the TetraCon® cells offer a high degree of precision, wider measuring range and minimal immersion depth needed for measuring. Additionally, these superior cells eliminate errors caused by polarization effects, and from dirty samples.



TetraCon®

In comparison with conventional measuring cells with 2 electrodes, the TetraCon® conductivity cell offers numerous technical advantages:

- Highest degree of precision and linearity by optimized cell geometry
- Extremely large measuring range with just one cell
- Long-term cell constant stability with high-quality abrasion-resistant graphite electrodes
- With built-in temperature probe
- Smallest immersion depth possible
- No measuring errors even with very dirty electrodes – contact resistance on the electrode surface is automatically compensated
- No measuring errors from cable influences
- No measuring errors from primary or secondary polarization effects
- No measuring errors due to contact with side walls or base of measuring vessels
- Robust, unbreakable epoxy body

Selection Guide

Measuring cell	MultiLine®: Multi 3410/3420/3430/inoLab® Multi IDS	ProfiLine Cond 3110	ProfiLine Cond 3210/3310	VARIO® C_{ond}	Cond 315i	LF 318	LF 320/323/325	LF 330/340A	Cond 330i/340i	inoLab® Cond, pH/Cond, Multi	LF 3000	MultiLab® 540	MultiLine® P4, Multi 340i, Multi 197i, Multi 1970i	MultiLine® P3 pH/LF, pH/Cond 340i	Multi 350i	LF 197, LF 597	Cond 1970i/197i
KLE 325		●	●														
LTA 1			②			②	②	②	②	②				②	②		②
LR 01/T											●						
TetraCon® 325, TetraCon® 325/C		●	●		●	●	●	●	●	●		●	●	●	●	●	●
TetraCon® 925	●																
TA 197 LF																●	●
TetraCon® DU/T			⑤				⑤	⑤	⑤	⑤	④	⑤			⑤	⑤	⑤
TetraCon® DU/TH			⑤				⑤	⑤	⑤	⑤	④	⑤			⑤	⑤	⑤
LR 325/01			●		●		●	●	●	●		●			●	●	●
LR 925/01	●																
LR 325/001			●					●	●	●		●			●		●
TetraCon® 325/S			●					●	●	●		●			●	●	●
ConOx															●		
TetraCon® V				●													
LR01 V				●													

Adapter (possible conversion with cell constants) is required:

② Adapter cable **K/LTA** together with temperature probe **TFK 325** or **TFK 150**
④ Connection cable **KKDU**
⑤ Connection cable **KKDU 325**

Conductivity Cells

Application	Standard	Universal		Special	Ultrapure Water		Trace	Flow-through
	KLE 325	TetraCon® 325	TetraCon® V	TetraCon® 325/S	LR 325/01	LR 01 V	LR 325/001	TetraCon® DU/T
Order No.	301 995	301 960	301 990	301 602	301 961	301 992	301 962	301 252**
Electrode material	Graphite	Graphite		Graphite	V4A steel		V4A steel	Graphite
Flow-through vessel	–	–		–	–		V4A steel	–
Shaft material	Epoxy	Epoxy		Epoxy	V4A steel		V4A steel	Epoxy
Shaft length	120 mm (4.72 in)	120 mm (4.72 in)		120 mm (4.72 in)	120 mm (4.72 in)		120 mm (4.72 in)	155 mm (6.10 in)
Cell constant	K = 0.84 cm^{-1}	K = 0.475 cm^{-1}		K = 0.491 cm^{-1}	K = 0.1 cm^{-1}		K = 0.01 cm^{-1}	K = 0.778 cm^{-1}
Diameter	15.3 mm (0.60 in)	15.3 mm (0.60 in)		15.3 mm (0.60 in)	12 mm (0.47 in)		20 mm (0.79 in)	–
Cable length	1.5 m (4.9 ft)	1.5 m (4.9 ft)		1.5 m (4.9 ft)	1.5 m (4.9 ft)		1.5 m (4.9 ft)	1 m (3.3 ft) (only with KKDU 325)
Measuring range	1 µS/cm … 20 mS/cm	1 µS/cm ... 2 S/cm*		1 µS/cm ... 2 S/cm*	0.001 µS/cm ... 200 µS/cm		0.0001 µS/cm ... 30 µS/cm	1 µS/cm ... 2 S/cm*
Temperature range	0 … 80 °C (32 … 176 °F)	0 … 100 °C (32 … 212 °F)		0 … 100 °C (32 … 212 °F)	0 … 100 °C (32 … 212 °F)		0 … 100 °C (32 … 212 °F)	0 … 60 °C (32 … 140 °F)
Filling volume	–	–		–	17 ml (without sensor)		ca. 10 ml (without sensor)	7 ml
Min./max. immersion depth	36/120 mm (1.42/4.72 in.)	36/120 mm (1.42/4.72 in.)	40 mm (1.57 in.)	40/120 mm (1.57/4.72 in.)	30/120 mm (1.18/4.72 in.)	40 mm (1.57 in.)	40/120 mm (1.57/4.72 in.)	–

IDS Conductivity Cells see page 13

For additional special measuring cells or other cable lengths, see WTW Product Details

** Measuring range depends on particular instrument,*
*** Adapter cable KKDU 325 (order no. 301 963), length 1 m (3.3 ft), is necessary for the connection*

Ultrapure Water According to Pharmacopeia

Calibration and testing agents

Kit for ultrapure water according to pharmacopeia

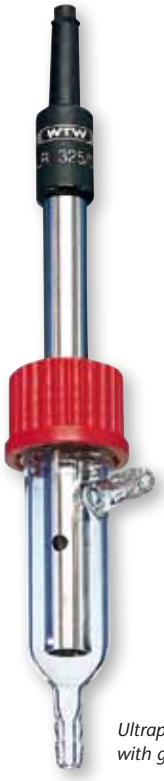
This kit contains LR 325/01 Ultrapure water cell, D01/T flow-through vessel made of glass (USP-KIT 1) or stainless steel (USP-KIT 2), NIST traceable 5 µS standard with accuracy ±2% and 6R/SET/LabTesting set

Calibration standard 100 µS/cm

Shelf life 2 years,
NIST traceable with accuracy ±3%

Calibration standard 5 µS/cm

Shelf life 1 year,
NIST traceable with accuracy ±2%



Ultrapure water cell LR 325/01 with glass flow-through vessel

Conductivity measuring kit ultrapure water measuring according to pharmacopeia, with stainless steel flow-through vessel for pharmaceutical water.

Ordering Information Calibration and Testing Agents

Kit for measuring the conductivity according to pharmacopeia		Order No.
USP Kit 1	Kit for measuring conductivity according to pharmacopeia, consisting of LR 325/01 Ultrapure water cell, D01/T glass flow-through vessel, NIST traceable 5 µS standard with accuracy ±2% and 6R/SET/ LabTesting set	300 569
USP Kit 2	As USP Kit 1, but flow-through vessel made of stainless steel instead of D01/T	300 568
Calibration agents		**Order No.**
KS 100µS	Calibration standard 100 µS/cm, shelf life 2 years, NIST traceable with accuracy ±3% (300 ml)	300 578
KS 5µS	Calibration standard 5 µS/cm, shelf life 1 year, NIST traceable with accuracy ±2% (300 ml)	300 580
E-SET Trace	Calibration set (6 x 50 ml bottles calibration and control standard, KCl 0.01 mol/l), NIST traceable with accuracy ±0.5 %	300 572

Flow-through vessels

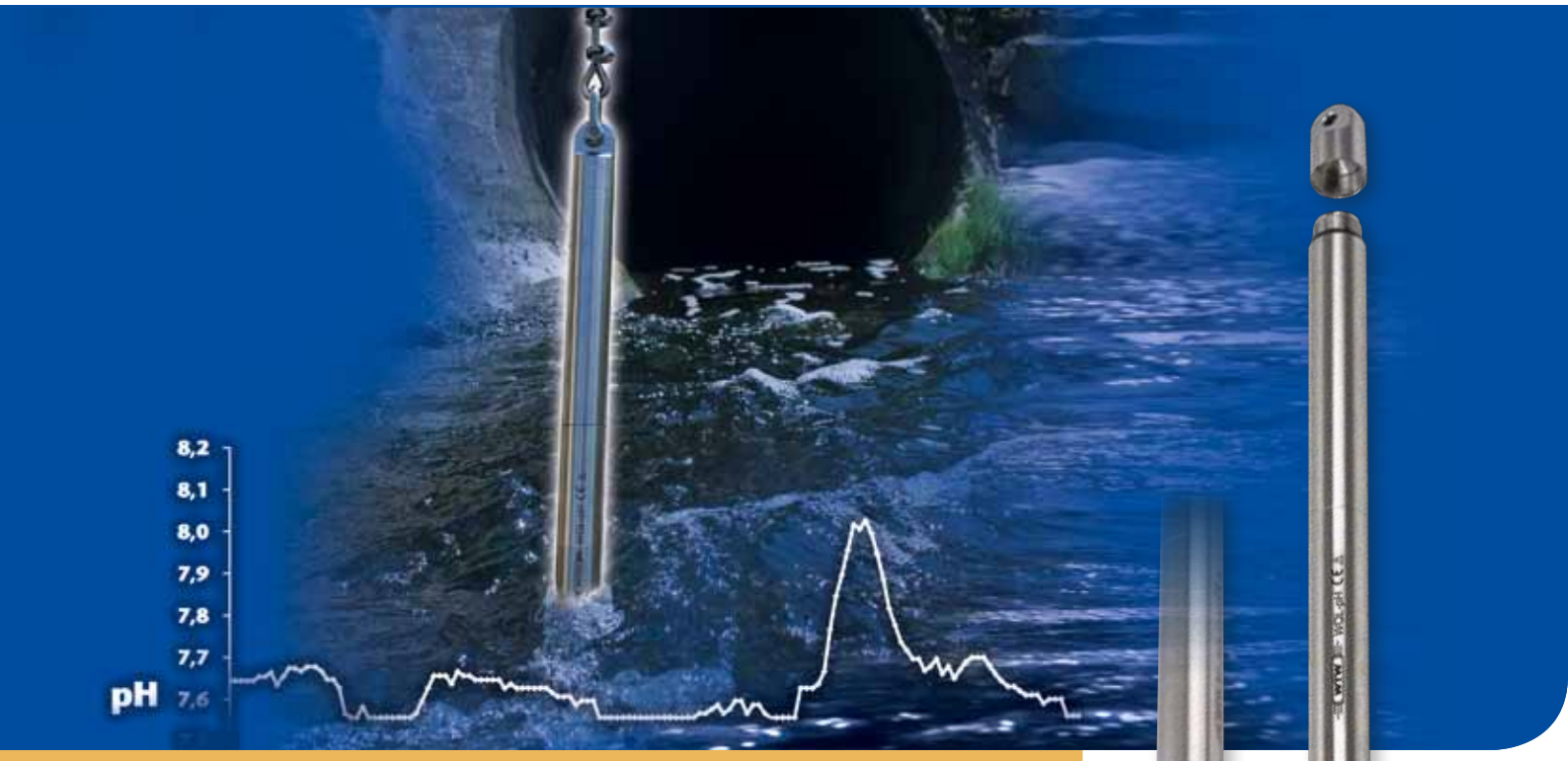
Trace conductivity cell LR 325/001 with stainless steel flow-through vessel

Glass flow-through vessel D01/T with ultrapure water cell LR 01 V

Ordering Information Flow-through Vessels

For LTA 1, LTA, LTA 01 and TFK 530		**Order No.**
D 530	Flow-through vessel of transparent PVC, suitable for conductivity cells and temperature probes, I.D. 44 mm, V*=97 ml	108 060
For TetraCon® 325		**Order No.**
D 201	Flow-through vessel of transparent PVC, I.D. 18 mm, V*=13 ml	203 730
For TetraCon® 96, LTA 100 and KLE 1		**Order No.**
D 1/T	Flow-through vessel, glass I.D. 24 mm, V*=36 ml	302 730
For LR 01/T and LTA 01		**Order No.**
D 01/T	Flow-through vessel, glass I.D. 18 mm, V*=17 ml	302 750

V = filling volume without sensor*



Data Logger WQL

The WQL product line consists of data loggers for water quality monitoring, and are ideal for measurements and data logging over long periods of time. The WQL Series meets all the requirements for continuous pH/ORP and conductivity measurement in ground and surface water, as well as in drinking and wastewater.

WTW data loggers excel in challenging applications, including difficult to access measuring points. Their robust design and durable electrodes guarantee stable measurements under tough conditions.

WQL-Cond cell

SensoLyt® WQL pH electrode

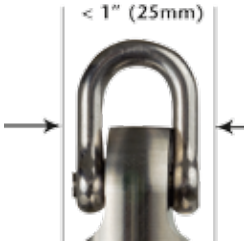
The WQL Series

- Reliable data logging
- Automatic measurement over long periods of time
- Up to 600,000 data sets
- Suitable for boreholes and pipes

Simple and easy to use

Data recording can be initiated or terminated manually via the Quick Start Button. Easy connection to PC with a mini USB connector cable. The status LED is used to monitor the operational state.

Optimized for boreholes



With a diameter of only 25 mm (1") the logger fits into very small pipes and boreholes. With the aid of the stainless steel shackle, which matches the diameter, the logger can be attached easily and safely.

Reliable data recording

All data loggers of the WQL series have a large flash memory for up to 600,000 records. This secure memory ensures reliable data storage to meet GLP requirements.

Long lifetime

A powerful 3.6 V lithium battery and power saving energy management guarantees a long service life. No additional accessories are needed to easily change the battery.

Well protected

The stainless steel finish provides optimum protection from all sides. The rugged WQL provides unmatched performance in field applications, even in the harshest conditions.

Convenient configuration and data analysis of the PC software WQL log

The operation and configuration are simple and easy, particularly suited for new, untrained users. Measurement results can be displayed as a table or graphics. Data can be exported into other software programs including Excel via the CSV format.

Sets

The convenient cases, with space for up to three data loggers and accessories, are suitable for field use.

Technical Data WQL Series

Model	WQL-pH/ORP				WQL-Cond	
Measuring range / resolution			SensoLyt® WQL	SensoLyt® WQL-PT	[µS/cm]	0.0 … 199.9
	pH	0.000 … 20.,000	2.000 … 12.000	—		200 .. 1999
	mV	-1000.0 … +1000.0	—	-2000.0 … +2000.0	[mS/cm]	2.00 … 19.99
	Temp. [°C]	-5.0 … +105.0	0.0 … +60.0	0.0 … +60.0		20.0 … 199.9
		(23.0 … 221.0 °F)	(32.0 … 140.0 °F)	(32.0 … 140.0 °F)		200 … 1000
					SAL	0.0 … 70.0
					TDS [g/l]	0 …200
					Temp. [°C]	-5.0 … +105.0
						(23.0 … 221.0 °F)
Accuracy (± digit)	pH	≤0.005			Conduc-tivity	±0.5% of the measured value
	mV	≤0.2			Temp.	±0.1
	Temp.	≤0.1				
Calibration	AutoCal	1-/2-/3 point			—	
	AutoCal-Tec	1-/2-/3 point				
	ConCal®	1-/2-/3 point				
Reference temperature	—				Selectable 20° C or 25° C (68/77 °F)	
Cell constant	—				0.475/cm ±1.5%	
Temperature compensation	—				Automatic/can be switched off	
Temperature coefficient	—				None, linear, nonlinear (nLF) according to EN 27888 (default)	

Ordering Information

WQL Series		Order No.
WQL-pH SET	Case set consisting of data logger WQL-pH including changeable pH electrode SensoLyt® WQL and accessories	4AA 591
WQL-Cond SET	Case set consisting of data logger WQL-Cond including an integrated four-electrode cell TetraCon® 325 and accessories	4CA 591
WQL-pH/Cond SET	Case set consisting of data loggers WQL-pH and WQL-Cond including electrodes and accessories	4AE 591

IP 68 CE 3 Year Warranty

Flow Measurement

The flow rate is an important parameter in the determination of water flow levels in running water. WTW offers two robust and compact flow meters for measuring the flow rate of rivers, streams, canals and wastewater systems.

The CP Series

- For an easy and fast flow measurement
- Rugged and portable
- Proven system

The CP series is characterized by propellers, which are protected against damage from flotsam or contact with the bottom of a river bed. A small magnet mounted on the edge of the propeller provides a non-contact inductive counting pulse. This is directly converted into speed by an integrated microcomputer and displayed on the screen. If desired, up to 30 speed values can be stored and later displayed via the screen. The built-in battery has a service life of five years and will be replaced as needed by the manufacturer. The flow meter's telescoping rod allows the meters to be easily used from the shore, from bridges, and from piers. A convenient carrying case makes transport easy.

Technical Data CP Series

Model	CP-1	CP-2
Measuring range	0.1 m/s to 6.1 m/s	0.1 m/s to 6.1 m/s
Accuracy	0.03 m/s	0.03 m/s
Telescope length	0.9 – 1.8 m (2.95 – 5.91 ft.)	1.5 m – 4.5 m (4.92 – 14.76 ft.)

Ordering Information

CP Series		Order No.
CP-1	Flow meter with retractable telescopic handle, 0.9 to 1.8 m (2.95 ft. to 5.91 ft.)	509 000
CP-2	Flow meter with retractable telescopic handle, 1.5 to 4.5 m (4.92 ft. to 14.76 ft.)	509 001

CE 1 Year Warranty

The WLL Series for Level Measurements

The height of the ground water level above sea level is an indicator of the volume changes at the measuring point. Ground water levels are crucial in the planning and execution of construction work (building foundations, traffic areas, landfills), but also a critical factor when monitoring long-term changes and effects on the environment.

The WLL Series

- Long-term monitoring
- USB output
- Software included

The WLL Series automatically measures and stores water level changes using compensated air pressure measurements. The pressure is detected by the analog waterproof sensor and is sent to the splash-proof logger as mA signal. The logger, which is powered by standard batteries, stores over 80,000 measured values including time and date. Data can be transmitted to a PC or laptop via a USB port: the operating modes can also be programmed via this interface. In addition to interval-controlled measuring data acquisition, there is the logarithmic mode, and an event-driven mode. There are two versions, with differing measuring ranges and cable lengths.

Technical Data WLL Series

Sensor	WLL-1	WLL-2	Logger	
Level range	0 – 4.5 m (0 – 14.76 ft.)	0 – 9 m 0 – 29.53 ft.)	Power supply	2 x 9 V 6LR61 type
Accuracy	0.1% of the maximum value at a constant temperature 0.2 % between 0 °C and 21 °C (32 °F and 70 °F)		Operating temperature	-10 °C to 85 °C (14 °F to 185 °F)
Output	4 to 20 m A		Measurement intervals	Fixed intervals: 1 second to 1 year High speed: 10 Events/sec, logarithmic, event-controlled
Cable length	7.5 m (25 ft.)	15 m (50 ft.)	Memory / Interface	81759 entries including date / time USB B Interface
Dimensions	Length: 19 cm (11.42 in.) Diameter: 2.1 cm (0.83 in.)		Dimensions	Length: 29.2 cm (11.50 in.) Diameter: 4.8 cm (1.89 in.)

Ordering Information

WLL Series		Order No.
WLL-1	Level logger including sensor, 7.5 m (25 ft.) cable, software, batteries	509 010
WLL-2	Level logger including sensor, 15 m (50 ft.) cable, software, batteries	509 011

CE 1 Year Warranty

BOD Measurements/Respiration

Biochemical Oxygen Demand

BOD measurement according to EN 1899-1 and EN 1899-2 and for self-checks

Biochemical Oxygen Demand (BOD) is an important parameter in water resource management, to measure the quality of water and treatment results in wastewater. In addition, BOD analysis potential is used in the planning and design of wastewater treatment facilities.

In routine use BOD determination is used to check the wastewater in the inflow and discharge of wastewater treatment plants. Depending on the measurement site and type of wastewater the BOD value can lie between a few mg/l and several thousand mg/l. Several methods are available for carrying out the measurement.

WTW offers various measuring systems for these methods.

In "dilution BOD" the oxygen content of a sample is measured with a dissolved oxygen sensor before and after an incubation period of 5 days. The difference between the measurements is the BOD_5 value; this is the official EPA method.

In "BOD self-checks" with the respirometer, the reduction in oxygen causes a definite pressure difference that can be measured by a pressure sensor. This practical method is very easy to perform.

Both methods are very different, but the measurements correlate directly to the discharge seen at municipal wastewater treatment facilities. Both methods require the samples to be kept at 20 °C (68 °F) for 5 days. WTW offers a wide range of temperature controlled incubators.

Depletion/Respiration

As environmental consciousness increases, microbiological degradability tests have become increasingly important, from soil surveys from waste sites to environmental impact surveys to characterize new chemical substances. The necessary respiration measurements for anaerobic or aerobic degradation can be easily performed using the high performance OxiTop®-C systems. WTW offers a wide range of application specific packages complete with the appropriate sample vessels.

inoLab® Multi 9310 IDS & inoLab® Oxi 7310

Oxi 1970i

OxiTop® IS 12

OxiTop® Control

Biogas determination

Soil respiration

"Dilution BOD"

According to EN 1899-1/EN 1899-2; official EPA method		*see page*
with inoLab® Multi 9310 IDS **with inoLab® Oxi 7310**	... securely traceable ... compliant documentation	*90* *91*
With ProfiLine Oxi 1970i	Recommended sensor: self-stirring dissolved oxygen sensor StirrOx® G	*91*

** North American version*

"BOD self-check measurement"

Worldwide approved method according to the self-check regulations		*see page*
OxiTop®	Simple routine measurement, mercury-free pressure measurement	*92/94*
OxiTop® Control	Routine, standard and special measurement, with automatic sample management	*92/95*

Depletion/Respiration

Special measurements		*see page*
OxiTop® Control OC 110	Respiration	*96/100*
	Biogas determination	
	Soil respiration	
	Biodegradability	

Accessories/Incubators

	see page
Upgrading and general accessories	*98*
Incubators/thermostat cabinets	*104*

Dilution BOD

According to DIN EN 1899-1 and DIN EN 1899-2; official EPA method

BOD determined reliably...

... using the innovative inoLab® Multi 9310 IDS

The new inoLab® Multi 9310 IDS is ideal meter for digital measurements of optical D.O. in the laboratory. The IDS technology enables in the easiest way ideal measurements and efficient documentation. The optical D.O. sensor FDO® 925 allows precise BOD measurements.

inoLab® Multi 9310 IDS

- Measuring safety without compromises
- Digital sensor recognition
- Intelligent sensor evaluation

FDO® 925

Flexible and powerful:

- fast responding optical D.O. sensor
- no own-consumption of oxygen
- matching stirrer can be mounted easily
- universal use

StirrOx® G

Self-stirring dissolved oxygen sensor – simultaneous stirring and measurement

- Single-handed operation for series measurements
- Constant flow for high reproducibility
- Immediately ready for measuring – no polarization period required
- Extremely low self-consumption of oxygen – only 0.008 µg h^{-1} $(mg/l)^{-1}$
- Zero-current free – no zero point calibration necessary
- Calibration and storage vessel OxiCal®-ST included
- Membrane life of up to 6 months
- Temperature compensation with 2 built-in sensors
- Membrane leakage monitoring – damaged membranes are indicated

BOD documented precisely...

... with the inoLab® Oxi 7310

The new inoLab® Oxi 7310 is the perfect laboratory meter for measuring BOD with the proven, galvanic D.O. sensors. With automatic GLP compliant documentation/AQA supports the traceability not only throughout the environmental laboratory. On demand also available with integrated printer.

inoLab® Oxi 7310

- USB interface for fast data transfer
- Data output via .csv format or using the optional integrated printer
- Connection for self-stirring oxygen sensor StirrOx® G

ProfiLine Oxi 1970i

- EPA approved method
- Accurate
- Battery and AC power operation

Laboratory dissolved oxygen meter ProfiLine Oxi 1970i with self-stirring DO sensor StirrOx® G.

Ordering Information

BOD measurement		Order No.
inoLab® Oxi 7310 SET 4	Professional, menu-driven D.O. laboratory meter for measurements/GLP compliant documentation. Galvanic oxygen sensor included in the set. For battery or AC operation. Instrument with Universal power supply, stand, operation instructions, self-stirring oxygen sensor StirrOx® G, cleaning solution, electrolyte, polishing strip, spare membrane caps, software CD-ROM and USB cable.	1BA304
inoLab® Oxi 7310P SET 4	same as above, but with integrated thermal printer.	1BA304P
inoLab® Multi 9310 SET 4	Digital multiparameter laboratory meter in a set including IDS sensor for measuring/ documentation according to GLP/AQA. With a universal measuring channel for pH/mV, D.O. and conductivity. Instrument with universal power supply, stand, operating instructions, optical IDS D.O. sensor FDO® 925, Software CD-ROM and USB cable.	1FD354
ProfiLine Oxi 1970i	ProfiLine dissolved oxygen meter, extremely robust, waterproof (IP 67), RS 232 digital output, for AC operation or rechargeable batteries, with universal power supply with connection for self-stirring DO sensor StirrOx® G and CellOx® 325	3B30-010
StirrOx® G	Self-stirring DO sensor for oxygen determination in Karlsruhe bottles, with OxiCal®-ST calibration and storage vessel and accessory case with spare parts and maintenance supplies	201 425

inoLab® Multi 9310 IDS & Oxi 7310:
IP 43 | CE | cETLus | 3 Year Warranty

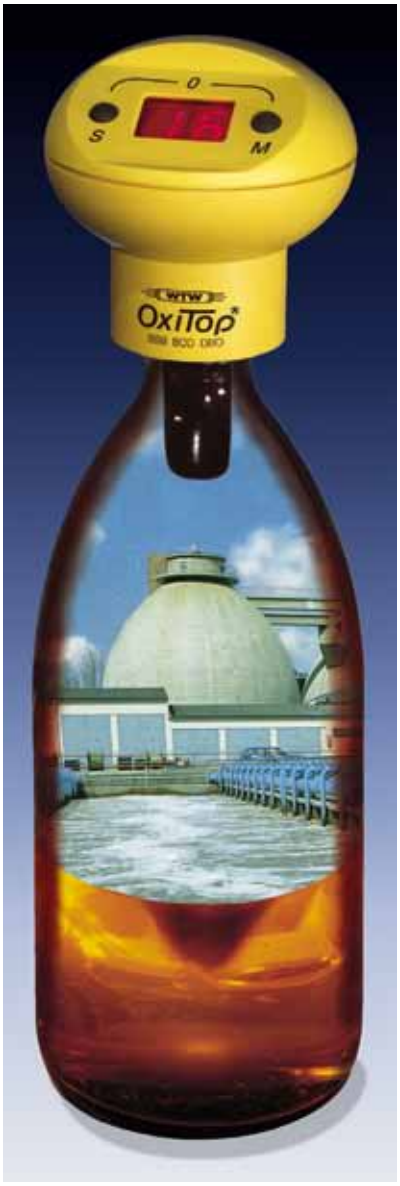
ProfiLine Oxi 1970i:
IP 66 IP 67 | CE | cETLus | 3 Year Warranty

For technical data on the inoLab® Multi 9310 IDS & Oxi 7310 refer to page 57 and 59

For technical data on the ProfiLine Oxi 1970i refer to page 65

BOD Self-check Measurement

Respiration/Biogas Determination with OxiTop® and OxiTop® Control



OxiTop® & OxiTop® Control

- Undiluted samples
- AutoTemp function for delayed start of cold samples
- Secure storage of measured values

Mercury-free measurement

Biochemical oxygen demand (BOD) determination is one of the most important parameters in water resource management, and is used to evaluate the impact of biodegradable substances in waters and wastewater. With its OxiTop® systems, WTW offers a unique, modular and mercury-free instrument system, suitable not only for BOD determination, but also for measuring biodegradability and depletion.

The advantages of **OxiTop®** and **OxiTop® Control** include simple operation and improved controls with measuring of up to 400 000 mg/l BOD (with OxiTop® Control OC 110). As the measured pressure is automatically converted, the values can be directly read as mg/l BOD.

Application range

	OxiTop®	OxiTop® Control OC 100	OxiTop® Control OC 110
Application	BOD routine	BOD routine, BOD standard	BOD routine, standard and BOD special, respiration/dilution, soil respiration, biodegradability, biogas determination
BOD range	0 – 4.000 mg/l	0 – 4.000 mg/l	0 – 400,000 mg/l
Measured value memory	5 days	0.5 hours – 99 days	0.5 hours – 99 days
Pressure mode	—	—	Pressure p 500 – 1.350 hPa
Sample volume	Fixed	Fixed	Definable

OxiTop® Complete Sets for 6 or 12 Measuring Vessels

These complete packages have been formulated to contain everything necessary to perform specific applications. The make up of each package depends on the application and varies by number of vessels, controllers and utensils for sample preparation.

Special stirring platforms were developed in order to maintain a constant temperature and guarantee optimum oxygen distribution in the sample. These stirrer platforms have space for either 6 or 12 standard bottles or 6 large vessels for special applications.

Applicable systems

- **BOD**
  OxiTop® IS 6 / IS 12
  OxiTop® Control 6 / 12
- **Soil respiration**
  OxiTop® Control B6M / B6
- **OECD / aerobic applications**
  OxiTop® Control A6 / A12
  OxiTop® Control S6 / S12
- **Biogas determination**
  OxiTop® Control AN 6 / AN 12
- **Microbial applications**
  OxiTop® Control AN 6 / AN 12
  OxiTop® Control A6 / A12

Composition of complete packages

	OxiTop®	OxiTop® Control				
Accessories	IS 6 / IS 12	6 / 12	B6 / B6M / B6M 2.5	A6 / A12	S6 / S12	AN6 / AN12
Vessel with measuring head	Amber bottle, 510 ml with rubber sleeve	Amber bottle, 510 ml with rubber sleeve	Duran bottle 500 ml / 1.0 l vessel / 2.5 l vessel; with adapter	1000 ml vessel / 250 ml vessel with adapter	Amber bottle, 510 ml with rubber sleeve	1000 ml vessel / 250 ml vessel with adapter
Number	6 / 12	6 / 12	6 / 6 / 6	6 / 12	6 / 12	6 / 12
Measuring heads	OxiTop®	OxiTop®-C	OxiTop®-C	OxiTop®-C	OxiTop®-C	OxiTop®-C
Stirrer	IS 6 / IS 12	IS 6 / IS 12	—	IS 6-Var / IS 12	IS 6 / IS 12	IS 6-Var / IS 12
Controller	—	OC 100	OC 110	OC 110	OC 110	OC 110
Software + cable	—	—	●	●	●	●
CO_2 absorbent	●	●	●	●	●	●
Nitrification inhibitor	●	●	—	●	●	●
Overflow measuring flask	164 / 432 ml	164 / 432 ml	—	—	—	—
Stirrer bars	6 / 12	6 / 12	—	6 / 12	6 / 12	6 / 12
Stirrer bar remover	●	●	—	●	●	●
Blocks of chart paper	●	●	—	—	—	—
see page	*94*	*95*	*101*	*102*	*102*	*103*

BOD Self-check Measurement

OxiTop® IS 6, IS 12

- High-precision
- 5-day automatic storage of measured values
- Portable
- Extendable

OxiTop® IS 12

Complete packages for 6 or 12 simultaneous measurements

Measurement using OxiTop® is based on pressure measurement in a closed system: microorganisms in the sample consume the oxygen and form CO_2; the CO_2 is absorbed by NaOH, creating a vacuum that can be measured as a mg/l BOD value.

The sample volume used regulates the amount of oxygen available for a complete BOD. Measurement ranges of up to 4,000 mg/l can be measured using different volumes.

The OxiTop® heads (green and yellow for inflow/outflow differentiation) have an AutoTemp function: if the sample temperature is too cold, the start of measurement is automatically delayed by at least 1 hour until a constant temperature has been reached.

Apart from the automatic storage of 5 measured values (1 value per day), further measured values can be read at all times during or after the period of 5 days, which permits the tracking of check values or measurements over longer periods.

Technical Data OxiTop® Measuring Head

Measuring principle	Manometric with pressure sensor
Measurement of	BOD_n
Measurement range	0 ... 40 digit corresponding to 0 ... 40 / 80 / 200 / 400 / 800 / 2000 / 4000 mg/l BOD
Accuracy	±1 digit (corresponds to ±3,55 hPa)
Pressure range	500 - 1350 hPa
Memory	For BOD_5: 1 value per day
Ambient temperature	Storage: -25 ... +65 °C (-13 ... 149 °F) Operation: +5 ... +50 °C (41 ... 122 °F)
Dimensions	H: 70 mm (2.8 in), Ø 70 mm (2.8 in)

Ordering Information

OxiTop® complete packages		**Order No.**
OxiTop® IS 6	Complete package, ready for use, for 6 simultaneous measurements, with IS 6 Inductive Stirring System, universal power supply 100-240V/50/60Hz and 6 OxiTop® measuring systems, including accessories	208 210
OxiTop® IS 12-6	Complete package, ready for use, for 6 simultaneous measurements (extendable to 12 simultaneous measurements), with IS 12 Inductive Stirring System, universal power supply 100-240V/50/60Hz and 6 OxiTop® measuring systems, including accessories	208 212
OxiTop® IS 12	Complete package, ready for use, for 12 simultaneous measurements, with IS 12 Inductive Stirring System, universal power supply 100-240V/50/60Hz and 12 OxiTop® measuring systems, including accessories	208 211

CE UL CUL 1 Year Warranty

BOD Self-check Measurement – for a larger number of samples

With easy sample management

OxiTop® Control 6, Control 12

- Controller-driven
- Simultaneous measurement of up to 100 samples
- Statistical evaluation
- Automatic sample ID

OxiTop® Control 12

Complete package for 6 or 12 simultaneous measurements

OxiTop® Control system uses software-controlled functions and infrared interface to communicate with the powerful OC 100 controller. This connection enables the simultaneous, group start, management, storage and tracking of 100 measuring heads, and tracks results on a large graphic display. Data can be transferred to the PC for evaluation and documentation via the **AK-540/B** cable (order no. 902 842) and the communication program **Achat OC** (order no. 208 990).

The OC 110 controller, in combination with the OxiTop® Control S6 / S12, is ideal when other applications in addition to BOD are required (see page 100).

Check sampling progress

The data can be called up at any time, even during sampling, thus enabling checking of the samples for errors. The display of the progress curve allows immediate detection of irregularities and interferences, such as a BOD value set too high for the volume used or undesired nitrification. Corrections can thus be made at an early stage.

Controller OC 100/OC 110

Features

- Simultaneous sample management with option of grouping up to 100 OxiTop®-C measuring heads.
- Data call-up of one parallel sample with statistical evaluation and as individual data.
- Automatic calculation and graphical display of BOD value.
- Data transfer even through glass doors.
- Protocol and documentation of data via Achat OC communication program in combination with a PC
- GLP and AQS with inspection intervals for calibration with the OxiTop® PM calibration tablets
(see page 98: Accessories)

OxiTop® OC 100

OxiTop®-C Measuring Head

- Instead of the usual display and keys, the OxiTop®-C measuring head has an infrared interface with which it communicates with Controller OC 100 or OC 110. By pointing the controller at an OxiTop®-C measuring head the sample can be identified and the measurement is started. Data can be called up or deleted and sampling progress can be displayed.
- Each sample is automatically assigned a unique ID number; eliminating manual sample identification even for multiple samples. In addition, statistical evaluations can be easily performed for multiple samples.
- The OxiTop®-C measuring heads have an AutoTemp function; if the sample temperature is too cold, the start of measurement is automatically delayed, by up to 4 hours, until a constant temperature can be reached. This mode can be deactivated for BOD standard.
- The measuring heads can store up to 360 data sets. Data are automatically stored in the corresponding interval according to the interval period set (0.5 h to 99 days).
- The built-in pressure sensor can register differences in pressure ranging from 500 to 1,350 hPa.

Application Range/Technical Data OxiTop® Control

	OxiTop® Control OC 100	OxiTop® Control OC 110
BOD routine	Individual samples up to 4,000 mg/l	Individual samples up to 4,000 mg/l
BOD standard	Multiple samples with statistical evaluation up to 4,000 mg/l	Multiple samples with statistical evaluation up to 4,000 mg/l
BOD special	—	User-defined volumes, 0.5 h – 99 days, up to 400,000 mg/l BOD
Soil respiration	—	User-defined volume determination
OECD / Aerobic applications	—	User-defined volume determination
Biogas determination	—	Pressure p 500 - 1350 hPa 10 intermediate values
Data sets per measurement	180 … 360 (depending on duration)	
Measurement period	0.5 h … 99 days	
Power supply	3 mignon (AA); alkaline 1.5 V	
Interface	IR (infrared); RS 232 for communication with PC	
Ambient temperature	Storage: -25 °C … +65 °C (-13 °F … 149 °F), Operations: +5 °C … +40 °C (41 °F … 104 °F)	
Dimensions	45 x 100 x 200 mm (1.7 x 3.9 x 7.9 in) (H x W x D)	
Weight	Approx. 390 g (0.86 lb)	

Technical Data OxiTop®-C Measuring Head

Measuring principle	Manometric with pressure sensor
Measurement of	BOD_n
Pressure range	500 - 1350 hPa
Accuracy	±1% of value ±1 hPa
Resolution	1 hPa (corresponds to 0.7% of BOD_n measuring range)
Power supply	Lithium batteries (280 mAh), 2 x CR2430
Ambient temperature	Storage: -25 ... +65 °C (-13 … 149 °F) Operation: +5 ... +50 °C (41 … 122 °F)
Dimensions	H: 70 mm (2.8 in), Ø 70 mm (2.8 in)

Ordering Information

OxiTop® Control		Order No.
OxiTop® Control 6	Complete package, ready for use, for 6 simultaneous measurements, with Controller OC 100 and IS 6 Inductive Stirring System, universal power supply 100-240V/50/60Hz and 6 OxiTop®-C measuring systems, including 6 sample bottles, 6 rubber sleeves, 6 stirrer bars and other accessories	208 201
OxiTop® Control 12	Complete package, ready for use, for 12 simultaneous measurements, with Controller OC 100 and IS 12 Inductive Stirring System, universal power supply 100-240V/50/60Hz and 12 OxiTop®-C measuring systems, including 12 sample bottles, 12 rubber sleeves, 12 stirrer bars and other accessories	208 204
OxiTop® Control S6/S12	Complete package with Controller OC110 and software	*see page 92*

OxiTop® Control:

CE UL CUL 1 Year Warranty

Controller OC 100 & OC 110, OxiTop®-C Measuring Head:

IP 54 CE UL CUL 1 Year Warranty

For applications also refer to p. 100 – 103 Respiration/Depletion measurement

System Extensions and General Accessories

OxiTop® Measuring Heads & SETs

Expandability and flexibility

To meet growth demands and accommodate additional applications, OxiTop® and OxiTop®-C systems are flexible and expandable. Available as individual items in different combinations including:

- Individual measuring heads OxiTop®/OxiTop®-C
- A set of two OxiTop® heads (yellow and green).
- Upgrade sets for an additional 6 positions with 6 heads each and flasks, sleeves and stirring bars, as well as the stirring platform.

Stirrers

Stirrer IS 6 and IS 12

IS 6-Var

For BOD measurement

Stirrers IS 6 and IS 12 have been specially developed for BOD measurement with the OxiTop® system. Software-controlled speed regulation prevents the magnetic stirrer bar from getting caught or wobbling.

The speed is selected so that an optimal gas exchange with the sample takes place. The stirrer is maintenance-free and non-wearing as it contains no moving parts.

The IS 6-Var model has been specially developed for use with large measuring vessels and has space for 6 measuring vessels. Its outer dimensions are identical to those of the IS 12.

Testing Aids for the OxiTop® System for Quality Control

Two testing aids are available for monitoring measurement and checking system leakage, which can be called up during a corresponding time interval using the AQA function in the controller.

OxiTop® PM

These calibration tablets simulate a complete BOD and perform quantitative monitoring of measurement (approx. 308 mg/l, batch-dependent) as well as checks for leakage over the entire period.

OxiTop® PT

This testing aid performs a "quick" check for under-pressure and leakage. The OxiTop® contains the pressure table required for the individual place of installation. OxiTop®-C automatically includes these values.

General Accessories

Storage racks

For safe storage of OxiTop® measuring systems and OxiTop®-C measuring heads, for 6 measuring heads each.

Marking rings

For identification of BOD bottles for OxiTop® instruments.

Overflow measuring flasks

In different standard sizes for OxiTop®

In addition to the standard 164 ml and 432 ml overflow measuring flasks, 22.7 ml, 43.5 ml, 97 ml, 250 ml, 365 ml are also available.

Technical Data Stirrers

Model	IS 6	IS 12	IS 6-Var
No. of stirring positions	6	12	6
Stirrer speed	Program-controlled 180 ... 450 min^{-1}		
Ambient temperature	Storage: -25 °C ... +65 °C (-13 °F ... 149 °F) Operation: +5 °C ... +40 °C (41 °F ... 104 °F)		
Dimensions (H x W x D)	67 x 265 x 181 mm (2.64 x 10.43 x 7.13 in)	67 x 266 x 350 mm (2.64 x 10.47 x 13.78 in)	70 x 350 x 266 mm (2.76 x 13.78 x 10.47 in)
Power supply	Universal power supply 100-240V/50/60Hz		

Please refer to the WTW Product Details for a precise listing of all available components

Depletion/Respiration with OxiTop® Control OC 110

With the global expansion of wastewater treatment, soil remediation, and waste treatment, the study and monitoring of biological cleaning treatments becomes increasingly important.

Biological tests are an important component, in addition to the usual physical-chemical measuring methods. In order to determine the microbial activity in and biodegradability of foodstuffs, pollutants, harmful substances or waste substances, respiration (depletion) measurements are often performed. In these measurements the respiration of the organisms is determined under defined conditions as the oxygen uptake or release of carbon dioxide.

Measurements are carried out via closed systems using the OxiTop®-C in combination with the OC 110 controller. Depending on the application, specially adapted measuring vessels are available, all of which are equipped with the necessary connection thread and some are autoclavable. Specialty packages are available with everything needed for a particular application.

For the incubation of larger measuring vessels, WTW offers the TS 1006-i thermostat cabinet as well as the IS 6-Var stirrer platform, to accomodate large diameter vessels.

Depletion/Respiration		
	Applications and Procedures	**Measuring**
Soil respiration	Soil analysis/ biodegradability of pollutants: laboratory method according to DIN ISO 16072	Aerobic using CO_2 absorption, quantitative CO_2 determination possible
Biodegradability	Determination according to OECD 301 F / DIN EN 29 408 / ISO 9408	Aerobic using CO_2 absorption
Biogas determination	Determination of anaerobic degradation processes	Anaerobic, determination of CO_2 + Methane
Microbiology	Growth and stress investigations: determination of the respiration rate	Aerobic, warning pressure possible

Determination of Soil Respiration

Laboratory method for determining the microbial soil respiration according to DIN ISO 16072.

OxiTop® Control B6/B6M

- Simple and precise
- Cost-efficient
- Optimum measuring vessels for subsequent quantitative determination of CO_2

Soil respiration measurements are used for forecasting, surveying and checking remediation work, for biodegradability measurements of substances (pesticides, fungicides, fertilizers, etc.) and for carrying out toxicity tests.

Thanks to specially designed, test-proven vessels, these measurements are made accurate and simple with the OxiTop® Control System. A cost effective alternative compared to conventional methods.

Soil respiration measurements can be carried out in 2 different vessel types.

For actively respiring soils with strong CO_2 development, the MG 1.0 measuring vessel is recommended: its large opening (approx. 100 mm / 3.9 in dia.) easily fits large-volume CO_2 absorber vessels for later quantitative CO_2 determination.

Example of application using PF/45... sample vessels

Example of application using MG/... measuring vessels

Ordering Information

OxiTop® Control	Complete soil respiration package	Order No.
OxiTop® Control B6M	Package for soil respiration (aerobic) with 6 MG 1.0 measuring vessels, 1000 ml, with stopper adapters for OxiTop®-C	208 232
OxiTop® Control B6	Package for soil respiration (aerobic) with 6 PF 45/500 sample vessels, 500 ml, Duran and 6 OxiTop® AD/SK adapters, autoclavable	208 230

Determination of Biodegradability

Laboratory procedures for determination of biodegradability according to DIN EN 29 408 / ISO 9408 / OECD 301 F

OxiTop® Control A6/A12

OxiTop® Control S6/S12

The determination of the biodegradability should be checked before new chemicals are used for the first time, not only for environmental reasons but to minimize disposal charges.

The sample and a blank are stirred at a constant temperature for 28 days in closed bottles.

The CO_2 produced is removed by means of an absorber, the resulting negative pressure is a measure of the biodegradability.

The OxiTop®-C continuous value recording guarantees proper documentation.

The measuring bottles and adapters can be autoclaved at 121 °C (249.8 °F).

Ordering Information

Model	Complete OECD packages	Order No.
OxiTop® Control A6	Package for aerobic applications with 6 x 1000 ml measuring units	208 220
OxiTop® Control A12	Package for aerobic applications with 12 x 250 ml measuring units	208 222
OxiTop® Control S6	Package for aerobic applications with 6 x 510 ml measuring units	208 196
OxiTop® Control S12	Package for aerobic applications with 12 x 510 ml measuring units	208 198

Biogas Determination

Determination of anaerobic degradation processes: biogas determination

OxiTop® Control AN6/AN12

Anaerobic degradation processes take place in the absence of oxygen. A septum sealed bottle nozzle fills the head space above the sample with inert gas. When anaerobic degradation has taken place, the dissolved CO_2 can be driven off and then removed from the head space by means of a CO_2 absorber. The resulting pressure difference is proportional to the CO_2 concentration; the remaining overpressure is proportional to the methane concentration.

The degradation process can be conveniently observed in the "pressure" operating mode.

Determination of the Respiration Rate

Microbiological growth and stress investigations: determination of the respiration rate (aerobic/anaerobic measurements)

OxiTop® Control AN6/AN12

OxiTop® Control A6/A12

The use of special measuring bottles with a septum sealed nozzle allows the interference-free addition of substrates and solutions.

Pressure alterations could indicate a reduction in oxygen concentration, which could necessitate the addition of oxygen, air, or other gases.

It is possible to set a "warning pressure" or a pressure limit so adjustments can be made.

The momentary pressure can be stored so the adjustments are fully documented. The recording of these measured values (max. 10 values) permits long-term measurement.

Ordering Information

Model	Complete packages for microbiology	Order No.
OxiTop® Control AN6	Package for aerobic or anaerobic applications with 6 x 1000 ml measuring units	208 225
OxiTop® Control AN12	Package for aerobic or anaerobic applications with 12 x 250 ml measuring units	208 227
Model	**Complete packages for aerobic measurements**	**Order No.**
OxiTop® Control A6	Package for aerobic applications with 6 x 1000 ml measuring units	208 220
OxiTop® Control A12	Package for aerobic applications with 12 x 250 ml measuring units	208 222

Incubators

OxiTop® Box

- Compact
- Precise
- Uniform temperature distribution

Example of an application:
OxiTop® Box with OxiTop® Control 12

Thermostat box with forced air circulation for 20 °C (±0.5 °C / 68 °F, tolerance 67.1 - 68.9 °F)

OxiTop® Box with hinged, non-corrosive, clear-view cover accommodates a maximum of either 12 OxiTop® simultaneous measurements or 20 Karlsruhe bottles.

The chamber is equipped with a connection for an IS 6 or IS 12 stirrer.

A special compartment is provided for 6 methylene blue samples.

A cross ventilation fan ensures uniform temperature distribution and automatic defrosting system with condensate evaporation, plus the compressor is CFC-free.

Technical Data

Model	**OxiTop® Box**
Temperature control	20 °C ±0.5 °C / 68 °F (tolerance 67.1 - 68.9 °F)
Ambient temperature	Storage: 25 °C ... +50 °C (-13 ... +122 °F) Operation: +10 °C ... +32 °C (+50 ... 89.6 °F)
Power consumption	200 W
Dimensions (H x W x D)	375 x 425 x 600 mm 14.76 x 16.73 x 23.62 in
Weight	Approx. 30 kg (66.139 lb)

Ordering Information

BOD thermostat boxes		**Order No.**
OxiTop® Box	BOD OxiTop® Box, thermostat box with temperature-controlled forced ventilation for 230 V 50 Hz AC power supply	208 432

CE 18 Months Warranty

Note: For versions for 115 V / 60 Hz, see WTW Product Details.

Thermostat Cabinets

- Versatile
- Powerful
- Cost-effective

To incubate samples at a constant, desired temperature during the reaction period, a thermostat cabinet is necessary. WTW offers thermostat cabinets in various sizes with a variably adjustable temperature range of 10 °C - 40 °C (50 °F - 104 °F) and a power supply of 230 V/50 Hz. Temperature accuracy lies at ±1 °C deviation from the set temperature.

Because the samples must be stirred, the thermostat cabinets are fitted with internal power sockets. 2 – 4 shelves are available, according to the thermostat cabinet size, thus enabling simultaneous temperature control of up to 48 standard BOD samples, or 4 IS 12 or IS 6-Var stirrer platforms.

The largest model, TS 1006-i is especially suited for special applications, as the space between the 4 shelves allows for 1.5 l vessels or flasks with side nozzles.

The sizes TS 606/2-i aTS 606/4-i are available with transparent insulating glass doors and are especially suited for use with the OxiTop® Control system. Data can be recalled through the closed glass door, to avoid temperature fluctuations caused by opening the door.

Technical Data

Model	TS 606/2-i	TS 606/3-i	TS 606/4-i	TS 1006-i
Shelves	2	3	4	4 widely spaced
Number of samples	2 x 12 BOD standard	3 x 12 BOD standard	4 x 12 BOD standard	4 x 12 BOD standard 4 x 6 special vessels
Glass door	Optional	—	Optional	—
Temp. control range	+10 °C … +40 °C (50 °F … 104 °F) ±1 K; adjustment interval: 1 °C			
Ambient temperature	Operation: +10 °C ... +32 °C (50 °F … 89.6 °F) (Climate class SN); Storage: -25 °C … +65 °C (-13 °F … 149 °F)			
Gross contents	180 l	260 l	360 l	500 l
Dimensions (H x B x D) outside	850 x 602 x 600 mm 33.47 x 23.70 x 23.62 in	1215 x 602 x 600 mm 47.84 x 23.70 x 23.62 in	1589 x 602 x 600 mm 62.56 x 23.70 x 23.62 in	1515 x 755 x 715 mm 59.65 x 29.72 x 28.15 in
inside	734 x 513 x 433 mm 28.90 x 20.20 x 17.05 in	1047 x 513 x 433 mm 41.22 x 20.20 x 17.05 in	1418 x 513 x 433 mm 55.83 x 20.20 x 17.05 in	1338 x 646 x 516 mm 52.68 x 25.43 x 20.32 in
Weight	37 kg (81.571 lb)	45 kg (99.208 lb)	50 kg (110.23 lb)	72 kg (158.73 lb)

Ordering Information

BOD thermostat cabinets – only available for 230 V/50 Hz		Order No.
TS 606/2-i	Thermostat cabinet for 2 BOD OxiTop® systems	208 380
TS 606/3-i	Thermostat cabinet for 3 BOD OxiTop® systems	208 382
TS 606/4-i	Thermostat cabinet for 4 BOD OxiTop® systems	208 383
TS 1006-i	Thermostat cabinet for 4 BOD OxiTop® systems	208 385

CE 1 Year Warranty

For other thermostat cabinets, see WTW Product Details.

Photometry

Straightforward measuring!

WTW offers photometers and test sets, perfectly matched for specific applications. The programs to run the test kits are stored in the meter.

pHotoFlex® Series

... for all-purpose use

Cell Tests without barcodes

Powder Tests

Portable and powerful – Ideal for field use

p. 124

pHotoFlex®

p. 117

Cases / Sets

The portable lab for field use

p. 120

LabStation

The small lab solution: pHotoFlex® plus LabStation

p. 120

photoLab® & photoLab® 6000 Series

... utmost precision for use in the lab and in-the-field

photoLab®

p. 115

photoLab® 6000 series

p. 110

Thermoreactors

Convenient and secure digestions

p. 122

Reagents/ accessories

p. 124

Systematic and Spectral Analysis – Routine Measurement and Photometric Testing

Photometric identification can be split into two groups:

The **routine measurement of standard parameters in water analysis** – also known as systematic analytics – displays the measured values of each parameter promptly thanks to the stored test kit methods. The test kit reagent reacts to the substance and is transformed into a measurable color. The coloration is caused by the absorption at certain wavelengths of the light spectra. Measurement takes place mostly at the wavelength with highest absorption.

These routine measurements are standard in water analysis of wastewater, drinking water and environmental monitoring.

A photometer used in conjunction with specific test kits offers a harmonized system for measuring in a variety of applications. The test kit methods and measuring range may not be identical to each photometer model due to optical and light related differences.

Spectral analysis is particularly useful for studies of unknown substances, methods development and for optimizing testing systems: For example, to determine the absorption maximum for test systems, and the suitable wavelength, spectra are run over a wider wavelength range in order to identify the highest and most suitable. Additionally, enzyme kinetics or multi-wavelength measurements can also be processed.

Portable and Accurate: The pHotoFlex®, photoLab® and photoLab® 6000 Series

In order to choose the appropriate instrument, the following should be considered:

Portable measuring	Measuring in laboratory environment
With pHotoFlex® and pHotoFlex® Turb	**With photoLab® S6/S12 and photoLab® 6000 series**
For fast and accurate measurements in the field these are important factors: • Low power consumption • Durability • Portability • Precision These requirements are met by a special optical system working with a combination of LED and filters. The portable pHotoFlex® instruments feature low warming and long lifespan LED technology for ultimate durability. With two cuvette sizes, these photometers can perform all common tests and a wide measuring range. LabStation and LSdata offer the convenience of a lab.	Precise, accurate results for research and routine measurements in the lab, these instruments offer: • AQA/IOC • Accurate measuring • Wide measuring ranges • Convenient features including test and cuvette recognition A complex optical system and lab conditions guarantee constant measuring conditions. The constant power supply allows the use of barcodes. The optical system and rectangular cuvettes up to 50 mm allow wide measuring ranges reaching up to trace elements analysis. The largely constant temperature in the lab allows extensive presettings for the methods, thereby providing a higher user comfort. Additionally, the following tasks can be accomplished using photoLab® 6000 series: • Measurement from 190 – 1100 nm • AQA extended for matrix check and large user groups • Scans (spectra), kinetics and multi-wavelength measurements • Data management via USB and PC-software (optional)

Features include:
- Proven quality
- Highest accuracy corresponding to optical technology used
- Large selection of cuvettes
- Outstanding instrument features

Application Photometers

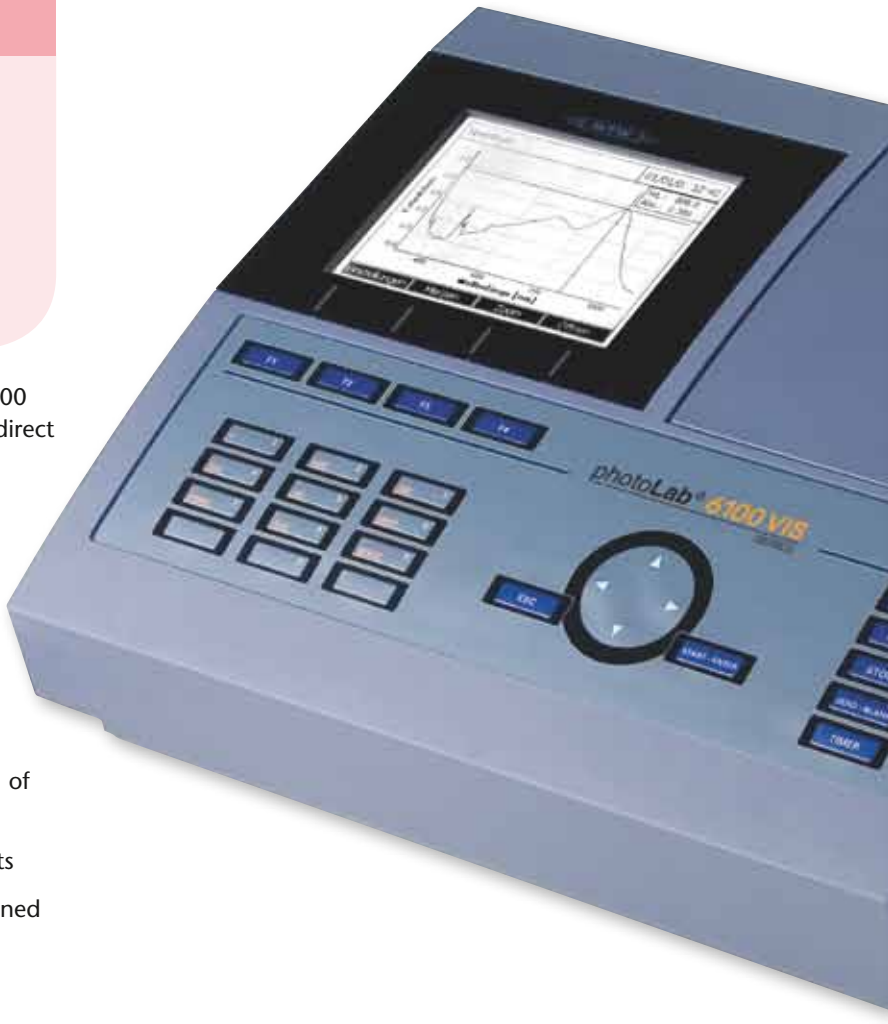
Application range	Portable Photometers			Filter		Spectral	
	pHotoFlex®			photoLab®			
	STD	pH	Turb	S6	S12	6100 UV	6600 UV-VIS
Application areas	Environmental monitoring, water analysis, beverage industry	Environmental monitoring, water treatment, beverage industry, wine industry, process control, multi-parameter applications for photometry, pH and turbidity.		Routine measurements in wastewater and drinking water, optional field use	Routine measurements in wastewater and drinking water, comprehensive laboratory testes, optional field use	Spectral and special analysis in industry, education and science and analysis of routine measurements with standard parameters in wastewater and drinking water, as well as environmental analysis and in-the-field use.	
Wavelengths	6 wavelengths: 436, 517, 557, 594, 610, 690 nm			6 wavelengths: 340, 445, 525, 550, 605, 690 nm	12 wavelengths: 340, 410, 445, 500, 525, 550, 565, 605, 620, 665, 690, 820 nm	320 nm–1100 nm (VIS), freely definable	190 nm–1100 nm (UV-VIS), freely definable
Optical system	LED with filters			Filter/Reference beam		Monochromator/Single Beam + AutoCheck	
Special functions	—	pH measurement	pH measurement, turbidity (IR 860 nm)	—	Kinetics	Spectra, kinetics, multi-wavelength measurements, graphical data evaluation, environmental parameters with routine and special tasks with AQA support, PC-software photoLab® Data *spectral*	
	Optional: LabStation with PC-software LSdata, rechargeable batteries, PC-software LSdata (stand-alone)						
Data sets	100	1000					
User-defined methods	10	100		No	50	100, 20 profiles	
Cuvettes	Round: 16 mm (height: 91 – 104 mm), 28 mm			Round 16 mm	Round and rectangular 10, 20, 50 mm		

The photoLab® 6000 Series
Spectral analysis – universal and flexible

The spectrophotometers of the photoLab® 6000 series for VIS and UV/VIS range offer the unique combination of systematic and spectral analysis with the proven analytical quality assurance AQA and the convenience of a filter photometer.

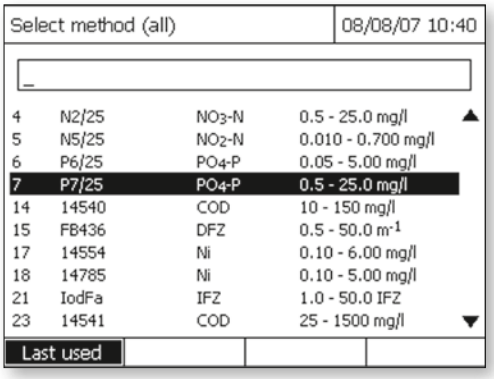
photoLab® 6000 Series

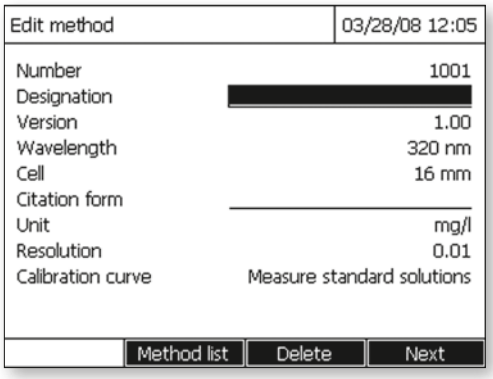
- 190 – 1100 nm
- Innovative optics
- Intuitive interface
- Extensive AQA



Thanks to state-of-the-art technology all photoLab® 6000 models are complete with optimized operation – fast, direct and intuitive:

- Menu navigation for all applications for concise operation
- Large, backlit graphic display, for simple graphical evaluation
- Direct access to functions such as menu related settings, dilution, quotation mode using function keys
- Selection tables for convenient selection and search of data, parameters, methods etc.
- Data filter for selective choice of measuring data sets
- Masks for easy handling and measuring of user defined methods
- USB for all data transfers





Systematic analysis – routine measurement with test kits

Especially important for routine measurements and in water analysis are speed, precision and convenient data transfer. photoLab® 6000 series offers proven and innovative functionalities:

- **AutoCheck** – an automatic referencing – for highest precision
- The proven combination of round and rectangular **cuvette** slots
- Automatic **cuvette** recognition for fast and effective handling
- Integrated **barcode recognition for round and rectangular cuvettes**, eliminating cuvette failures and initiating prompt measuring start
- More than 250 methods for commercial test kits
- Color measurement according to APHA 2120F
- Direct methods such as SAC, color etc.
- Industrial applications, e.g. brewery

Analytical Quality Assurance (AQA) – From self monitoring to large laboratory environment

The instrument supported **A**nalytical **Q**uality **A**ssurance has become a must across all industries to guarantee plausible and correct measuring results. The photoLab® 6000 series supports the AQA for checking the instrument and for individual routine measurements. The administration of user groups for large laboratory environments including administrative, user and guest profiles is also supported. The AQA feature can be switched on or off.

AQA

- Extensive equipment testing
- MatrixCheck
- Extended user administration

- Calibration intervals for instrument and test kits
- **PhotoCheck**: Instrument check including linearity at 3 wavelengths and 4 measuring points
- Grey filter and UV-VIS test standards
- Standards for single parameters and combined checks
- Matrix check with spiking

AQA2 setup	08/16/07 18:25
General	
Mode	Measurements
Lock methods	Yes
Method	6: P6/25
AQA2	AQA2 inactive
Interval	50 Measurements
Target value	0.80 mg/l PO_4-P
Tolerance	0.08 mg/l PO_4-P
Standard ID	
Method	Apply

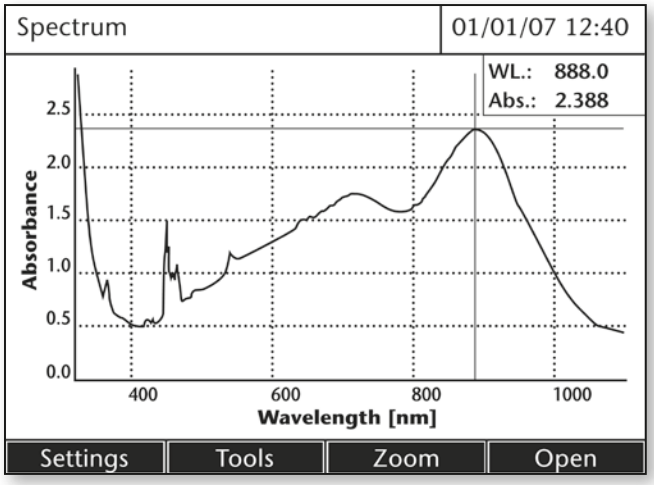
PhotoCheck

Spectral analysis –
For user-defined methods, spectra and kinetics

All user-specific laboratory applications and special tasks are made easy by the menu navigated instruction, and additional functions:

- **100 user-defined methods – also complex functions** – Linear and non-linear applications can be entered via entry mask
- **Special tasks / entry of formulas for complex measurement** procedures
- **Spectra with freely range** definable wavelength
- **Multi-wavelength measurement**
- **Kinetics:** With a maximum or selectable number of measurements time interval and start delay are adjustable

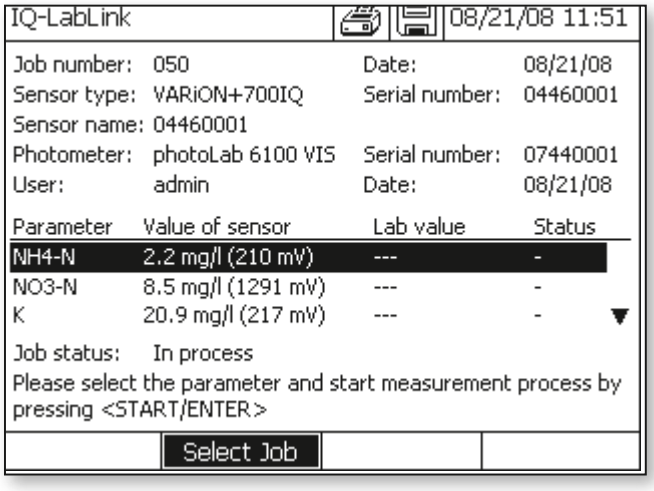
The settings can be stored in 20 profiles each and recalled when required. The 4 MB capacity can store approximately 100 spectra of 300 – 900 nm and 400 kinetics sets with each of 150 measuring values.



IQ-LabLink – Automatic Matrix Adjustment for IQ Sensor Net

IQ-LabLink

- Convenient and menu-driven matrix adjustment
- Safe and fast data transfer via USB
- Automatic allocation to several sensors



The photoLab® 6000 Serie offers – together with the IQ Sensor Net – a system aided procedure for matrix adjustment of the ISE sonsors: The data of the sensors are transfered via USB from the MIQ/TC 2020 XT to the photometer via "job list". The required parameters are measured with a convenient and automated measuring procedure and transferred via USB back to the controler. The matrix adjustment of all respective sensors is reliable and without mistaken identity.

Data management with USB and photoLab® Data *spectral*

photoLab® 6000 series is equipped with three interfaces: USB-A to connect printer, barcode reader and USB stick, USB-B for PC-connection and an RS 232 interface. Thus, the data exchange via USB is extremely convenient:

- Measurement data, spectra, and kinetics
- Software and method updates

The PC-Software photoLab® Data *spectral* offers a convenient user interface for easy data exchange and post-processing of measurement data:

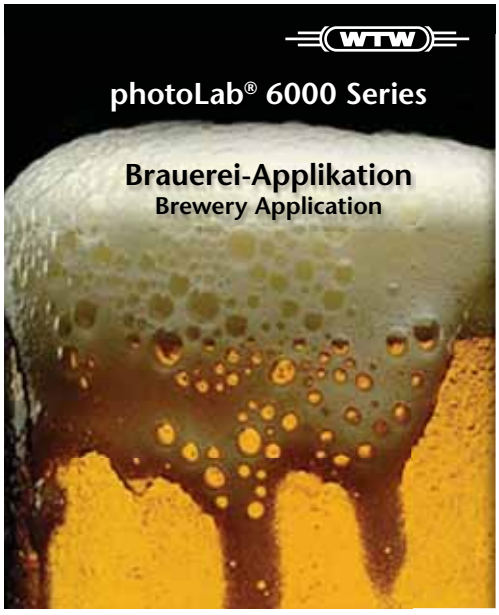
- GLP-compliant data management with device ID and user administration
- Data transfer to PC for further processing with LIMS and export into spreadsheet
- Export of spectra in application software for the uniform presentation and processing of spectra
- Adjustment of several photometers
- Administration of IQ LabLink job files

Brewery Application Package for photoLab® 6000 Series

The package offers standard methods according to MEBAK for measurement of common parameters in brewery (EBC). The methods are uploaded to the meter via USB and will be immediately activated. After first upload and activation future updates can be simply downloaded via the WTW website.

Anthocyanogenes (Harris - Rickett-Method)	EBC
Bitterness Beer*	EBC
Bitterness Wort*	EBC
Colour	EBC
Copper	EBC, Cuprethol method
Flavanoids	EBC
Free Amino Nitrogen (FAN) dark wort	EBC
Free Amino Nitrogen (FAN) dark beer	EBC
Free Amino Nitrogen (FAN) light beer	EBC
Free Amino Nitrogen (FAN) light wort	EBC
Iodine photometric	Method with correction factor
Iron	EBC, Methode via calibration curve
Iso-α-acid*	Multiwavelength method
Nickel	EBC
Nickel	EBC
Reducing Power	
Steam Volatile Phenols	Method via calibration curve
Thiobarbituric Acid Number (TAN) in beer and wort	
Thiobarbituric Acid Number (TAN) in congress wort	
Total Carbohydrates	EBC
Total Polyphenols	EBC
Vicinal Diketons (Diacetyl, 2,3-Pentandion)	EBC
α-cids	Standard method

** with photoLab 6600 UV-VIS only*



photoLab® 6000 series en-route – convenient portable operation

A spectrophotometer is typically used in the laboratory, although it is convenient when it can also be operated on-site. For on-site use, it is important to have safe transport, a sheltered area and a corresponding measuring preparation with warm up period and zeroing after transport. The light-weight and easy-to-operate photoLab® 6000 series is flexible when on-site operation is required. A sturdy carrying case, and a 12 V adapter cable for connection to a typical car battery are available options.

Technical Data photoLab® 6000 series		
Model	**photoLab® 6100 (VIS)**	**photoLab® 6600 (UV/VIS)**
Wavelength range	320 – 1100 nm	190 – 1100 nm
Technique	Single Beam with AutoCheck (time-shifted reference)	
Lamp	Tungsten	Xenon Flashlamp
Wavelength resolution / accuracy	1nm; ±1nm	
Scan speed	Approx. 334 nm/min resp. 5.6 nm/sec	Approx. 455 nm/min resp. 7.6 nm/sec
Band width	4 nm	
Test recognition	Automatic test recognition via barcode for all cuvette types with automatic measurement start	
Absorbance range	-3.3 …+3.3 Abs	
Photometric resolution	0.5% of measurement value or 0.005 Abs at Extinction 2	
Photometric reproducibility	± 0.002 E @ 1 E (or better)	
Photometric accuracy	0.003 E for E < 0.600 E 0.5% or value or 0.600 E - 2.000 E	
Photometric linearity	< 1% up to 2.000 A at 340 - 900 nm	
Stray light	< 0.1% at 340 and 408 nm	
Cuvette recognition	Automatically for all cuvette types: round 16 mm, 10, 20, 50 mm w/o adapter	
Measurement modes	Concentration, absorbance, transmission, kinetics and spectra with absorbance, % transmission, multi-wavelength measurement	
Display	Graphical display with backlit for enhanced graphical evaluation of data	
Storage	1000 measurement values; spectra and kinetics up to 4 MB => 100 spectra (300 – 900 nm) and 400 kinetics with 150 values	
Methods and profiles	More than 200 programmed methods, 100 user defined methods, 20 profiles each for kinetics and absorption spectra	
Update	Via internet, PC, USB stick	
Interfaces	1 USB-A for USB stick, printer, barcode reader, 1 USB-B for PC, 1 RS 232 for serial connection of printer/PC	
Approvals	cETLus (= UL), CE	
Protection class	IP 30 and protecting rinse for optical slot	
Power supply	Universal plug	
Temperature range/ humidity	Use between +10 °C and +35 °C (+50 °F and +95 °F), Storage: -25 °C up to +65 °C (-13 °F up to +149 °F) Average p.a.: ≤75 %, 30 days /year: 95%; rest: 85%	
Dimensions (W x H x D)	404 x 197 x 314 mm (15.9 x 7.8 x 12.4 in.)	
Weight	Approx. 4.5 kg (9.9 lb without plug-in power supply)	
Accessories	PC software for easy data evaluation (Q2/2008), cable for portable car battery (12 V) , carrying case	

Ordering Information		
Model		**Order No.**
photoLab® 6100 VIS	Spectrophotometer (VIS) for spectral and routine analysis in the range of 320 - 1100 nm	250 201
photoLab® 6600 UV-VIS	Spectrophotometer (UV/VIS) for spectral and routine analysis in the range of 190 - 1100 nm	250 202
photoLab® Data *spectral*	PC software for convenient data management	902 761
PL6-BREW	Brewery application package according to MEBAK/EBC	250 214
FC spectral 6000	Field case for photoLab® 6000 series	250 212
ADA 12V	12 V car adapter cable for operation of photoLab® 6000 series	902 760

IP 30 CE cETLus 2 Year Warranty

The photoLab® Series – Immediate and high precision measuring

The photoLab® filter photometers offer laboratory precision, convenience and quick results. This is most beneficial for routine tasks in water analysis:

Open the lid, insert the cuvette, read the measuring value instantly

photoLab® Series

- AQA/IQC, multistage
- Automatic cuvette identification
- Barcode recognition for all cuvette types

Speed and accuracy results from the filter technology used with reference beam technique. Combined with barcoded round and rectangular cuvette tests, efficient and cost-effective measurements are possible. Defined wavelengths by high-precision filters do not require any mechanics and therefore make this measuring instrument practically maintenance free.

- Auto Check for highest stability and precision
- Automatic cuvette recognition for all used cuvette types
- Automatic test recognition via barcode for round and rectangular cuvette tests
- Automatic measuring start
- Automatic Quality Assurance (AQA)
- Wide range of programmed test kits: from convenient cell test to economical reagent test kits

photoLab® S6

The filter photometer with 6 wavelengths for all common routine determinations with cell tests (round) for wastewater and drinking water analysis.

The instrument is simple and easy, ideal for:

- Sporadic, single measurements
- Using cell tests for fast measuring results
- Standard measurements with easy storage

photoLab® S12

Filter photometer with 12 wavelengths for extensive routine operations in service laboratories and for education.

In addition to the barcoded cell tests, there are a considerable number of economic reagent test kits available for rectangular cuvettes. Uniquely, the barcode support also comes with test kits for 10 mm, 20 mm and 50 mm rectangular cuvettes. Even trace concentrations are covered – especially important for drinking water analysis. Additionally, 50 user defined methods are possible and measurements of kinetics can be performed.

The instrument is highly efficient and cost-effective for:

- Routine determinations with a large number of samples
- Measuring the smallest concentrations
- Special tasks with user-defined methods

These features are also suitable for service laboratories.

Technical Data photoLab®

Model	photoLab® S6 and S6-A	photoLab® S12 and S12-A
Type	Filter photometer	Filter photometer
Photodiode array for	6 wavelengths	12 wavelengths
Wavelengths, nm	340, 445, 525, 550, 605, 690	340, 410, 445, 500, 525, 550, 565, 605, 620, 665, 690, 820
User-defined methods	–	50
Auto-zero adjustment	Yes	Yes
AutoSelect-function	Yes	Yes
Cuvette recognition	Yes	Yes
Cuvette type	Round	Round, 10 mm, 20 mm and 50 mm
Data storage and time	500 data sets with date and time	1000 data sets with date and time
Essential functions	Concentration, absorption and transmission measurement, AQA/IQC, RS 232 interface	Concentration, absorption and transmission measurement, AQA/IQC, Kinetics, RS 232 interface
Operation with rechargeable batteries (optional)	1 working day, total discharge protection, maintenance charging during AC operation	1 working day, total discharge protection, maintenance charging during AC operation
Test marks	CE	CE
Warranty	2 years	2 years

Ordering Information

Model		Order No.
photoLab® S6	AC power operated version, universal plug	250 013
photoLab® S6-A	Version with rechargeable batteries, universal plug	250 022
photoLab® S12	AC power operated version, universal plug	250 024
photoLab® S12-A	Version with rechargeable batteries, universal plug	250 026

CE 2 Year Warranty

Note: versions for other power supplies/countries on request

pHotoFlex®: The Portable Photometers

The pHotoFlex® series offers the unique combination of photometry, pH and turbidity measurement. This is most beneficial for routine tasks in water analysis: precision with low power consumption achieved through optical filters together with the LEDs for 6 wavelengths. Additionally, the pH measuring and the optional turbidity measuring (IR range) are integrated for pHotoFlex® pH and pHotoFlex® Turb, making these instruments the perfect partners for all measurements in the field: in a wastewater plant for wastewater and reference measurements, in drinking water analysis at a wellhead or in a cistern, and for monitoring bodies of water. They are versatile, low current and offer many extra features.

pHotoFlex® Series

- Precise
- Versatile
- Robust

- The smart adapter solution for operating different cuvette types: Flip the adapter: ø 28 mm and 16 mm from 92 up to 104 mm
- Backlit display with automatic switch-off
- User guidance via display for easy operation without handbook reading
- Large selection of test sets for all requirements
- Integrated pH measurement with pHotoFlex® pH
- Turbidity measurement according to DIN 27027/ISO 7027 and pH with pHotoFlex® Turb
- User-defined programs

The menu guides you through all measuring tasks, and allows a quick and easy selection of the 10 most frequently used tests out of a "favorites" list. To further enhance in-the-field operation, use the field case with convenient, integrated laboratory tray. (*see p. 120 for details).*

Beneficial: Measurements and data evaluation can be processed conveniently in the laboratory with LabStation and LSdata. (*see p. 120 for details).*

Convenient operation via barcode is possible! Barcodes are included in the analysis descriptions.

NEW

pHotoFlex® STD – Portable Photometer for Water Analysis and Routine Measurement

With the portable pHotoFlex® STD photometric measurements for water analysis and other routine measurements can be performed onsite and in the laboratory: easy, comfortable and low-current. The basic model of the pHotoFlex® Series offers 6 wavelengths using LEDs, which allows approx. 3000 measurements per battery set.

pHotoFlex® STD

- Intuitive and easy
- More than 160 Methoden
- 10 user-defined methods
- Storage of 100 data sets

Data are transferred to PC via the RS232 interface. They can be managed and processed acc. to GLP with the optional PC-Software LSdata.

The stand-alone instrument can be upgraded with LabStation to full and even more comfortable lab use. Together with the LabStation mains operation and barcode reading with an external barcode reader is possible. Additionally the rechargeable battery set coming with the LabStation will be „charged".

More test kits:

Together with pHotoFlex® STD more reagents for field use are offered: An increasing selection of the practical powder pillows are available. pHotoFlex® STD offers the option for slope correction of calibration curves.

The complete reagent portfolio is listed on pages 125–133.

pHotoFlex® pH – Portable Photometer with pH

The portable photometer pHotoFlex® pH demonstrates its capability with complex tasks in environmental and process monitoring at a variety of sites.

pHotoFlex® pH

Additionally:

- Integrated pH measurement
- Automatic temperature compensation
- NH_3 and CO_2

with pH electrode SenTix® 41

pH function

The integrated pH function allows measurements of pH 0 ... 16 with automatic buffer recognition (TEC/NIST). Temperature compensation is automatic within the permitted range of – 5 ... 100 °C (23 ... 212 °F). WTW's MultiCal®-routine allows the automatic calibration with up to 3 calibration points. WTW offers a large selection of pH electrodes as optional accessories: For field use, the maintenance-free SenTix® 41 is recommended, whereas for precision measurements in the laboratory, the SenTix® 81 glass electrode could be used. The electrodes are described in detail in the pH measuring chapter, starting on page 40.

pHotoFlex® Turb – Total Capability

The pHotoFlex® Turb is analogous to the pHotoFlex® pH, but includes an infrared (IR) light source for nephelometric turbidity measurement (90°), according to the requirements of DIN 27027/ISO 7027. Its precision is comparable to laboratory instruments for turbidity measurement. Together with the AMCO Clear® standards highest precision for the sensitive testing of drinking water is given.

The calibration with the supplied AMCO Clear® standards and measured data can be documented and output via RS232.

pHotoFlex® Turb

Additionally:

- Turbidity measurement according to DIN 27027/ ISO 7027
- 0-1100 NTU/FNU
- Calibration kit (0.02-10-1000 NTU)

Field Case Set

- The “in-field laboratory”
- Integrated tray
- LSdata

pHotoFlex® pH/pHotoFlex® Turb in a convenient field case

A small lab for in-field use. The integrated tray features places for the instrument, cuvettes, measuring beaker and a stand for the pH electrode.

- pH electrode SenTix® 41
- 1 variable pipette with 5 ml volume
- Calibration standards
- LSdata for convenient data management and definition of user-defined methods.
- Many useful accessories: empty cuvettes, buffer solutions with pH 4.01 and 7.00, PC cable AK Labor 540 B, stand for the pH electrode, cleaning tissues, screwdriver
- Space for other accessories

The in-field lab: Sets for pHotoFlex® pH and pHotoFlex® Turb (exept pHotoFlex® STD).

LabStation and LSdata

Smart data management

The LabStation – holding the instrument – upgrades the portable pHotoFlex® pH and Turb® 430 models to a small laboratory solution. The LabStation also serves as charging station for the included rechargeable battery set.

With the software package LSdata, the measured data can be processed on a PC conveniently and according to GLP standards. The software is included in the LabStation and field cases. LSdata is also available as stand-alone package.

- Data export from the instrument to the PC according to GLP and with password protection
- Subsequent processing in Excel format, e.g. for clear documentation of individual sampling points
- Generation, administration and matching between instrument and PC of user-defined methods via dialogue window
- Calculation of calibration curve for user-defined methods

A useful note for field work:

For taking along all necessary utensils, such as test kits and spray bottle with distilled water as well as a disposal container, you can also pick a tool box from any from any building center to perfectly suit your needs.

pHotoFlex® with LabStation

Technical Data

Model	pHotoFlex® STD	pHotoFlex® pH	pHotoFlex® Turb
Light source	LED	LED	LED
Wavelengths nm	436, 517, 557, 594, 610, 690	436, 517, 557, 594, 610, 690	436, 517, 557, 594, 610, 690 + 860
User-defined methods	10	100	100
Methods/software update	Via Internet	Via Internet	Via Internet
Data storage	100 data sets	1000 data sets	1000 data sets
pH	—	0-16	0-16
Turbidity	—	—	0-1100 NTU/FNU
Accuracy Photometry pH pH / Turbidity	<2 nm wavelength accuracy, 0.005 abs. reproducibility — —	<2 nm wavelength accuracy, 0.005 abs. reproducibility ±0.01 pH —	< 2 nm wavelength accuracy, 0.005 abs. reproducibility ±0.01 pH 0.01 NTU/FNU or ±2% of the measured value
Calibration: pH / Turbidity	—	3 point	3 point
Interface	RS 232, USB via adapter (optional)	RS 232, USB via adapter (optional)	RS 232, USB via adapter (optional)
Measuring parameters	Photometry	Photometry, pH	Photometry, pH, Turbidity
Battery	Type AA batteries 4x1.5 V, for approx. 3000 measurements	Type AA batteries 4x1.5 V, for approx. 3000 measurements	Type AA batteries 4x1.5 V, for approx. 3000 measurements
Rechargeable battery	Optional: LabStation	Optional: rechargeable battery or LabStation	Optional: rechargeable battery or LabStation
Test marks	cETLus	cETLus	cETLus
Warranty	2 years	2 years	2 years

Ordering Information

pHotoFlex®		Order No.
pHotoFlex® STD	Portable photometer	251 105
pHotoFlex® pH	Portable photometer with pH	251 100
pHotoFlex® Turb	Portable photometer with pH and turbidity	251 110
pHotoFlex® pH/SET	Portable universal LED filter photometer in a field case with tray to hold instrument, LSdata and accessories	251 200
pHotoFlex® Turb/SET	Portable universal LED filter photometer with integrated turbidity measurement and pH functions in a field case with tray to hold instrument, calibration standard kit, LSdata and accessories	251 210
LSdata	PC-software for photoFlex®/Turb® 430 series	902 762
FC pHotoFlex®/Turb® 430	Field case with tray to hold instrument, for all pHotoFlex® and Turb® 430 models	251 304
LS Flex/430	LabStation for all pHotoFlex® and Turb® 430 models with LSdata software, rechargeable battery and universal mains adapter	251 301
RB Flex/430	Rechargeable battery for pHotoFlex® pH/Turb models and Turb® 430 IR/T with universal plug	251 300

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Thermoreactors

Thermoreactors for COD and all other thermal digestion processes

Thermoreactors are required for the determination of COD, total nitrogen or total phosphorus. They ensure complete digestion of the sample, as they maintain the necessary high reaction temperature throughout the defined period.
For sample digestion three crack sets are available: crack set 10 (model 14687, 100 digestions) and crack set 10-C (model 14688, 25 cuvettes) for heavy metal, as well as crack set 20 for total nitrogen (model 14963, 90 determinations).

In each of the WTW thermoreactors, the most important temperatures and digestion times are stored in 8, easily selectable digestion programs. In addition to these 8 fixed standard programs, CR 3200 and CR 4200 thermoreactors allow you to store 8 of your own user-defined programs. Suitable for 16 mm cuvettes.

Thermoreactors

- Programs for routine tests
- Rapid digestion for COD
- Quality assurance with testing sensor (optional)

CR 2200

CR 3200

CR 4200

Fast Digestion for CSB

New programs for COD

For COD digestion, programs according to various international standard methods are available. On demand of many customers, a rapid digestion for 20 minutes at 148 °C (298.4 °F) is provided, as this timespan has proven to be sufficient for many applications.

All reactors have timer functions. All reactors display when the reaction temperature is reached.

Safety precautions

Along with superior safety, all WTW thermoreactors optimize the heat transmission between the heating block and cuvettes. The safety hood prevents chemicals from splashing in the event of a broken cuvette, a covering provides protection from contact with the heating block surface.

CR 2200

Ideal for performing routine water analysis tests with small sample amounts, as 7 programs are available for digestion of 12 sample cuvettes at 100, 120, 148 and 150 °C (212, 248 and 298.4 °F).

CR 3200

In addition, you can program the CR 3200 to carry out 8 of your individual digestions at freely selectable temperatures up to 170 °C (338 °F).

CR 4200

The right choice for performing multiple tests simultaneously, such as COD (148 °C/298.4 °F) and total-N (120 °C/248 °F), as the two thermoblocks for 12 cuvettes can each be controlled separately. It also has memory for 8 of your own user-defined programs with free temperature selection up to 170 °C (338 °F).

Temperature Probe TFK CR

Quality Assurance:

Quality assurance is constantly increasing in importance, even in the operational analysis sector. The CR 3200 and CR 4200 thermoreactors are both equipped with the external temperature probe TFK CR (Order No. 250 100) as a testing aid. This temperature probe can be plugged into the interface in place of a cuvette, and the set and actual temperatures can be outputted either to a printer or a PC. This means that the function can not only be monitored, but also documented.

Application Areas and Technical Data Thermoreactors

Application Areas	CR 2200	CR 3200	CR 4200
Routine measurements	●	●	●
Wastewater	●	●	●
Specialized tasks in wastewater	–	●	●
Specialized tasks in wastewater and in laboratories	–	●	●
Number of samples, max.	1 x 12	2 x 12, same program	2 x 12, different programs
8 pre-stored programs	100 °C (212 °F) 30 min, 60 min, 120 °C (248 °F) with 30 min, 60 min, 120 min, 148 °C (298.4 °F) 120 min, 20 min 150 °C (302 °F) 120 min	100 °C (212 °F) 30 min, 60 min, 120 °C (248 °F) with 30 min, 60 min, 120 min, 148 °C (298.4 °F) 120 min, 20 min 150 °C (302 °F) 120 min	100 °C (212 °F) 30 min, 60 min, 120 °C (248 °F) with 30 min, 60 min, 120 min, 148 °C (298.4 °F) 120 min, 20 min 150 °C (302 °F) 120 min
User programs	–	8 freely selectable 25-170 °C (77-338 °F)	8 freely selectable 25-170 °C (77-338 °F)
Control accuracy	±1 °C ±1 digit		
Safety class	I to DIN VDE 0700 part 1/11.90		
Instrument safety	EN 61010, UL 3101, CAN/CSA C22.2-1010; EN 61010-2-010, IEC-CAN/CSA C22.2-1010.2.010		
Dimensions	W: 256 mm (10.08 in); H: 185 mm (7.28 in), open: 290 mm (11.42 in); D: 315 mm (12.4 in)		

Ordering Information

Model		Order No.
CR 2200	Reactor (230 VAC with Europlug*) for COD and other thermal digestions. For up to 12 reaction cuvettes. (Regional power supply available on demand)	1P21-1
CR 3200	Reactor (230 VAC with Europlug*) for COD and other thermal digestions. For up to 2x12 reaction cuvettes. (Regional power supply available on demand)	1P22-1
CR 4200	Reactor (230 VAC with Europlug*) for COD and other thermal digestions. For up to 2x12 reaction cuvettes in two separately controllable heating blocks. (Regional power supply available on demand)	1P23-1

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*) other plugs are available

Reagents from A – Z
The Right Test for Every Application

A wide choice of tests is available for routine analysis in different applications. Depending on the optical system and the wavelength employed, photometer and test set make up a matched system with different specific advantages.

For use with portable photometers, test sets need to be straightforward. The low consumption LED optics allows the use of easy-to-use and cost-effective test sets, e.g. powder tests. In the laboratory, instruments with barcode and utmost optical sensitivity suggest the use of high-precision tests with barcode reader, certificate and quality assurance support.

WTW continues to expand the reagent offering. Not only are new tests developed, but the compatability of tests with different instruments is continuously being developed. Due to the different photometer optics, one test may yield different measuring ranges in different instruments; LED photometers may have smaller measuring ranges for the same test.

Reagents for Routine Tasks

- Convenient and cost effective
- Precise
- Assured quality by AQA/IQC

Taking measurements correctly

In reviewing lot certificates, one recognizes the most important factor: Choosing the matching measuring range is critical. Each test kit is characterized by its limits of chemical procedure. At the limits of the measuring range, this has the biggest impact on the results. Therefore, it may be worth repeating the measurement using a test set with a better suited measuring range.

Test Types Overview

Identification: ● = cell test TC = cell test TP = powder test ■ = reagent test

Type	Round cell test	Reagents test	Powder test
Certificate	With certificate (●) for optimum precision Without certificate (TC) for very good precision	With certificate (■) for optimum precision	Without certificate (TP), precise
Test identification	Barcode (●) and/or method selection	Barcode (●) and/or method selection	Method selection, barcode optional (external)
Advantages:	Reaction cuvette with barcode or method selection, 16 mm: Sample adding, inserting, measuring and reading at minimum work, QA support for assured results	Wide measuring range, using 10, 20 and 50 mm rectangular cuvettes for determination of trace concentrations. QA support for assured results	Compact, straightforward procedure; minimal equipment required
Application area:	Laboratory, infrequent work or very large sample throughput	Laboratory, low concentrations, cost-effective routine work with large sample throughput	Portable measurements, screening and monitoring tasks

Reagents

	Model	Measuring Range (Specification max.)	Cuvette (mm) [1] Depending on meter	ml	Order No.	No. of tests	CC	SW	photoLab® S6	photoLab® S12	photoLab® 6000	photoLab® Spektral	pHotoFlex®
Acid Capacity up to pH $_{4.3}$													
● / ■	01758	**KS $_{4.3}$ 0.40 - 8.00 mmol/l 20 - 400 mg/l $CaCO_3$**	16	1	252 087	120	✔	✔	●	●	●	●	●
Aluminum Al													
●	00594	**0.02 - 0.50 mg/l Al**	16	6	252 068	25	–	✔	–	●	●	●	–
■	14825	**0.020 - 1.20 mg/l Al**	10, 20, 50, 28	5	250 425	300	✔	✔	–	●	●	●	●
TP	Al-1 TP	**0.002 - 0.250 mg/l Al**	28	20	251 400	100	–	–	–	–	–	–	●
Ammonia NH_3 (subject to pH value and temperature)													
●	14544	**0.5 - 16.0 mg/l NH_4-N 0.09 - 3.00 mg/l NH_3 (pH 8.5/25 °C/77 °F)**	16	0.5	250 329	25	✔	✔	–	–	●	–	●
■	14752/1	**0.010 - 3.00 mg/l NH_4-N 0.000 - 0.730 mg/l NH_3 (pH 8.5/25 °C/77 °F)**	10, 20, 50 , 16, 28	5	250 426	500	✔	✔	–	–	●	–	●
■	14752/2	**0.010 - 3.00 mg/l NH_4-N 0.000 - 0.730 mg/l NH_3 (pH 8.5/25 °C/77 °F)**	10, 20, 50, 16, 28	5	252 081	250	✔	✔	–	–	●	–	●
Ammonium NH_4													
●	14739	**0.010 - 2.000 mg/l NH_4-N 0.01 - 2.60 mg/l NH_4^+**	16	5	250 495	25	✔	–	●	●	●	●	–
●	A6/25	**0.20 - 8.00 mg/l NH_4-N 0.26 - 10.3 mg/l NH_4^+**	16	1	252 072	25	✔	✔	●	●	●	●	●
●	14544	**0.5 - 16.0 mg/l NH_4-N 0.6 - 20.6 mg/l NH_4^+**	16	0.5	250 329	25	✔	✔	●	●	●	●	●
●	14559	**4.0 - 80.0 mg/l NH_4-N 5.2 - 103.0 mg/l NH_4^+**	16	0.1	250 424	25	✔	✔	●	●	●	●	–
■	14752/1	**0.010 - 3.00 mg/l NH_4-N 0.013 - 3.86 mg/l NH_4^+**	10, 20, 50, 16, 28	5	250 426	500	✔	✔	–	●	●	●	●
■	14752/2	**0.010 - 3.00 mg/l NH_4-N 0.013 - 3.86 mg/l NH_4^+**	10, 20, 50, 16, 28	5	252 081	250	✔	✔	–	●	●	●	●
■	00683	**2.0 - 150 mg/l NH_4-N 2.6 - 193 mg/l NH_4^+**	10	0.1, 0.2	252 027	100	✔	✔	–	●	●	●	–
TP	NH_4-1 TP	**0.01 - 0.50 mg/l NH_4-N 0.013 - 0.64 mg/l NH_4^+**	20, 28	10	251 408	200	–	–	–	–	●	–	●
TC	NH_4-2 TC (LR)	**0.02 - 2.50 mg/l NH_4-N 0.03 - 3.20 mg/l NH_4^+**	20, 16	2	251 997	50	–	–	–	–	●	–	●
TC	NH_4-3 TC (HR)	**0.4 - 50.0 mg/l NH_4-N 0.5 - 64.4 mg/l NH_4^+**	20, 16	0.1	251 998	50	–	–	–	–	●	–	●
Antimony: Please ask for application brochures													
AOX													
●	00675	**0.05 - 2.50 mg/l AOX**	16		252 023	25	–	–	●	●	●	●	–
Arsenic													
■	01747	**0.001 - 0.100 mg/l As**	10, 20, 16	350	252 063	30	–	–	–	●	●	●	●
Additionally,	AS absorption tube required				252 066								

● = Cell Tests ■ = Reagent Tests TC = Cuvette Tests TP = Powder Pillows CC = CombiCheck SW = Saltwater ml = Sample Volume (photoLab®) 1) Ø 16, 28 □ 10, 20, 50

Reagents

	Model	Measuring Range (Specification max.)	Cuvette (mm) [1] Depending on meter	ml	Order No.	No. of tests	CC	SW	photoLab® S6	photoLab® S12	photoLab® 6000	photoLab® Spektral	pHotoFlex®
Ascorbic acid: Please ask for application brochures													
BOD Biochemical oxygen demand O_2													
●	00687	**0.5 - 3000 mg/l BOD**	16	–	252 028	50	–	✔	●	●	●	●	–
Boron B													
■	14839	**0.050 - 0.800 mg/l B**	10	5	250 427	60	–	–	–	●	●	●	–
●	00826	**0.05 - 2.00 mg/l B**	16	4	252 041	25	–	✔	–	●	●	●	–
Bromate: Please ask for application brochures													
Bromine Br_2													
■	00605	**0.020 - 10.00 mg/l Br_2**	10, 20, 50	10	252 014	200	–	–	–	●	●	●	–
Cadmium Cd													
●	14834	**0.025 - 1.000 mg/l Cd**	16	5	250 314	25	✔	–	●	●	●	●	●
■	01745	**0.002- 0.500 mg/l Cd**	10, 20, 50, 28	10	252 051	55	–	–	●	●	●	●	●
Calcium Ca													
■	14815	**1.0 - 160 mg/l Ca**	10, 20, 16, 28	0.1	250 428	100	–	✔	–	●	●	●	●
●	00858	**10 - 250 mg/l Ca**	16	1	252 047	25	–	–	●	●	●	●	–
Carbon dioxide CO_2 (subject to pH and temperature)													
● / ■	01758	**$KS_{4.3}$ 0.40 - 8.00 mmol/l 14 - 275 mg/l CO_2 (pH 6.5/18.6 °C/65.48 °F)**	16	1	252 087	120	–	–	–	–	–	–	●
Chlorine Cl_2		*(f = free, t = total)*		*200* = 100 Cl_2 free + 100 Cl_2 total*									
●	00595	**0.03 - 6.00 Cl_2, f**	16	5	250 419	200	–	–	●	●	●	●	●
●	00597	**0.03 - 6.00 Cl_2, f+g**	16	5	250 420	200	–	–	●	●	●	●	●
■	00598/1	**0.010 - 6.00 Cl_2, f**	10, 20, 50	10	252 010	1200	–	–	–	●	●	●	–
■	00598/2	**0.010 - 6.00 Cl_2, f**	10, 20, 50	10	252 011	200	–	–	–	●	●	●	–
■	00599	**0.010 - 6.00 Cl_2, f+g**	10, 20, 50	10	252 012	200	–	–	–	●	●	●	–
■	00602/1	**0.010 - 6.00 Cl_2, g**	10, 20, 50	10	252 013	200	–	–	–	●	●	●	–
■	00602/2	**0.010 - 6.00 Cl_2, g**	10, 20, 50	10	252 055	1200	–	–	–	●	●	●	–
TP	Cl2-1 TP	**0.02 - 2.00 mg/l Cl_2, f**	20, 28	10	251 401	100	–	–	–	–	●	–	●
TP	Cl2-2 TP	**0.5 - 5.0 mg/l Cl_2, f**	20, 28	25	251 402	100	–	–	–	–	●	–	●
TP	Cl2-3 TP	**0.02 - 2.00 mg/l Cl_2, g**	20, 28	25	251 414	100	–	–	–	–	●	–	●
TP	Cl2-4 TP	**0.5 - 5.0 mg/l Cl_2, g**	20, 28	10 +15 H_20	251 415	100	–	–	–	–	●	–	●
Chlorine Liquid test kit (free and total chlorine) Cl_2													
● / ■		**0.010 - 6.00 Cl_2**	16, 50	10			–	–	●	●	●	●	–
	00086 Chlorine reagent Cl2-1				252 077	200							
	00087 Chlorine reagent Cl2-2				252 078	400							
	00088 Chlorine reagent Cl2-3				252 079	600							
	00089 Accessories Cl2 (round cells etc.)				252 080	25							

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1) Ø 16, 28
□ 10, 20, 50

Reagents

	Model	Measuring Range (Specification max.)	Cuvette (mm) [1] Depending on meter	ml	Order No.	No. of tests	CC	SW	photoLab® S6	photoLab® S12	photoLab® 6000	photoLab® Spektral	pHotoFlex®
Chloride Cl													
●	14730	**5 - 125 mg/l Cl**	16	1	250 353	25	✔	✔	●	●	●	●	●
■	14897/1	**2.5 - 250 mg/l Cl**	10, 16	1, 5	250 491	100	✔	✔	–	●	●	●	●
■	14897/2	**2.5 - 250 mg/l Cl**	10, 16	1, 5	252 082	175	✔	✔	–	●	●	●	●
Chlorine dioxide ClO_2													
■	00608	**0.020 - 10.00 mg/l ClO_2**	10, 20, 50, 16, 28	10	252 017	200	–	–	–	●	●	●	●
Chromate (chromium VI and total chromium) Cr													
●	14552	**0.05 - 2.00 mg/l Cr**	16	10	250 341	25	–	✔	●	●	●	●	●
■	14758	**0.01 - 3.00 mg/l Cr**	10, 20, 50	5	250 433	250	–	✔	–	●	●	●	–
Chromium plating bath CrO_3: See reagent-free tests													
COD Chemical oxygen demand O_2													
●	14560	**4.0 - 40.0 mg/l COD (148 °C/298.4 °F, 2 h)**	16	3	250 303	25	✔	–	●	●	●	●	–
●	01796	**5.0 - 80.0 mg/l COD (148 °C/298.4 °F , 2 h)**	16	2	252 092	25	✔	–	●	●	●	●	–
●	C3/25	**10 - 150 mg/l COD (148 °C/298.4 °F, 2 h)**	16	3	252 070	25	✔	–	●	●	●	●	●
●	14895	**15 - 300 mg/l COD (148 °C/298.4 °F, 2 h)**	16	2	250 359	25	✔	–	●	●	●	●	●
●	14690	**50 - 500 mg/l COD (148 °C/298.4 °F, 2 h)**	16	2	250 304	25	✔	–	●	●	●	●	●
●	C4/25	**25 - 1500 mg/l COD (148 °C/298.4 °F, 2 h)**	16	3	252 071	25	✔	–	●	●	●	●	●
●	14691	**300 - 3500 mg/l COD (148 °C/298.4 °F, 2 h)**	16	2	250 351	25	✔	–	●	●	●	●	●
●	14555	**500 - 10000 mg/l COD (148 °C/298.4 °F, 2 h)**	16	1	250 309	25	✔	–	●	●	●	●	●
●	01797	**5000 - 90000 mg/l COD (148 °C/298.4 °F , 2 h)**	16	0,1	252 093	25	–	–	●	●	●	●	–
TC	COD1 TC (LR)	**3 - 150 mg/l COD (148 °C/298.4 °F , 2 h)**	16	2	251 990	25	–	–	–	–	●	–	●
TC	COD2 TC (MR)	**20 - 1500 mg/l COD (148 °C/298.4 °F , 2 h)**	16	2	251 991	25	–	–	–	–	●	–	●
TC	COD3 TC (HR)	**200 - 15000 mg/l COD (148 °C/298.4 °F , 2 h)**	16	0,2	251 992	25	–	–	–	–	●	–	●
COD Chemical oxygen demand (HG free, Cl^- is also detected and interferes in higher concentrations)													
●	09772	**10 - 150 mg/l COD (148 °C/298.4 °F, 2 h)**	16	2	250 301	25	✔	–	●	●	●	●	●
●	09773	**100 - 1500 mg/l COD (148 °C/298.4 °F, 2 h)**	16	2	250 306	25	✔	–	●	●	●	●	●

● = Cell Tests ■ = Reagent Tests TC = Cuvette Tests TP = Powder Pillows CC = CombiCheck SW = Saltwater ml = Sample Volume (photoLab®) 1) Ø 16, 28 □ 10, 20, 50

Reagents

	Model	Measuring Range (Specification max.)	Cuvette (mm) [1] Depending on meter	ml	Order No.	No. of tests	CC	SW	photoLab® S6	photoLab® S12	photoLab® 6000	photoLab® Spektral	pHotoFlex®
Copper Cu													
●	14553	**0.05 - 8.00 mg/l Cu**	16	5	250 408	25	–	✔	●	●	●	●	●
■	14767	**0.02 - 6.00 mg/l Cu**	10, 20, 50, 16, 28	10	250 441	250	–	✔	–	●	●	●	●
TP	Cu-1 TP	**0.04 - 5.00 mg/l Cu**	20, 28	10	251 403	100	–	–	–	–	●	–	●
Copper plating bath Cu: See reagent-free tests													
Cyanide (free and easy liberatable cyanide) CN													
●	14561	**0.010 - 0.500 mg/l CN**	16	5	250 344	25	–	–	●	●	●	●	●
■	09701	**0.002 - 0.500 mg/l CN**	10, 20, 50	5, 10	250 492	100	–	–	–	●	●	●	–
Cyanuric Acid													
■	19250	**replaced by model 19253**	20	5	252 088	100	–	–	–	●	●	●	–
■	19253	**2 - 160 mg/l Cyanuric Acid**	20	5	252 091	100	–	–	–	●	●	●	–
DEHA/Oxygen Scavengers													
■	19251	**0.020 - 0.500 mg/l DEHA**	20	10	252 089	200	–	–	–	●	●	●	–
TP	DEHA-1 TP	**0.004 - 0.450 mg/l DEHA**	20, 28	25	251 421	100	–	–	–	●	●	–	–
Detergents: See Surfactants: anionic, cationic, nonionic													
Fluoride F													
●	14557	**0.025 - 1.50 mg/l F**	16	5	250 365	25	–	✔	–	●	●	●	●
■	14598/1	**0.10 - 20.0 mg/l F**	10	5 or 0.5	252 048	100	–	–	–	●	●	●	–
■	14598/2	**0.10 - 20.0 mg/l F**	10	5 or 0.5	252 083	250	–	–	–	●	●	●	–
Formaldehyde HCHO													
●	14500	**0.10 - 8.00 mg/l HCHO**	16	2	250 406	25	–	–	●	●	●	●	●
■	14678	**0.02 - 8.00 mg/l HCHO**	10, 20, 50	3	250 331	100	–	–	–	●	●	●	–
Gold Au													
■	14821	**0.5 - 12.0 mg/l Au**	10, 16	2	250 436	80	✔	✔	–	●	●	●	●
Halogens (total): See Cl_2, Br_2, J_2, ClO_2, O_3													
Hazen: See reagent-free tests: Coloration													
Heavy metals: See lead, cadmium, chromium													
Hydrazine N_2H_4													
■	09711	**0.005 - 2.00 mg/l N_2H_4**	10, 20, 50	5	250 493	100	–	–	–	●	●	●	–
TP	N2H4-1 TP	**0.004 - 0.600 mg/l N_2H_4**	20, 28	10	251 416	100	–	–	–	–	●	–	●
Hydrogen peroxide H_2O_2													
●	14731	**0.25 - 20.0 mg/l H_2O_2**	16	10	250 402	25	–	✔	–	●	●	●	–
■	18789	**0.015 - 6.00 mg/l H_2O_2**	10, 20	8	252 067	100	–	–	–	●	●	●	–
Iodine I_2													
■	00606	**0.050 - 10.00 mg/l I_2**	10, 20, 50	10	252 015	200	–	–	–	●	●	●	–

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Reagents

	Model	Measuring Range (Specification max.)	Cuvette (mm) [1] Depending on meter	ml	Order No.	No. of tests	CC	SW	photoLab® S6	photoLab® S12	photoLab® 6000	photoLab® Spektral	pHotoFlex®
Iodine number: See reagent-free tests: Coloration													
Iron Fe													
●	14549	**0.05 - 4.00 mg/l Fe**	16	5	250 349	25	✔	✔	●	●	●	●	●
●	14896	**1.0 - 50.0 mg/l Fe**	16	1	250 361	25	–	–	●	●	●	●	●
■	14761/1	**0.005 - 5.00 mg/l Fe**	10, 20, 50, 16, 28	5	250 435	1000	✔	✔	–	●	●	●	●
■	14761/2	**0.005 - 5.00 mg/l Fe**	10, 20, 50, 16, 28	5	250 439	250	✔	✔	–	●	●	●	●
■	00796	**0.010 - 5.00 mg/l Fe**	10, 20, 50	8	252 042	150	✔	✔	–	●	●	●	–
TP	Fe-1 TP	**0.012 - 1.800 mg/l Fe**	16, 28	10	251 404	100	–	–	–	–	●	–	●
TP	Fe-2 TP	**0.02 - 3.00 mg/l Fe**	16, 28	10	251 405	100	–	–	–	–	●	–	●
Lead Pb													
●	14833	**0.10 - 5.00 mg/l Pb**	16	5	250 313	25	✔	–	●	●	●	●	–
■	09717	**0.010 - 5.00 mg/l Pb**	10, 20, 50, 16, 28	8	252 034	50	✔	–	–	●	●	●	●
Magnesium Mg													
●	00815	**5.0 - 75.0 mg/l Mg**	16	1	252 043	25	–	✔	●	●	●	●	●
Manganese Mn													
■	01739	**0.005 – 2.000 mg/l Mn**	10, 20, 50	8	252 056	250	–	–	–	●	●	●	
■	14770/1	**0.01 - 10.0 mg/l Mn**	10, 20, 50, 16, 28	5	250 442	500	✔	✔	–	●	●	●	●
■	14770/2	**0.01 - 10.0 mg/l Mn**	10, 20, 50, 16, 28	5	252 084	250	✔	✔	–	●	●	●	●
●	00816	**0.10 - 5.00 mg/l Mn**	16	7	252 035	25	✔	–	●	●	●	●	●
TP	Mn-1 TP	**0.2 - 20.0 mg/l Mn**	20, 28	10	251 406	100	–	–	–	–	●	–	●
TP	Mn-2 TP	**0.007 - 0.700 mg/l Mn**	20, 28	10	251 417	100	–	–	–	–	●	–	●
Molybdenum Mo													
●	00860	**0.02 - 1.00 mg/l Mo**	16	10	252 040	25	–	–	–	●	●	●	–
■	19252	**0.5 - 45.0 mg/l Mo**	20	10	252 090	100	–	–	–	●	●	●	–
TP	Mo-1 TP	**0.3 - 35.0 mg/l Mo**	20, 28	10	251 407	100	–	–	–	–	●	–	●
TP	Mo-2 TP	**0.3 - 40.0 mg/l Mo**	20, 28	25	251 418	100	–	–	–	–	●	–	●
Monochloramine													
■	01632	**0.05 – 10.0 mg/l Cl_2**	10, 20, 50	10	252 057	150	–	–	–	●	●	●	–
Nickel Ni													
●	14554	**0.10 - 6.00 mg/l Ni**	16	5	250 409	25	✔	–	●	●	●	●	●
■	14785	**0.02 - 5.00 mg/l Ni**	10, 20, 50, 28	5	250 443	250	✔	–	–	●	●	●	●
Nickel plating bath: See reagent-free tests													
Nitrogen (total): See Total Nitrogen N_{Total}													

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Reagents

	Model	Measuring Range (Specification max.)	Cuvette (mm) [1] Depending on meter	ml	Order No.	No. of tests	CC	SW	photoLab® S6	photoLab® S12	photoLab® 6000	photoLab® Spektral	pHotoFlex®
Nitrate NO_3													
●	14556	**0.10 - 3.00 mg/l NO_3-N** **0.4 - 13.3 mg/l NO_3**	16	2	250 411	25	✔	✔	–	●	●	●	●
●	N2/25	**0.5 - 25.0 mg/l NO_3-N** **2.2 - 110.7 mg/l NO_3**	16	1	252 073	25	✔	–	●	●	●	●	–
●	14542	**0.5 - 18.0 mg/l NO_3-N** **2.2 - 79.7 mg/l NO_3**	16	1.5	250 410	25	✔	–	●	●	●	●	●
●	14764	**1.0 - 50.0 mg/l NO_3-N** **4 - 221 mg/l NO_3**	16	0.5	250 347	25	✔	–	●	●	●	●	–
●	00614	**23 - 225 mg/l NO_3-N** **102 - 996 mg/l NO_3**	16	0.1	252 019	25	–	–	●	●	●	●	–
■	14942	**0.2 - 17.0 mg/l NO_3-N** **0.9 - 75.3 mg/l NO_3**	10, 20, 50, 16	1	250 422	50	✔	✔	–	●	●	●	●
■	14773	**0.2 - 20.0 mg/l NO_3-N** **0.9 - 88.5 mg/l NO_3**	10, 20	1.5, 3	250 444	100	✔	–	–	●	●	●	–
■	09713/1	**0.10 - 25.0 mg/l NO_3-N** **0.40 - 110.7 mg/l NO_3**	10, 20, 50	0.5	250 421	90	✔	–	–	●	●	●	–
■	09713/2	**0.10 - 25.0 mg/l NO_3-N** **0.40 - 110.7 mg/l NO_3**	10, 20, 50	0.5	252 085	250	✔	–	–	●	●	●	–
TC	NO3-1 TC	**0.2 - 30.0 mg/l NO_3-N** **1 -133.0 mg/l NO_3**	16	2	251 993	50	–	–	–	–	●	–	●
Nitrite NO_2													
●	N5/25	**0.010 - 0.700 mg/l NO_2-N** **0.03 - 2.30 mg/l NO_2**	16	5	252 074	25	–	✔	●	●	●	●	●
■	14776/1	**0.005 - 1.00 mg/l NO_2-N** **0.016 - 3.28 mg/l NO_2**	10, 20, 50, 16, 28	5	250 445	1000	–	✔	–	●	●	●	●
■	14776/2	**0.005 - 1.000 mg/l NO_2-N** **0.016 - 3.28 mg/l NO_2**	10, 20, 50, 16, 28	5	250 440	335	–	✔	–	●	●	●	●
■	00609	**1.0 - 90.0 mg/l NO_2-N** **3.3 - 295.2 mg/l NO_2**	16	8	252 069	25	–	–	●	●	●	●	–
TP	NO_2-1 TP	**0.002 - 0.300 mg/l NO_2-N** **0.007 - 0.985 mg/l NO_2**	20, 28	10	251 409	100	–	–	–	–	●	–	●
TC	NO_2-2 TC	**0.03 - 0.60 mg/l NO_2-N (LR)** **0.10 - 1.97 mg/l NO_2 (LR)** **0.30 - 3.00 mg/l NO_2-N (HR)** **0.99 - 9.85 mg/l NO_2 (HR)**	16 16	2 0,5	251 994	24	–	–	–	–	●	–	●
TP	NO_2-3 TP	**0.00 - 0.33 mg/l NO_2-N** **0.00 - 1.08 mg/l NO_2**	20, 28	25	251 419	100	–	–	–	–	●	–	●
Organic Acids (volatile)													
●	01763	**50 - 3000 mg/l**	16	0,5	252 060	100	–	–	●	●	●	●	–
Oxygen O_2													
●	14694	**0.5 - 12.0 mg/l O_2**	16	–	250 403	25	–	–	●	●	●	●	–

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Reagents

	Model	Measuring Range (Specification max.)	Cuvette (mm) [1] Depending on meter	ml	Order No.	No. of tests	CC	SW	photoLab® S6	photoLab® S12	photoLab® 6000	photoLab® Spektral	pHotoFlex®
Ozone O_3													
■	00607/1	**0.010 - 4.00 mg/l O_3**	10, 20, 50, 16, 28	10	252 016	200	–	–	–	●	●	●	●
■	00607/2	**0.010 - 4.00 mg/l O_3**	10, 20, 50, 16, 28	10	252 054	1200	–	–	–	●	●	●	●
pH													
●	01744	**pH 6.4 – 8.6**	16	10	252 050	280	–	✔	●	●	●	●	–
Phenol C_6H_5OH													
■	00856	**0.002 – 0.100 mg/l C_6H_5OH** **0.025 – 5.00 mg/l C_6H_5OH**	20 10, 20, 50	200 10	252 058	50 250	–	✔	–	●	●	●	–
●	14551	**0.10 - 2.50 mg/l C_6H_5OH**	16	10	250 412	25	–	✔	–	●	●	●	●
Phosphate PO_4													
●	P6/25	**0.05 – 5.00 mg/l PO_4-P** **0.05 – 5.0 mg/l P_{Total}** **0.2 - 15.3 mg/l PO_4**	16	5	252 075	25	✔	✔	●	●	●	●	●
●	P7/25	**0.5 - 25.0 mg/l PO_4-P** **0.5 - 25.0 mg/l P_{Total}** **1.5 - 76.7 mg/l PO_4**	16	1	252 076	25	✔	✔	●	●	●	●	●
●	14546	**0.5 - 25.0 mg/l PO_4-P** **1.5 - 76.7 mg/l PO_4**	16	5	250 413	25	✔	✔	●	●	●	●	●
●	00616	**3.0 - 100.0 mg/l PO_4-P** **9.0 - 307.0 mg/l PO_4**	16	0.2	252 021	25	–	✔	●	●	●	●	●
■	14848/1	**0.010 - 5.00 mg/l PO_4-P** **0.030 - 15.3 mg/l PO_4**	10, 20, 50, 16, 28	5	250 446	420	✔	✔	–	●	●	●	●
■	14848/2	**0.010 - 5.00 mg/l PO_4-P** **0.030 - 15.3 mg/l PO_4**	10, 20, 50, 16, 28	5	252 086	220	✔	✔	–	●	●	●	●
■	14842	**0.5 - 30.0 mg/l PO_4-P** **1.5 - 92.0 mg/l PO_4**	10, 20	5	250 447	400	–	✔	–	●	●	●	–
■	00798	**1.0 - 100.0 mg/l PO_4-P** **3.0 - 307.0 mg/l PO_4**	10, 16	8	252 045	100	–	✔	–	●	●	●	●
TP	PO_4-1 TP	**0.007 - 0.800 mg/l PO_4-P** **0.02 - 2.50 mg/l PO_4**	20, 28	10	251 410	100	–	–	–	–	●	–	●
TC	PO_4-2 TC	**0.02 - 1.60 mg/l PO_4-P** **0.06 - 4.91 mg/l PO_4**	16	5	251 989	50	–	–	–	–	●	–	●
TC	PO_4-3 TC	**0.02 - 1.10 mg/l PO_4-P** **0.02 - 1.10 mg/l P_{Total}** **(digestion, 100 °C/212 °F)** **0.06 - 3.37 mg/l PO4**	16	5	251 988	50	–	–	–	–	●	–	●
TC	PO_4-4 TC	**0.02 - 1.10 mg/l PO_4-P** **0.02 - 1.10 mg/l P_{Total}** **(digestion, 100 °C/212 °F)** **0.06 - 3.37 mg/l PO4**	16	5	251 987	50	–	–	–	–	●	–	●

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Reagents

	Model	Measuring Range (Specification max.)	Cuvette (mm) [1] Depending on meter	ml	Order No.	No. of tests	CC	SW	photoLab® S6	photoLab® S12	photoLab® 6000	photoLab® Spektral	pHotoFlex®
Phosphate (total): See Phosphate PO_4													
Potassium K													
●	14562	**5.0 - 50.0 mg/l K**	16	2	250 407	25	–	✔	●	●	●	●	●
●	00615	**30 - 300 mg/l K**	16	0.5	252 020	25	–	✔	●	●	●	●	●
SAC: See reagent-free tests													
Silicate/Silicic acid Si													
■	14794	**0.005 - 5.00 mg/l Si** **0.01 - 10.70 mg/l SiO_2**	10, 20, 50, 16, 28	5	250 438	300	–	✔	–	●	●	●	●
■	00857	**0.5 - 500 mg/l Si** **1.1 - 1070 mg/l SiO_2**	10, 16	4/0.5	252 046	100	–	–	–	●	●	●	●
TP	Si-1 TP (LR)	**0.005 - 0.75 mg/l Si** **0.01 - 1.60 SiO_2**	28	10	251 411	100	–	–	–	–	●	–	●
TP	Si-2 TP (HR)	**0.3 - 46.7 mg/l Si** **0.7 - 100 mg/l SiO_2**	16, 28	10	251 412	100	–	–	–	–	●	–	●
TP	Si-3 TP (HR)	**0.5 - 93 mg/l Si** **1 - 200 mg/l SiO_2**	20, 28	25	251 422	100	–	–	–	–	●	–	●
Silver Ag													
■	14831	**0.25 - 3.00 mg/l Ag** (total-Ag: 100 °C/212 °F or 120 °C/248 °F, 1 h) Digestion reagents are contained in the test set	10, 20, 16	10	250 448	100	–	–	–	●	●	●	●
Sodium Na													
●	00885	**10 - 300 mg/l Na**	16	0.5	252 044	25	–	–	●	●	●	●	●
Sulfate SO_4													
●	14548	**5 - 250 mg/l SO_4**	16	5	250 414	25	✔	✔	●	●	●	●	●
●	00617	**50 - 500 mg/l SO_4**	16	2	252 022	25	✔	✔	●	●	●	●	–
●	14564	**100 - 1000 mg/l SO_4**	16	1	250 415	25	✔	✔	●	●	●	●	–
■	14791	**25 - 300 mg/l SO_4**	10	2.5	250 449	200	✔	–	●	●	●	●	–
TP	SO_4-1 TP	**0 - 70 mg/l SO_4**	20, 28	10	251 413	100	–	–	–	–	●	–	●
TP	SO_4-2 TP	**2 - 70 mg/l SO_4**	20, 28	25	251 423	100	–	–	–	–	●	–	●
Sulfide/Hydrogensulfide S													
●	14779	**0.02 - 1.50 mg/l S**	10, 20, 50	5	250 450	220	–	–	–	●	●	●	–
Sulfite SO_3													
●	14394	**1.0 - 20.0 mg/l SO_3**	16	3	250 416	25	–	–	–	●	●	●	–
■	01746	**1.0 - 60.0 mg/l SO_3**	10	2	252 053	150	–	–	–	●	●	●	–

● = Cell Tests
■ = Reagent Tests
TC = Cuvette Tests
TP = Powder Pillows
CC = CombiCheck
SW = Saltwater
ml = Sample Volume (photoLab®)
1) Ø 16, 28
□ 10, 20, 50

Reagents

	Model	Measuring Range (Specification max.)	Cuvette (mm) [1] Depending on meter	ml	Order No.	No. of tests	CC	SW	photoLab® S6	photoLab® S12	photoLab® 6000	photoLab® Spektral	pHotoFlex®
Surfactants													
a-Ten (anionic) ●	14697	**0.05 - 2.00 mg/l a-Ten**	16	5	250 333	25	–	–	–	●	●	●	–
c-Ten (cationic) ●	01764	**0.05 - 1.50 mg/l CTAB**	16	5	252 062	25	–	–	–	●	●	●	–
n-Ten (nonionic) ●	01787	**0.10 - 7.50 mg/l Triton X-100**	16	4	252 061	25	–	–	–	●	●	●	–
Tin Sn													
●	14622	**0.10 - 2.50 mg/l Sn**	16	5	250 401	25	–	✔	–	●	●	●	–
TOC Total organic carbon													
●	14878	**5.0 - 80.0 mg/l TOC**	16	3	252 036	25	–	–	●	●	●	●	–
●	14879	**50 - 800 mg/l TOC**	16	3	252 037	25	–	–	●	●	●	●	–
Total Nitrogen N_{Total}													
●	14537	**0.5 - 15.0 mg/l N_{Total} (120 °C/248 °F, 1 h)**	16	10	250 358	25	✔	–	●	●	●	●	●
●	14763	**10 - 150 mg/l N_{Total} (120 °C/248 °F, 1 h)**	16	1	250 494	25	✔	–	●	●	●	●	–
●	00613	**0.5 - 15.0 mg/l N_{Total} (120 °C/248 °F, 1 h)**	16	10	252 018	25	✔	–	●	●	●	●	–
TC	N_{tot}1 TC (LR)	**0.5 - 25.0 mg/l N_{Total} (120°C, 30 min.)**	16	2; 2	251 995	50	–	–	–	–	●	–	●
TC	N_{tot}2 TC (HR)	**10 - 150 mg/l N_{Total} (120°C, 30 min.)**	16	0.5; 2	251 996	50	–	–	–	–	●	–	●
Total phosphate: See Phosphate PO_4													
Water hardness, RH residual hardness													
●	14683	**0.075 - 0.750 °d 0.50 - 5.00 mg/l Ca**	16	4	250 404	25	–	–	●	●	●	●	–
Water hardness, total hardness													
●	00961	**0.7 - 30.1 °d, 5 - 215 mg/l Ca**	16	1	252 039	25	–	–	●	●	●	●	●
Zinc Zn													
●	00861	**0.025 - 1.000 mg/l Zn**	16	2	252 049	25	–	–	●	●	●	●	●
●	14566	**0.20 - 5.00 mg/l Zn**	16	0.5	250 417	25	✔	–	●	●	●	●	●
■	14832	**0.05 - 2.50 mg/l Zn**	10	5	250 451	90	–	–	–	●	●	●	–
	06146	Extracting agent, required			250 452	180							

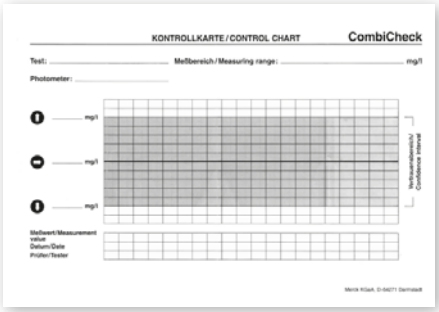
● = Cell Tests ■ = Reagent Tests TC = Cuvette Tests TP = Powder Pillows CC = CombiCheck SW = Saltwater ml = Sample Volume (photoLab®) 1) Ø 16, 28 □ 10, 20, 50

CombiCheck

CombiCheck solutions are ready-to-use multi-parameter standards. Each package contains a standard solution as well as a stocking solution. Both solutions can be used for analytical quality assurance directly **without dilution**.

- The standard solution is used to check the accuracy of the results for the complete system: procedure – analytical method – reagents – photometer.
- The stocking solution is used to check sample-dependent influences (MatrixCheck) by measuring the recovery rate, and to determine the most suitable sample preparation method.

The maximum number of determinations that can be made with a **CombiCheck** standard solution depends on the test set used. With the stocking solution, 280 determinations are possible.
Please see the test kit brochure for more information.



Storage: +2 … +8 °C (35.6 … 46.4 °F)

CombiCheck

Parameter	Concentration	Suitable for test set model	Max. no. of determinations
14676 CombiCheck 10			250 482
Ammonium	4.00 mg/l NH_4-N	A6/25 14558	90 90
Chloride	25.0 mg/l Cl	14730	90
COD	80 mg/l CSB	C3/25 14540	30 30
Nitrate	2.5 mg/l NO_3-N	14556 14773	45 60
Phosphate	0.80 mg/l PO_4-P	P6/25 14543 14848	18 18 9
Sulfate	100 mg/l SO_4	14548 14791 00617	18 40 48
14675 CombiCheck 20			250 483
Ammonium	12.0 mg/l NH_4-N	14544	180
Chloride	60 mg/l Cl	14730	90
COD	750 mg/l CSB	C4/25 14541	30 30
Nitrate	9.0 mg/l NO_3-N	N2/25 14542 14563 14773 14942 09713	90 60 90 60 60 180
Phosphate	8.0 mg/l PO_4-P	P7/25 14729	90 90
Sulfate	500 mg/l SO_4	14564	90

CombiCheck

Parameter	Concentration	Suitable for test set model	Max. no. of determinations
14677 CombiCheck 30			250 484
Cadmium	0.500 mg/l Cd	14834	19
Copper	2.00 mg/l Cu	14553 14767	19 19
Iron	1.00 mg/l Fe	14549 14761 00796	19 9 12
Manganese	1.00 mg/l Mn	14770 00816	9 13
14692 CombiCheck 40			250 485
Aluminum	0.75 mg/l Al	14825	19
Nickel	2.00 mg/l Ni	14554 14785	19 19
Lead	2.00 mg/l Pb	14833 09717	19 11
Zinc	2.00 mg/l Zn	14566	190
14695 CombiCheck 50			250 486
Ammonium	1.00 mg/l NH_4-N	14739 14752	19 19
Nitrogen	5.0 mg/l N_{ges}	14537 00613	9 9
COD	20.0 mg/l CSB	14560	32
14696 CombiCheck 60			250 487
COD	250 mg/l CSB	14690 14895	48 48
Chloride	125 mg/l Cl	14897	96
14689 CombiCheck 70			250 488
Ammonium	50.0 mg/l NH_4-N	14559 00683	950 480
COD	5,000 mg/l CSB	14555	95
Nitrogen	50.0 mg/l N_{Total}	14763	95
14738 CombiCheck 80			250 489
COD	1,500 mg/l CSB	14691	48
Nitrate	25.0 mg/l NO_3-N	14764	190
Phosphate	15.0 mg/l PO_4-P	14729 P7/25	95 95

Accessories

Standard Solutions

Standard solutions with limited stability, to be freshly prepared at regular intervals:

- Free chlorine
- Bound chlorine
- Formaldehyde
- Hydrazine
- Hydrogen peroxide
- Hydrogen sulfide
- Phenol
- Silicon
- Sulfide
- Sulfite
- Anionic surfactants

Standard Solutions

Parameter	Conc. in mg/l	Amount in ml	Model	Order No.
Aluminum	1000	500	19770	250 460
Ammonium	1000	500	19812	250 461
AOX	20	85 (8-16 Checks)	00680	252 026
Lead	1000	500	19776	250 462
Boron	1000	500	19500	250 463
BOD	210	10 bottles for 10 x 1l	00718	252 030
Cadmium	1000	500	19777	250 464
Calcium	1000	500	19778	250 465
Chloride	1000	500	19897	250 466
Chromium	1000	500	19779	250 467
Chromate	1000	500	19780	250 468
COD 160	100	30	KCSB 100	250 356
COD 1500	400	30	KCSB 400	250 357
Iron	1000	500	19781	250 469
Fluoride	1000	500	19814	250 470
Potassium	1000	500	70230	252 471
Silicic acid (Silicon)	1000	500	70236	252 472
Copper	1000	500	19786	250 473
Manganese	1000	500	19789	250 474
Nickel	1000	500	19792	250 475
Nitrate	1000	500	19811	250 476
Nitrite	1000	500	19899	250 477
Phosphate	1000	500	19898	250 478
Silver	1000	500	19797	250 479
Sulfate	1000	500	19813	250 480
TOC	1000	100	09017	250 499
Zinc	1000	500	19806	250 481

PhotoCheck

AQA/IQC: Comprehensive testing aid for optics and measurement linearity

The stable colored solutions are used for checking the filter and the wavelength settings 445 nm/446 nm, 520 nm/525 nm as well as 690 nm. With 4 solutions for each wavelength, correct wavelength setting and linearity of absorbance can be tested. Testing is easy and convenient via menu-guided function.

PipeCheck

Testing aid for the right pipetting volume

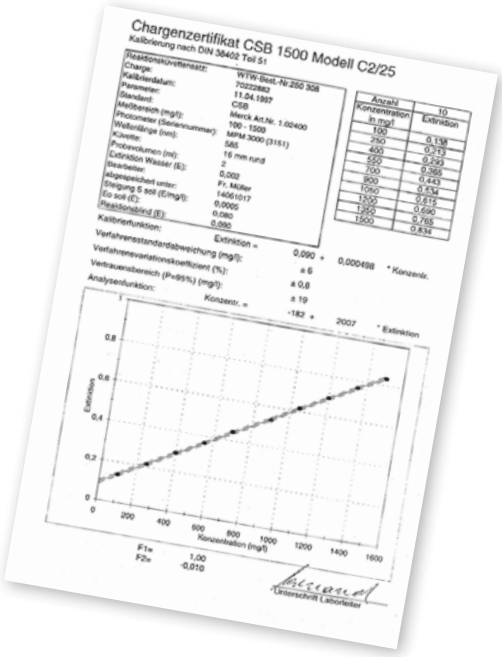
The appropriate test solution is diluted with distilled water using the pipette to be checked, and the extinction of the dilute solution is compared with that of a reference solution. Pipettes with a variation in volume of more than ±2.5% must be regarded as being faulty.

Ordering Information

Model		Order No.
PhotoCheck 14693*	Testing equipment for photoLab®	250 490
PipeCheck 14962	Testing equipment for pipette volume	250 498

*) also available for pHotoFlex on demand

General Information



- The current **analytical procedure** is included in each package.
- Certificates for test sets ■ and ● can be found on the WTW homepage www.WTW.com.
- **Storage:** Unless otherwise noted, the test set can be stored at **+15 to +25 °C (59 to 77 °F)**.
- WTW recommends regularly checking reagents and photometers, e.g. with **PhotoCheck** and **CombiCheck.**
- Barcoded cell tests are marked with ●; these are pre-prepared rapid tests, with only **one** measuring range. The cell is "round", with an outer diameter of 16 mm.
- Barcoded reagent tests are marked with ■. The measuring range information applies to the total useable measuring range for this method without sample dilution and normally involves changing a (rectangular) cuvette.
- All reagent tests require either reaction vessels, or RK 14/25 empty cuvettes and rectangular cuvettes
- Not all types of single-use cells can be recognized by photoLab®; WTW recommends the use of PMMA cuvettes (Order no. 250 607).
- The designations **TC** and **TP** stand for new test sets without lot certificate, that are suited for pHotoFlex®. **TC** are cell tests in 16 mm (0.63 in) cuvettes; **TP** are powder tests and are measured in round cells of 16 mm or 28 mm (0.63 in or 1.1 in) according to their measuring range.
- 16 mm round cells are not suitable for repeated use and are not to be used with reagent tests.
- In some tests a second citation form is given for the measuring ranges, e.g. nitrate as nitrate (NO_3) and as nitrate nitrogen (NO_3-N). Other optional expressions (citations) are contained in the analysis instructions for the instruments.
- Tests requiring a **digestion** (e.g. COD) are marked with the **digestion** temperature and time (e.g. 148 °C/ 298.4 °F , 2 h). Thermoreactors from WTW are equipped with appropriate programs. Crack tests are available for digestion of heavy metal and total nitrogen (***see WTW Product Details).***

The specifications for DIN/ISO/EN/US EPA are mentioned in the WTW Product Details.

Reagent-free Tests

% transmittance
0 – 100 % T, 10, 20, 50 mm cuvette (self-absorption).

Extinction / Absorbance
According to the Lambert-Beer law, the extinction $E=\varepsilon(\lambda)\cdot c\cdot d$ is proportional to the concentration of substances contained in the water. The proportionality constant $\varepsilon(\lambda)$ depends on the wavelength. These constants, and other data required for the determination of water parameters, are stored in contemporary photometers as method data. The basic quantity measured is and remains the extinction.

Coloration
(EN ISO 7887: 1994)
If pure water is observed in transmitted light it appears to have a weak blue coloration. This coloration can change in the presence of contaminants to form a wide range of colorations. Natural waters usually have a yellow-brown color due to iron or clay particles or humic matter. (A green coloration can be produced by algae.) The "true" color of water is determined after filtration through a 0.45 µm filter.
Normally, most yellow-brown waters and the outflows of municipal sewage treatment plants can be measured at 436 nm. The outflows of industrial wastewater treatment plants show no sharp and distinctive extinction maxima. For the investigation of such water it is obligatory to measure at 436 nm (mercury line); the two other measuring wavelengths 525 nm and 620 nm can, depending on the filter used, vary slightly from these wavelengths. For discontinuous measurements the standard permits the use of filter photometers with a spectral bandwidth of < 20 nm for measurements at 436 nm, 525 nm and 620 nm. Thus, instruments with 445 nm and 520 nm interference filters with a bandwidth of 10 nm are also suitable. For comparability with the standard methods, however, a spectrophotometer is required. The results are presented in m^{-1} together with the measuring wavelength, spectral bandwidth, water temperature and pH.
In some publications the result is given in DFZ (translucent coloration number), which is identical with the m^{-1} result.
(DIN ISO 6271: 19988)
To determine the color of clear liquids, the color number with the platinum-cobalt scale (Hazen color number, APHA color number) is used. Spectrophotometers are mentioned as being suitable for measuring the stock solutions at 430 nm, 455 nm, 480 nm and 510 nm. According to the standard, the measurement itself is carried out with a color comparator that allows a visual comparison.

Chrome-plating bath
Reagent-free measurement of the self-coloration of an electroplating bath: 5 ml of the sample are pipetted into a 100 ml volumetric flask, filled up to the mark with distilled water and mixed well. 4 ml of the diluted sample are pipetted into a 100 ml volumetric flask, filled up to the mark with distilled water and mixed well. 5 ml of the 1:500 dilution are placed in a screw-cap glass and 5 ml 40% sulfuric acid are added. The glass is sealed and the contents mixed well. The solution is transferred into a rectangular cuvette for the measurement.

Nickel-plating bath
Reagent-free measurement of the self-coloration of an electroplating bath: 5 ml of the sample are pipetted into a round cuvette and 5 ml 40% sulfuric acid are added. The cuvette is sealed and the contents mixed. The solution is transferred into a rectangular cuvette for the measurement.

Copper-plating bath
Reagent-free measurement of the self-coloration of an electroplating bath: 25 ml of the sample are pipetted into a 100 ml volumetric flask, filled up to the mark with distilled water and mixed well. 5 ml of the diluted sample are placed in a screw-cap glass and 5 ml 40% sulfuric acid are added. The glass is sealed and the contents mixed well. The solution is transferred into a rectangular cuvette for the measurement.

SAC – Spectral Absorption Coefficient
The spectral absorption coefficient generally known as SAC (unit:1/m) and measured photometrically being the sum of dissolved organic water components: In drinking water, the SAC is commonly measured at a wavelength of 436 nm; within the wastewater industry at 254 nm. A separation has to be made between clear and turbid samples. It has to be considered that the determination as a sum parameter can only be applied usefully when assuming that the composition of the water content is not subject to extreme variations. SAC methods are available as part of the photoLab® 6000 series.

Quality Control Using Turbidity Measurements

Turbidity measurements are of extreme importance in quality monitoring in water, wastewater, beverage production, electroplating and petrochemical applications.

Light passing through liquid that contains undissolved solids, such as algae, mud, microbes and other insoluble particles, is both absorbed and scattered. Turbidity increases with the amount of undissolved solids present in the sample; the shape, size and composition of the particles also influence the degree of turbidity. In the past, turbidity has been determined by simply measuring light passing through the sample. However, measuring the **scattered light at an angle of 90°** has proven to be a more accurate method particularly at lower measuring ranges. Instruments that use this method are also referred to as **nephelometers.**

Turbidity Measurements

- High precision standards*)
- AQA functions
- DIN/ISO + US EPA

*) The supplied polymere standards (AMCO Clear®) are retraceable to formazine standards and rated to be a primary standard according to US EPA. Due to production accuracy, and stability in solution the calibration and the resulting measured values are more precise.

Turbidity instruments or nephelometers differ in light source. To meet ISO 7027/ DIN EN 27027 (EN ISO 7027) standard a measurement at the wavelength of 860 nm is required. The *Standard Methods for the Examination of Water and Wastewater* / US EPA require a white light tungsten lamp.

Which light source – infrared (IR) or white light (tungsten)?

An infrared light source minimizes or even eliminates the influence of coloration in a solution, because there is almost never an absorption at a wavelength of 860 nm. The detection sensitivity for small particles, on the other hand, is somewhat lower at this wavelength because of the generally lower light scattering of small particles.

White light has a higher sensitivity for small particles, however, the inherent coloration of the solution has a stronger disturbing effect in this case.
The IR measurement is required by DIN ISO, the white light measuring by US EPA.

Nephelometric or transmittance measuring?

The nephelometric measurement at 90° scattered light is advantageous for lower turbidity, whereas the transmission measurement at 180° is beneficial for medium to high turbidity values: With increasing turbidity, restray and scattering effects between particles are growing bigger. The reduction of light intensity in this case leads to a more accurate result than a 90° nephelometric measurement. Therefore, lab meters for high values are equipped with several measuring options: Ratio modes calculate the final result from different measured angles. For ratiometric measurements, there is no specific standard method to be followed; rather, procedures are established by the application or industry.

Typical turbidity values for various liquids	
Liquid	**NTU**
Deionized water	0.02
Drinking water	0.02 ... 0.5
Spring water	0.05 ... 10
Wastewater (untreated)	70 ... 2000
White water (paper industry)	60 ... 800

Please note:

As floating and moving particles are measured in turbidity, slight measurement deviations are possible. In order to achieve results that are as representative as possible, attention should be paid to the following:
- samples should be measured immediately, as particles otherwise settle.
- constant lamp operating temperature.
- condensation on samples should be avoided.
- the position of the standards should be marked to exclude the influence of glass inhomogenities.
- Tip for validation standards: In daily work a validation standard in desired value by dilution of the 10 NTU standard has been shown excellent practicability. And is considerably more stable as a socalled stabilized formazine.

The Right Instrument for the Right Use

4 models to choose from:
2 portable models, each with either IR or tungsten light source, and 2 laboratory meters with IR or Tungsten light source:

Application areas for turbidity measuring

	Turb® 355 T/IR	Turb® 430 T/IR	Turb® 550/Turb® 550 IR	Turb® 555/Turb® 555
Applications	Portable use for wastewater, surface water and ground water applications	Portable use for all water testing applications incl. drinking water, wine industry, process control Laboratory use: optional for all applications up to 1100 NTU/ FNU with LabStation	Meter for routine and precise measurements	Meter for routine and precise measurements including QC of complex samples and high turbidity values.
Light source	Tungsten lamp/IR LED	Tungsten lamp/IR LED	Tungsten lamp/IR LED	Tungsten lamp/IR LED
Measuring range	0-1100 NTU/FNU	0-1100 NTU/FNU	0-1000 NTU/FNU	0-10000 NTU/FNU/FAU
Calibration	Automatic 1-3 point	Automatic 3 point	Automatic 1-3 point	Automatic 1-5 point
Special features	Portable field meter	Portable field meter Calibration interval Calibration documentation Storage for measure values Optional: LabStation, LSdata	AQA Flow-through measurement (unpressurized)	AQA complete with password protection, ratio method for the reduction of interferences; transmission, flow-through measurement (unpressurized/ up to 4 bar)

Lab Turbidity Meters

Turb® 550 / Turb® 550 IR

- Measuring range 0.01 ... 1 000 NTU with autoranging
- Automatic 1-3 point calibration
- Flow-through measurement

The professional turbidity meter – Up to 1 000 NTU

Laboratory turbidity meters for nephelometric measurements with automatic 1-3-point calibration and calibration interval monitoring. Measuring range selection from 0.01 ... 1 000 NTU is carried out automatically, and for comparative measurements the current and previous values can be shown on the 2-line display.

Standard equipment includes instrument with built-in short operating instructions, 3 cuvettes and 3 standards: 0.02 – 10.0 – 1 000 NTU, AMCO Clear® standards with approval for drinking water as primary standards according to US EPA, and according to EN ISO 7027.

An unpressurized flow-through adapter is available for continuous measurements.

Turb® 555 / Turb® 555 IR

- Measuring range 0.0001 to 10 000 NTU with AutoRange function
- Automatic 1 ... 5 point calibration
- Ratio
- Flow-through measurement

The ADVANCED professional meter – measuring range up to 10 000 NTU

Highly precise lab instrument with wide measurement range from 0.0001 up to 10 000 NTU (automatic switch of measurement ranges) for all applications of turbidity, in particular for quality control of high turbidity values. For values ≤ 1100 NTU, the calibration of Turb 430 and Turb 550 is faster and easier in handling.

The measuring system with its 4 detectors allows not only nephelometric (90° scatter) measurements and transmittance measurements, but also ratio measurements in which the influences of stray light and sample color are reduced. Comprehensive AQA functions such as monitoring the calibration interval or password protection for calibration and setup access fulfill quality assurance requirements for measured values, and are all also included in the documentation of the measurements.

Continuous flow-through measurements are possible up to a pressure of 4 bar with FLOW-THRU-TURB vessel.

Flow-through vessel Flow-Turb

Come complete with 4 AMCO Clear® standards for calibration up to 4000 NTU. For applications up to 10 000 NTU a further standard is available. Due to the precise manufacturing accuracy and long-time stability, the AMCO Clear® standards are preferred compared to Formazin.

Technical Data

		Turb® 550	Turb® 550 IR	Turb® 555	Turb® 555 IR
Measuring principles		Nephelometric	Nephelometric	Nephelometric ratio method transmission	Nephelometric ratio method transmission
Light source		Tungsten lamp	IR-LED	Tungsten lamp	IR-LED
Measuring range	**NTU**	0 ... 1000	0 ... 1000	0 ... 10000	0 ... 10000
	FNU	–	0 ... 1000	–	0 ... 10000
	EBC	–	–	0 ... 2450	0 ... 2450
	Nephelos	–	–	0 ... 67000	–
	FAU	–	–	–	0 ... 10000
Resolution		0.01 NTU from 0.00 ... 9.99 0.1 NTU from 10.0 ... 99.9 1 NTU from 100 ... 1000		0.0001 NTU from 0.0001 ... 9.9999 NTU 0.001 NTU from 10.000 ... 99.999 NTU 0.01 NTU from 100.00 ... 999.99 NTU 0.1 NTU from 1000.0 ... 9999.9 NTU	
Accuracy		±2% of value or ±0.01 NTU		0 ... 1000 NTU: ±2% of value or ±0.01 NTU 1000 ... 4000 NTU: ±5% of value 4000 ... 10000 NTU: ±10% of value	
Reproducibility		±1% of value or ±0.01 NTU			
Calibration		Automatic 1...3 point calibration		Automatic 1...5 point calibration	
Response time		< 3 seconds		< 6 seconds	
Cuvettes		28 x 70 mm (1.1 x 2.76 in) round cuvette, 25 ml sample volume			
AQA functions		Calibration interval monitoring Calibration protocol		Calbration interval monitoring Calibration protocol Password-protected access to calibration and configuration time-controlled data transmission	
Operating temperature		+10 ... +40 °C (50 ... 104 °F)		0 ... +50 °C (32 ... 122 °F)	
Power supply		Plug-in power supply 100 - 240 VAC ±10% / 47 - 63 Hz			

Ordering Information

Model		Order No.
Turb® 550	Laboratory turbidity meter with universal power supply 90 ... 250 V, 3 calibration standards 0.02 – 10.0 – 1000 NTU, 2 empty cuvettes	600 100
Turb® 550 IR	Laboratory turbidity meter for measurements according to DIN EN 27 027, ISO 7027 (EN ISO 7027) universal power supply 90 ... 250 V, 3 calibration standards 0.02 – 10.0 – 1000 NTU, 2 empty cuvettes	600 110
Turb® 555	High-end laboratory turbidity meter according to US EPA with universal power supply 90 ... 250 V, 4 calibration standards 0.02 – 10.0 – 100 – 1750 NTU, 3 empty cuvettes	600 200
Turb® 555 IR	High-end laboratory turbidity meter according to DIN/ISO (EN ISO 7027) with universal power supply 90 ... 250 V, 4 calibration standards 0.02 – 10.0 – 100 – 1750 NTU, 3 empty cuvettes	600 210

CE cETLus 2 Year Warranty

For flow-through vessels, calibration standards and other accessories, see WTW Product Details.

Portable Turbidity Meters

Turb® 430 IR / Turb® 430 T

- Scattered light characteristics according to Pharmacopeia 5.0
- Multifunctional LabStation
- GLP/AQA conform documentation

Lab accuracy & comfort in portable field instrument

With the turbidimeters **Turb® 430 T** and **Turb® 430 IR**, the user has the choice to perform nephelometric measurements at 90° scattered light, according to the application and standard required.

The **Turb® 430 IR** meets the DIN 27027/ISO7027 requirements, the **Turb® 430 T** those of US EPA 180.1. The measuring range is from 0 to 1100 NTU/FNU and is identified automatically. Measurements in the low range, e.g. for drinking water, are excellent together with easiest calibration and convenient handling.

All measurements and menu driven 3-point calibration along with the easy functions for accurate and precise measurements require minimal training. The calibration is performed via an AMCO Clear® standards set (0.02-10-1000 NTU). Up to 1000 data sets with ID numbers can be stored and output using the LabStation and powerful LSdata software ***(see page 120).***

A turbidity measuring lab for in the field – the Turb® 430IR/T sets

The quality of the measurement results is supported by adjustable calibration intervals with documentation.

The Turb® 430 is not only a field measuring instrument (especially with the practical field case), but also a "small lab instrument" for applications up to 1100 NTU/FNU and with optimum data management.
Optional: single meter, field case with LSdata, accessories ***(see WTW Product Details).***

Turb® 355 T / Turb® 355 IR

- 0 – 1100 NTU/FNU
- Easy operation
- Convenient

Small portable turbidity meter for control purposes
Battery-operated portable turbidity meter with Tungsten lamp according to US EPA or infrared LED (860 nm) for nephelometric measurements according to ISO 7027/DIN/EN 27 027 (EN ISO 7027): Handy, lightweight and easy-to-operate.

The Turb® 355 T / IR comes in a handy carrying case. All necessary accessories (calibration standards 0,02 – 10,0 and 1000 NTU, empty cuvettes and batteries) are included. The instrument is powered by 4 AAA batteries.

Technical Data

	Turb® 430 IR / Turb® 430 T	Turb® 355 T / 355 IR
Measuring principles	Nephelometric (90° scatter)	Nephelometric (90° scatter)
Light source	IR-LED/Tungsten lamp	Tungsten lamp/IR-LED
Measuring range NTU FNU	0 … 1100 / 0-1100 0 … 1100	0 … 1100 0 … 1100
Resolution	0.01 from 0.00 … 9.99 0.1 from 10 … 99.90 1 from 100 … 1100	0.01NTU from 1 … 9.99 0.1 NTU from 10.0 … 99.9 1 NTU from 100 … 1000
Accuracy	0.01 NTU or ±2 % of the measured value	±2 % of the measured value or ±0.1 NTU last decimal place in range 1 … 500 NTU ±3% of the measured value in range 500 … 1100 NTU
Reproducibility	<0.5% of the measured value or 0.01 NTU/FNU	±1% of the measured value or ±0.05 NTU/FNU
Calibration	Automatic 3 point calibration	Automatic 1...3 point calibration
Response time	Approx. 3 seconds (IR) / approx. 7 seconds (T)	14 seconds
Cuvettes	28x60 mm (1.10x2.36 in.), 20 ml sample volume	25x45 mm (0.98x1.77 in), 15 ml sample volume
Interface	RS 232, USB via adapter	
Special functions Calibration protocol Storage of measured value RS 232 Date/Time Data evaluation Rechargeable battery	Yes 1000 Yes Yes Yes Optional	— — — — — —
Operating temp.	0 … +50 °C (32 … 122 °F)	0 … +50 °C (32 … 122 °F)
Power supply	4 x AA batteries for approx 3,000 measurements	4 micro (AAA) alkaline manganese batteries suitable for more than 1,500 measurements

Ordering Information

Model		Order No.
Turb® 355 IR	Portable turbidity meter according to ISO 7027 / DIN EN 27 027 (EN ISO 7027) in professional case with 4 micro (AAA) alkaline manganese batteries, 3 calibration standards 0.02 – 10.0 – 1000 NTU and 2 empty cuvettes	600 311
Turb® 355 T	same as Turb® 355 IR, but with tungsten lamp according to US EPA	600 312
Turb® 430 IR	Portable turbidity measuring instrument (90°) according to DIN EN 27027, includes calibration kit (0.02 - 10 - 1000), 2 empty cuvettes, cleaning tissues, batteries (4 x AA), suited for drinking water. Optional LabStation or rechargeable battery pack, set, LSdata (see WTW Product Details)	600 320
Turb® 430 T	Portable turbidimeter (90°, tungsten) according to US EPA 180.1, includes calibration standard kit (0.02-10-1000 NTU) and accessories: 2 empty cuvettes (28 mm), cleaning tissues, batteries (4 x AA); suitable for drinking water. Optional LabStation or rechargeable battery pack, set, LSdata (see WTW Product Details)	600 325

Turb® 430 IR / Turb® 430 T:
IP 67 CE cETLus 2 Year Warranty

Turb® 355 T / Turb® 355 IR:
IP 67 CE 2 Year Warranty

Colony Counter

One and two and three...

The most time-consuming part of performing a microbial count is the actual counting process on Petri dishes. Colony counters facilitate this task and are essential in every bacteriological laboratory. The WTW BZG 40 offers easy, rapid and reliable counting of bacterial colonies with very simple handling.

BZG 40

- Intelligent counting technology
- Easy-to-use
- Safe
- Flexible

The **colony counter BZG 40** allows safe and easy work with its reliable counting mechanism: The support of the Petri dishes is pressure sensitive; a touch with a pen triggers the counting impulse. The sensitivity can be individually adjusted. All measurements can be stored and transferred to a PC.

Intelligent counting technology

The **BZG 40** has an optical and/or acoustic counting monitor and an automatic weight compensation for different Petri dishes. The pressure sensor system provides a balanced sensitivity over the entire working surface. The Single Mode allows the measurement of single samples; the Multi Mode provides measurement and averaging of up to 20 Petri dishes. All data will be stored on demand on a SD card.

The white light LED illumination guarantees a long life span, the magnifier gives an undistorted view and can be positioned to individual needs.

The separately switchable back or side illumination for direct and indirect illumination can be adapted to dark or light colonies.

The direct illumination is well suited for dark nutrient media, the indirect illumination for light ones. The BZG 40 has additionally an input for an external counting pen and an exchangeable grid (Wolffhügel grid).

Technical Data

Display	LCD graphic display (0…999) with reset
Standard magnifier	1.7
Illumination	white light LED (background/side illumination, separately switchable, brightness adjustable)
Diameter of counting area	120 mm
Memory	2 GB SD card
Interface	RS 232, USB-B
Power supply	universal power supply 100 - 240 V ± 15%, 50…60 Hz
Dimensions	260 x 330 x 110 mm (w x d x h) without magnifier holder
Weight	4.5 kg
Test certificate	CE certificate

Ordering Information

Colony Counter		Order No.
BZG 40	Colony counter with magnifier (1.7-fold, 100 mm/3.34 in dia.) complete with plug-in flexible arm, switchable background (light - dark) and Wolffhügel grid; for Petri dishes 70 mm (2.76 in) and 100 mm (3.34 in) dia. 230 V / 50 ... 60 Hz	803 314

CE 1 Year Warranty

WTW Software – Simple and Convenient

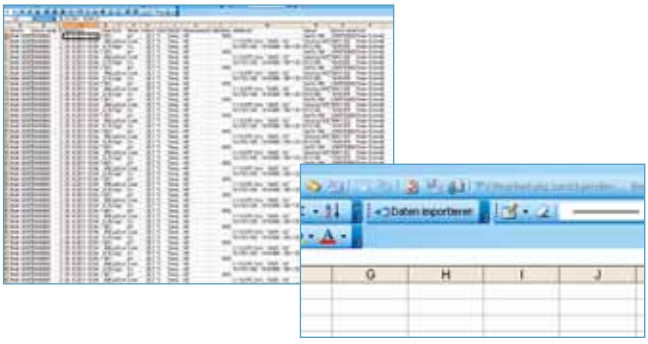
MultiLab® Importer

- Data transfer directly into Excel®
- Easy and convenient
- Free download or update on www.wtw.com

Free software for direct data transfer into Excel® für MultiLine®, ProfiLine und inoLab®

(See also synoptical table Meters/Cables/Software)

MultiLab® Importer is a free Excel® add-in for easy data transfer of measuring values from MultiLine®, ProfiLine and the new inoLab® instruments. By clicking the "import data" button the program automatically recognizes the connected instrument. The data transfer to the PC is then initiated. The formatted display of all measuring values and additional data simplifies the further process. Calibration records will be transferred as text fields.



MultiLab® User

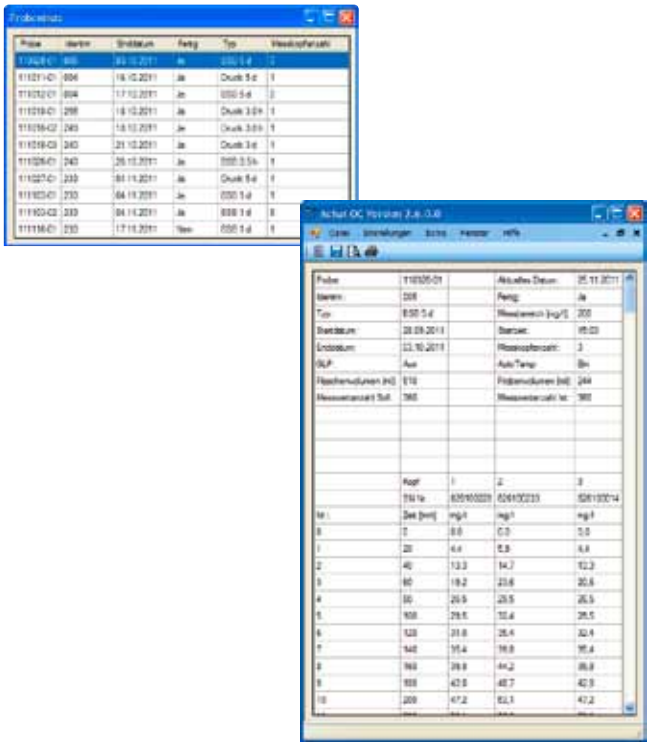
- Instrument and program are password-protected
- Allocation down to user level
- User-friendly

The convenient, PC-supported software for installing user administration on both MultiLine® or inoLab® Multi IDS

The MultiLab® User serves for setting up a user access or a measuring point list for the MultiLine® oder inoLab®. Up to 50 names can be configurated and if applicable saved with a password. After connecting and starting the instrument, the programme automatically recognizes the instrument; an administrator password protects unauthorized access. The user list is prepared, revised and deleted via the PC and the result will be copied onto each instrument. The automatic allocation of name and generated measuring or calibration data ensures complete traceability.

ACHAT OC

- Importing complete data onto controller
- Exporting for further processing via Excel or .csv format
- Reading of old .oxt files
- Accessories: interface cable AK 540 B



Communication program for collecting all measuring data from an OxiTop® OC 100 or OC 110 Controller

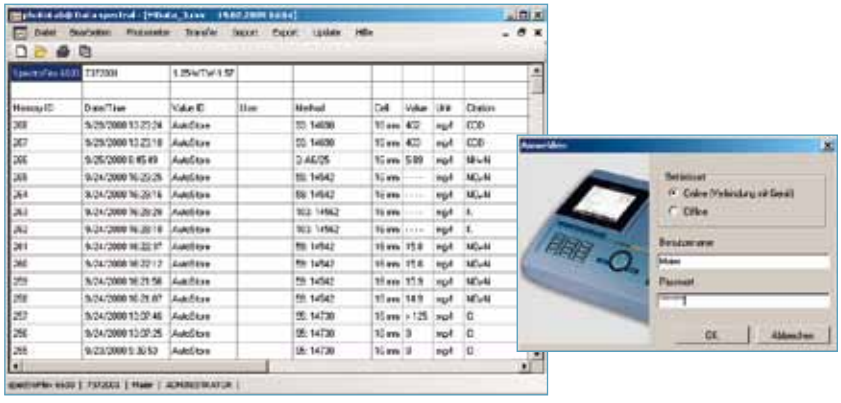
The new ACHT OC is a program for collecting all data of OxiTop® control systems; compatible with the latest PC environment. The new designed graphical interface provides a clearly organized display of the data and guarantees the export into a .csv format.

photoLab® Data spectral

Data management for the photoLab® 6000 Series

The photoLab® Data spectral PC software provides a well-designed user interface for spectrophotometers of the photoLab® 6000/spectroFlex series, facilitating convenient data exchange between the PC and photometer. photoLab® Data spectral eases the processing of results from water analysis, routine measurements, spectra and general data:

- Data management according to GLP with user administration and instrument ID
- Data transfer from the photometer to the PC for further processing (i.e. LIMS, XLS)
- Export of spectra into specialized software for standard display and processing of spectra
- Synchronization of methods, profiles and software updates on several photometers
- Administration of IQ-LabLink job files from the WTW online system IQ Sensor Net



LSdata

Data management for the photoFlex® and Turb® 430 Serie

The PC software package LSdata offers smart and comfortable data management of water analysis, routine measurements and calibration protocols of photoFlex®/Turb® 430 instruments. The user friendly interface allows:

- Data Import with user and instrument identification
- Export into Excel or .csv formate (e.g. LIMS) for data processing
- Definition and administration of user defined methods via handy user interface
- Automatic calculation of the calibration curve for user-defined methods
- Synchronization of method data for one or more instruments via PC
- Documentation of calibration protocol for pH and turbidity

The PC Software package is available as stand-alone package and included in field sets and LabStation for photoFlex®/Turb® 430.

Adapter for USB to serial interfaces

Overview of Meters/Cables/Software

MI = MultiLab® Importer Mp = MultiLab® pilot AO = ACHAT OC MA = Multi/ACHAT II pDS = photoLab® Data *spectral* LS = LSdata

b = bidirectional f = can be remote controlled u = unidirectional

Instrument	Software	Interface cables	Type
Cond 197i, 1970i	Mp	AK 340/B, AK 325/S	b
Cond 340i/3400i*	Mp	AK 340/B, AK 325/S	b
inoLab® 7310, 7320, 9310, 9420, 9430	MI	AK USB A-Mini	b
inoLab® 730/7300*	Mp	AK 340/B	b
inoLab® 735/7350*	Mp	AK 340/B	b
inoLab® 740/7400*	Mp	M-PC/5, AK T-PC, AK T-P9 PIN/25 PIN, AK T-R 2ST	f
inoLab® 750/7500*	Mp	AK T-PC, AK T-P9 PIN/25 PIN, AK T-R 2ST	f
inoLab® Level 2	Mp	AK 340/B	b
inoLab® Level 3	Mp	M-PC/5, AK T-PC, AK T-P9 PIN/25 PIN, AK T-R 2ST	f
Multi 197i, 1970i	Mp	AK 340/B, AK 325/S	b
Multi 340i/3400i*	Mp	AK 340/B, AK 325/S	b
Multi 350i/3500i*	Mp	AK 340/B, AK 325/S	b

Instrument	Software	Interface cables	Type
Multi 3410, 3420, 3430	MI	AK USB A-Mini	b
Oxi 197i, 1970i	Mp	AK 340/B, AK 325/S	b
Oxi 340i/3400i*	Mp	AK 340/B, AK 325/S	b
OxiTop® OC 100/110	AO	AK 540 B	u
pH 197i, 1970i	Mp	AK 340/B, AK 325/S	b
pH 340i/3400i*	Mp	AK 340/B, AK 325/S	b
pH/Cond 340i/3400i*	Mp	AK 340/B, AK 325/S	b
pH/ION 340i/3400i*	Mp	AK 340/B, AK 325/S	b
pH/Oxi 340i/3400i*	Mp	AK 340/B, AK 325/S	b
pHotoFlex® Serie	LS	AK 540 B, ADA USB	u
photoLab® S6, S12	MA	AK Labor	b
photoLab® 6000 Serie	pDS	SK/TC	b
ProfiLine 3310, 3315	Mp, MI	AK USB A-Mini	b
Turb® 430 Serie	LS	AK 540 B, ADA USB	u

Ordering Information

		Order No.
KOM pilot	Communications package, consisting of 1 x MultiLab® pilot and 1 AK 340/B	902 915
photoLab® Data *spectral*	PC software for easy data management	902 761
LSdata	PC software for pHotoFlex®/Turb® 430 series	902 762
Multi/ACHAT II	Software for PC under Windows, German and English	902 750
KOM Labor	Communications package, consisting of: 1 x Multi/ACHAT II and 1 AK Labor	902 754
ACHAT OC	PC communication program for Controller OxiTop® OC 100 or OC 110 for further processing of measuring data	208 990
ADA USB/Ser	Adapter USB serial interface RS 232 (9-pin socket)	902 880

** North American version*

For additional accessories and interface cables, see WTW Product Details.

WTW Printers

WTW instruments with a serial interface can be connected directly to a PC (see software section). Data can therefore be printed by using the PC printer.

For protocol purposes, a printer can also be connected directly.

For instruments with a serial interface WTW offers suitable printers and cables. As the transmission rate (baud rate) of most instruments is permanently fixed, it may be necessary to set the printer to the suitable transmission rate.

P 3001

LQ 300+

Technical Data

Model	P 3001	inoLab® printer	LQ 300+
Printing method	Thermal printer		24-pin matrix printer
Printing line	40 characters/line	–	80 characters at 10 cpi
Paper width	112 mm (4.41 in)		182 mm ... 216 mm (7.17 ... 8.50 in) (single sheet, autom. feed)
Type of paper	Thermal printer paper, normal quality: legible approx. 5 years high quality: legible at least 10 years		Normal paper 52.3 g/m²... 90 g/m²
Size (W x D x H)	170 x 170 x 66 mm (6.69 x 6.69 x 2.60 in)	–	366 x 275 x 141 mm (14.41 x 10.83 x 5.55 in)
Weight	Approx. 1 kg (2.20 lb)	–	Approx. 4.3 kg (9.48 lb)
Power supply	230 V AC, 50 Hz rechargeable battery	–	220 V AC ... 240 V AC, 50 Hz ... 60 Hz
Ambient temperature			
Operation	0 °C ... 40 °C (32 °F ... 104 °F)		+5 °C ... 35 °C (41 °F ... 95 °F)
Storage	-20 °C ... 55 °C (-4 °F ... 131 °F)		-20 °C ... 55 °C (-4 °F ... 131 °F)
Tested safety to			EN 60 950
Interface(s)	RS 232 (serial) Centronics (parallel)	–	RS 232 (serial) Centronics (parallel)

Ordering Information

Printer P 3001		Order No.
P 3001	Thermal matrix printer, AC and rechargeable battery operation. Paper width 112 mm (4.41 in), preset baud rate: 4800; preset characters/line: 40	250 045
AK 325/S	Interface cable to connect instrument to P 3001	902 837
AK 540/S	Interface cable to connect instrument to P 3001	902 843
Printer LQ 300+		**Order No.**
LQ 300+	Matrix printer, AC operation on 230 VAC. Standard paper (A4 or endless)	250 046
AK/LQ 300	Interface cable to connect instrument to LQ 300+ (only photoLab® series, not inoLab®, not 3xx(i) series)	250 746

For further connection cable and accessories, see WTW Product Details.

Customer Service/Certificates

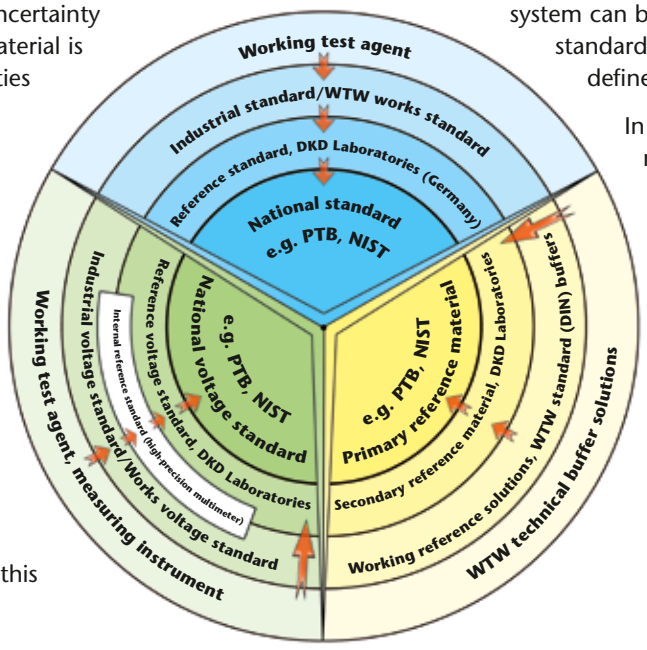
We are active...

in solving your quality assurance problems

Every measured value includes errors. This applies particularly when calibrating a device against standard materials. It is necessary to quantify this error in order to know the deviation in comparison to internationals standards.

In chemical analysis reference materials are used. The relevant properties of such materials are determined by metrological facilities. The uncertainty of a measurement for such a material is documented. Examples of facilities that can provide such qualified evidence are the National Institute of Standards (NIST, Gaithersburg MD, USA) and the Physikalisch-Technische Bundesanstalt (PTB, D-Braunschweig).

In further steps (secondary, tertiary, etc.) reference materials are derived from the primary reference materials by comparative measurements. The uncertainty of each of these steps compared to the original standard can be given; this takes into account the equipment and methods used. It is important that the calibration of a measuring system can be traced back to the particular standard in an unbroken chain with defined uncertainty.



In practice so-called working reference buffer solutions are used; these are obtained by comparing them with primary or secondary material. WTW pH buffers meet these requirements. The individual certainty of the pH of a particular buffer solution is documented by a certificate.

What we can offer you

IQ/OQ/PQ

WTW offers the qualification of measuring systems particularly for the pharmaceutical industry. As a starting point, any requirements the measuring system has to fulfill, are specified in the design. This is where the customer decides what he intends to measure, in which environment the measurement will take place and which measuring task is to be completed. After selecting suitable components, WTW provides the documentation on demand for qualifying the system on location. This will be done by a WTW staff member after an appointment is agreed.

Scope of services:

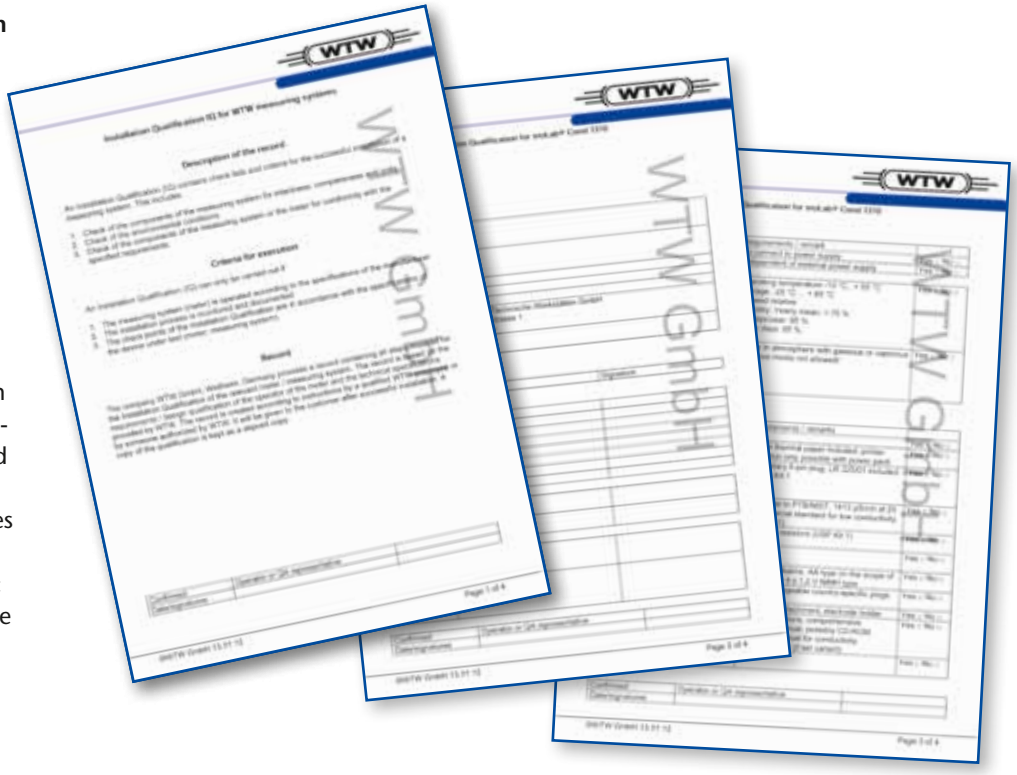
The **Installation Qualification (IQ)** reviews the scope of delivery regarding completeness and purpose as well as considering the environmental conditions. The documentation is processed by a prefabricated and signed record.

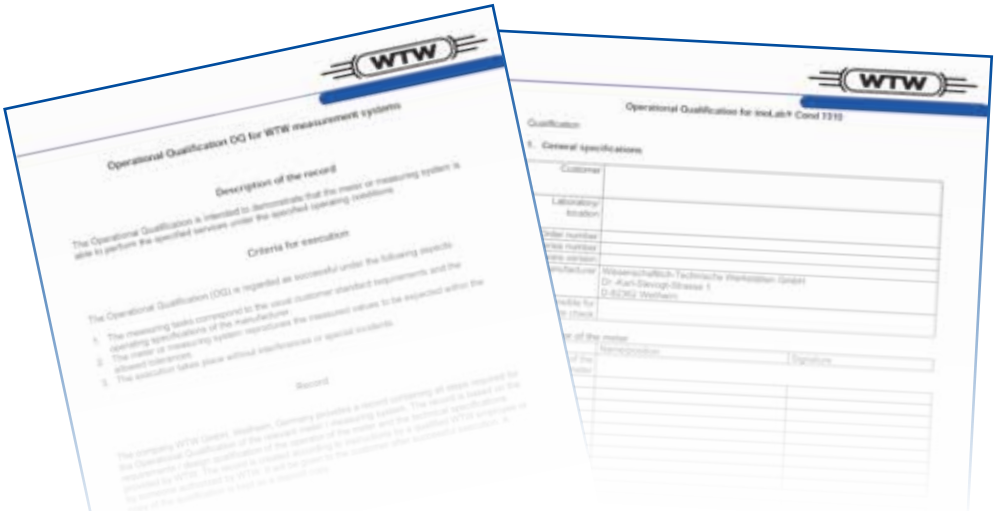
The **Operational Qualification (OQ)** serves for reviewing the correct function of the instrument under specified conditions. The processed calibrations have the advantage that the measuring values are verifiable against certified reference material (exception: D.O.). Also here the results are recorded.

Regarding the **Performance Qualification (PQ)** the customer receives WTW documents that he can mainly use for two conditions: One is the routine verification and the other is the procedure in case of an incident. For this purpose the customer may make any necessary copies of the provided documents.

WTW offers documents for the following products:

inoLab® 7110, 7310, 9310 IDS, 9420 IDS, 9430 IDS, 7320 (only pH!) as well as ProfiLine handheld instruments. MultiLine® IDS on request.





... certified

Calibration of measuring systems for determination of conductivity, pH, and dissolved oxygen in aqueous media

No certification to DIN ISO 9000 without test agent monitoring

The perfect functioning of the test agent used is a constant requirement for the accuracy and comparability of measured values. This is why it belongs to the basic rules of **quality assurance** and **Good Laboratory Practice** that the accuracy of each test agent is monitored at regular intervals after a defined period of use by carrying out a calibration. This task is faced by a continually increasing number of companies and laboratories that are trying to achieve or have already achieved certification of their QA system according to the DIN ISO 9000 series of standards.

Why you should make use of the manufacturer's technical expertise

Proper calibration requires specially qualified personnel with particular knowledge of the individual instrument and the presence of suitable calibration facilities. This is why it is usually more efficient and economical to allow test agent monitoring to be carried out by an external calibration laboratory or directly by the manufacturer.

WTW provides this service for all WTW measuring systems for the determination of conductivity, pH, and dissolved oxygen.

We have been certified to ISO 9001 since 1993 and are completely familiar with the requirements of the standard. Our calibration facilities are linked to national standards. Calibration agents for which no national standards exist are prepared in accordance with recognized national and international standard methods.

We carry out calibration and provide you with a calibration certificate.

If required, we can also carry out test agent monitoring for our photometers and BOD measuring instruments. Please ask for our advice.

WTW offers different types of certificates

1. Certificate of Compliance

General certificate (without mentioning the serial number) which certifies that the product complies with the technical data given in the operating instructions.
The certificate is not signed and is free of charge.

2. Manufacturer's Test Certificate

Individual certificate (mentioning the serial number) which states that the product has been tested and complies with the information given about accuracy on the certificate. Contains a passage about the regular calibration of the test agents used by us and their traceability to national and international standards. Can be produced by the customer as evidence for ISO 900 purposes.

Certificate for brand-new products:

These Certificates are added to all instruments. The certificate is not signed and is free of charge.

CE Declaration of Conformity

Certifies that the product complies with the valid EC directives.

Certificates according to FDA regulations

Validation of instruments according to FDA regulations, including IQOQPQ, on request.

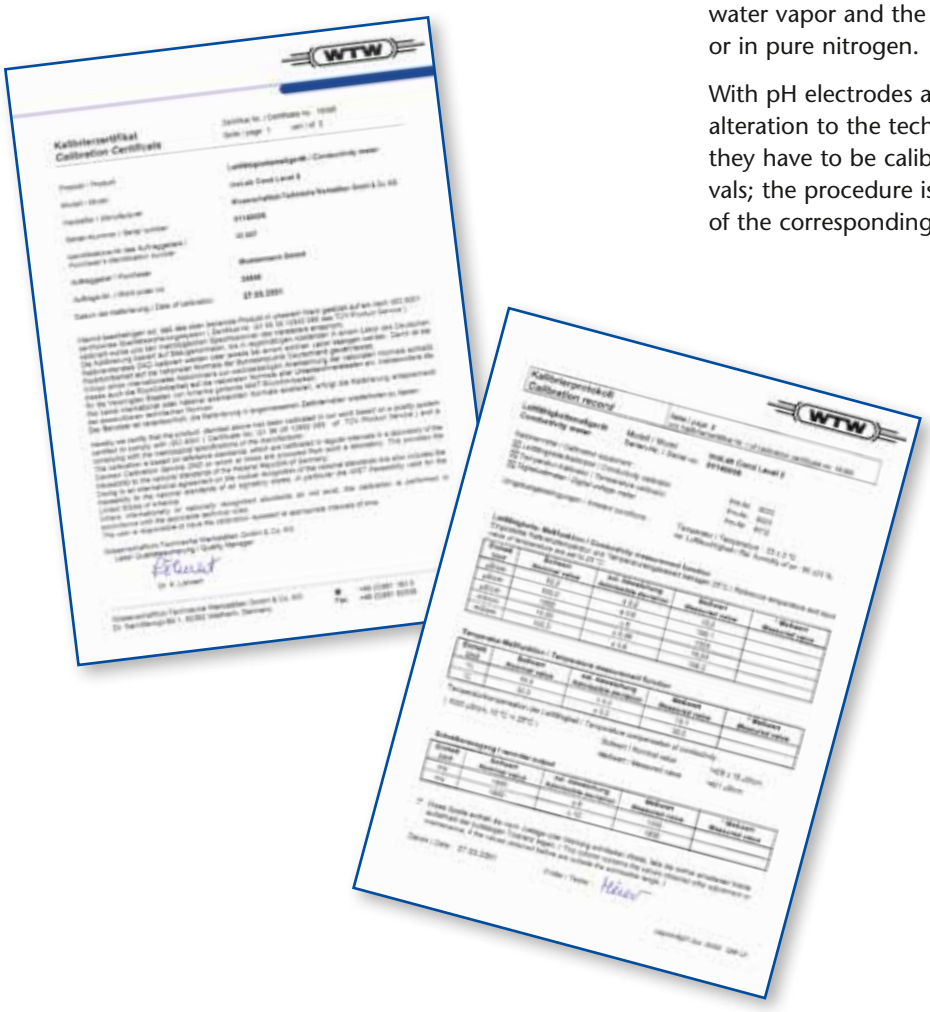
Manufacturer's certificate for calibration solutions

When ordering or within 3 months of purchase we can supply a manufacturer's certificate for the pH buffer solutions and conductivity calibration solutions offered in our range of products; this certifies their controlled manufacture on the basis of national and international standards.

Calibration certificates available for a fee

Calibration certificate for an instrument

The measuring functions of the instrument are calibrated independently of the signal generator by using electrical standards.



Calibration certificate for a signal generator

For pH electrodes and conductivity cells the calibration is made by using calibration solutions. For dissolved oxygen sensors the slope is calibrated by using air saturated with water vapor and the zero current by using a zero solution or in pure nitrogen.

With pH electrodes and dissolved oxygen sensors a gradual alteration to the technical data occurs (aging). This is why they have to be calibrated by the operator at regular intervals; the procedure is described in the instruction manuals of the corresponding instrument.

Certificate for used products:

Provided at the customer's request in association with a repair contract. Test data are listed in a protocol. The certificate is signed by our QM officer and will be invoiced.

Analog

Monitors
EcoLine/QuadroLine®
and sensors

D.O.
pH
Cond
Turb

- High accuracy and enhanced EMC performance using integrated pre- amplifier
- Integrated lightning protection
- EcoLine 170: Monitors for field installation
- QuadroLine® 296: Monitors for panel mounting 96 x 96 mm (3.78 x 3.78 in)

NH_4
NO_3
NO_2

Analyzer

TresCon®/
TresCon® Uno

TresCon®: Multi-parameter analyzer for up to three parameters

Self-calibrating systems: easy-to-use – easy-to-extend

Also available as a compact single parameter unit

Digital

Multi-parameter System

IQ Sensor Net

System 182 (XT) and 2020 XT

TSS

NH_4

NO_3

COD

TOC

DOC

SAK

BOD

P_{Total}

PO_4

- One system for all parameters
- High accuracy and enhanced EMC performance using
  – integrated pre-amplifier & digital processing
- Integrated lightning protection
- Sensor can be pre-calibrated in Lab
- Universal sensor connection
  – Standard for all digital sensors
- Easily expandable using 2-wire technology
- 0/4 ... 20 mA
  RS 232, RS 485, PROFIBUS-DP, Modbus RTU

Are you interested?

Please order the WTW Online Catalog

Company highlights	
1945	*Company founded by* ***Dr. Karl E. Slevogt***
1948	*Renamed to Wissenschaftlich-Technische-Werkstätten (WTW)*
1954	*Introduction of first WTW pH meter*
1965	*Introduction of first WTW dissolved oxygen meter*
1976	*Bavarian State Award for the* ***Combibox*** *compact multi-parameter system*
1982	*Introduction of the world's first zero-current-free (stable zero point) dissolved oxygen sensor for field measurements*
1983	*Start of WTW's online measuring technology program*
1986	*First company to offer a 3-electrode dissolved oxygen sensor (****TriOxmatic®****) with automatic calibration on air (****OxiCal®****)*
1987	*First company to offer a 4-electrode conductivity sensor (****TetraCon®****) for portable water analysis*
1993	*First manufacturer of D.O., pH and conductivity measuring systems to be certified to ISO 9001*
1995	• *Introduction of the mercury-free* ***OxiTop®*** *system for manometric BOD determination* • *First company to offer monitors with built-in lightning protection*
1997	*New* ***photoLab®*** *laboratory photometers combine precision with outstanding ease of use*
1998	• *Introduction of the* ***PurCon®*** *sample preparation system as a replacement for conventional filtration systems* • *First WTW spectrophotometer*
1999	*The new laboratory instruments of the* ***inoLab® family*** *set new standards for the measurement of pH, D.O., conductivity, ISE and temperature*
2000	*Introduction of TresCon® – the modular analytical system for the continuous measurement of ammonium, nitrite, nitrate, phosphate*
2001	• ***IQ Sensor Net*** *– the multi-parameter measuring system offers unlimited possibilities for online measurements* • *The new* ***VisoTurb®*** *and* ***ViSolid®*** *turbidity and solid sensors with their revolutionary ultrasonic keeping clean system give "low-maintenance" a completely new meaning*
2002	• ***AmmoLyt® 700 IQ*** *enables reliable Online direct measurement of Ammonium* • ***PurCon® IS****: Sample Preparation – directly without pump*

About us

As a Xylem brand WTW is committed to use our expertise and innovative technology to provide our customers with solutions to their most challenging problems.

a xylem brand

As part of that commitment WTW continues to develop and launch new innovative product lines, building upon our proven sensor and analytics technology. We take pride in improving and setting new standards in the markets which we serve.

If you want to know more about Xylem please visit www.xyleminc.com

Laboratory & Field Instrumentation

The product range from WTW offers the world's most complete line of pH/ORP, D.O./ BOD/Respirometry and Conductivity Instruments, Turbidity Meters and Photometers including reagents. WTW systems range from rugged waterproof, portable field meters to an integrated line of laboratory instruments and accessories, as well as completely new multi-parameter instruments with state-of-the-art technology for lab and field applications.

The MultiLine® multi-parameter instruments, with high-resolution graphic display, feature extreme durability for measurements in a variety of applications where parameters can be measured sequentially or simultaneously.

The new inoLab® laboratory meter line include digital high-performance multi-parameter instruments with IDS technology taking advantage of the innovative new digital IDS sensors, which convert the measuring values directly in the sensor and transfer the digital signals to the measuring instrument, delivering precision and convenience.

WTW offers premium optical technology instruments with the spectrophotometers of the photoLab® 6000 series for the UV and VIS range.

Online Instrumentation

For many years, the IQ Sensor Net has set the standard for online measuring technology. It is suitable for conventional instrumentation with analog outputs as well as for field bus instrumentation. The innovative digital sensors in this system represent the state of the art in process measuring.

A new controller family MIQ/MC2 with integrated USB and LAN interfaces opens the IQ Sensor Net System to the future-proof world of internet communication via TCP/IP technology. The new spectral UV-VIS sensors CarboVis®, NitraVis® and NiCaVis® allow for chemical-free measurements of COD, TOC, BOD, SAC, NO_3 and TS directly in the wastewater process. Their new optical design, integrated ultrasonic cleaning system and high-tech materials Titanium and PEEK assure high measurement reliability, simple handling and extreme durability.

The new interface level sensor IFL 700 IQ is ideal for sludge management at wastewater treatment plants: based upon the ultrasonic measuring principle it detects sludge-water interface levels via runtime of ultrasound signal echoes. The IQ Sensor Net system is therefore the most flexible, digitally based system providing from 1 to 20 measuring points.

For the measuring and control of wastewater, WTW offers the world's most complete line of pH/ORP, D.O., Conductivity, Nitrogen, Carbon, Phosphate and unique self-cleaning Turbidity instrumentation as well as comprehensive accessories.

The dependability, reliability, and versatility of WTW field proven Ammonia, Phosphate, Nitrite and Nitrate Analyzers, probes, and pH, ORP, D.O., and Conductivity systems and meters have established WTW products as industry standards world-wide.

WTW has built a solid reputation in its more than 60 year history by providing "best in class" products with unparalleled customer and technical support. WTW strives to deliver solutions to our customers measuring problems. Our Customer Care Centers are dedicated to ensuring each customer's individual success. WTW's extensive applications library, coupled with knowledgeable applications specialists, provide for rapid resolutions to technical challenges.

With support facilities around the globe, the WTW manufacturing center, located just south of Munich, Germany, delivers quality technical instrumentation with continuous support. We are proud to present our product offering to you and look forward to serving your needs.
"Made in Germany".

Company highlights

2003	***NitraLyt® 700 IQ** is a perfect supplementary nutrient parameter (Nitrate) for Online direct measurement*
2004	• *Multi-parameter portable meter **Multi 350i** represents state-of-the-art technology in field applications* • ***NitraVis®**, **CarboVis®** and **NiCaVis®** – spectral "in-situ" Online sensors for Nitrate, Carbon and TSS measurement for wastewater control*
2005	• *Portable photometers and turbidity meters for universal applications:* ***pHotoFlex®/pHotoFlex® Turb*** ***Turb 430 IR*** • ***IQ Sensor Net System 182*** *compact 2 channel transmitter*
2006	• ***VARiON®** ammonium and nitrate **multisensor** with automatic compensation of interference ions*
2007	• *The new optical D.O. sensor **FDO® 700 IQ** completes the WTW portfolio for online D.O. measuring* • *The new spectrophotometers of the **photoLab® 6000 series** combine systematic and spectral analysis with well proven quality assurance AQA.*
2008	*The IQ Sensor Net system keeps on developing:* • *New **terminal/controller T 2020 XT** with USB and dual-processor function* • ***System 182 XT-4**: perfect for up to 4 sensors* • ***IQ-LabLink** joins online measuring with laboratory calibration*
2009	*The new ProfiLine single parameter portable meters feature extreme robustness and outstanding ease of use*
2010	***MultiLine® IDS** – new digital world of portable measurement:* • ***MultiLine®** – digital multi-parameter portable meters and* • ***FDO® 925** – optical dissolved oxygen sensor for field and lab*
2011	***inoLab® Multi IDS** – IDS technology for the lab*
2012	• *UV-VIS sensors – Next generation of **CarboVis®**, **NitraVis®** and **NiCaVis®** sensors with new optical design, integrated ultrasonic cleaning technology and high-tech materials* • ***IFL 700 IQ sensor** – Interface level measurement for sludge management*

www.WTW.com

Information around the Clock

New Products
WTW presents its complete line of new products, innovative measuring and analytical instruments, helpful accessories, useful system extensions, special sets and much more ***24 hours a day.***

Applications
WTW can provide you with solutions for all your measurement needs. In addition, you will find tech tips, application notes, ***and much more.***

Downloads
Need a Manual, Application Report or a WTW Certificate?
Have a look at our Download Area.

Contact Addresses

Looking for your local contact?
Here you can find your "local WTW":
contact addresses, representatives, distributors… Click!

General information

1. Special versions of instruments on request.
2. Accessories and spare parts for older models – please make separate inquiry.
3. In order to avoid our customers having to pay a surcharge for small-volume purchases, we supply our consumables in practical minimum ordering quantities.

Technical alterations
The technical description corresponds to the current products. Alterations because of technical improvements are possible.

Illustrations
We draw your attention to the fact that the illustrations are intended to clarify certain points. There may therefore be discrepancies between the illustrations and the written text.

Liability
We accept no responsibility for printing errors, writing errors or mistakes in the translation.

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** North American version*

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** North American version*

WTW Product Families ...

Optical / BOD

Photometers *p. 106*

photoLab® 6100 VIS / 6600 UV-VIS
photoLab® S6/S12
pHotoFlex® Series

- Photometrical Tests

Wide range of tests available

Turbidity Meters *p. 138*

Turb® 430 / 355 / 550 / 555

- NTU

Respirometer OxiTop® *p. 88*

OxiTop®/OxiTop® Control

- BOD
- Respiration

Soil respiration, biodegradation OECD, Biogas determination, respiration rate

General Technical Data ...

Optical Instruments

Laboratory Meters

	photoLab® Series			Thermo-reactor	Turb®	
	S6	S12	6100 VIS 6600 UV-VIS	CR 2200 CR 3200 CR 4200	550/550IR	555/555IR
Cuvette Size (mm)	16	16, 10, 20, 50	16, 10, 20, 50	16	28	28
Internal Diagnostics	●	●	●	●	●	●
Drain	●	●	●	—	—	—
Display	LCD	LCD	Graphic/ backlit	LCD	LCD	LCD
Keypad	Silicone	Silicone	Foil with Prompts	Foil with Prompts	Foil with Prompts	Foil with Prompts
Choice of Language	●	●	●	●	—	—
Memory: Data Sets	500	1000	1000/ 4 MB	—	●	●
Methods/ User Defined Methods	130/—	150/50	200/100	5;–/5;8/5,8	—	—
Real Time Clock	●	●	●	●	●	●
GLP Supported Functions	●	●	●	●	●	●
AQA	●	●	●	—/●/●	●	●
Identification No.	●	●	●		—	—
Calibration Protocol	●	●	●	●	●	●
Calibration Interval Selectable	●	●	●	—	●	●
Password Protection	●	●	●	—	—	●
Interface	RS 232	RS 232	2 USB 1 RS232	RS 232	RS 232	RS 232
PC Connection	●	●	●	●	●	●
PC Software MultiAchat II	—	optional	●	—	—	—
Alarm Function	—	—	●	●	—	—
Method Update via Internet	●	●	●/USB	—	—	—
Dimensions mm (in.) (H x W x D)	140x270 x260 (5.51x10.63 x10.24)	140x270 x260 (5.51x10.63 x10.24)	404x197 x314 (15.91x7.76 x12.36)	185x256 x315 (7.28x10.08 x12.40)	100x252 x290 (3.34x9.92 x11.42)	100x252 x290 (3.34x9.92 x11.42)
Weight kg (lb.)	2.3 (5.07)	2.3 (5.07)	4.1 (9.04)	3/4/4 (6.61/8.82/8.82)	1 (2.20)	1 (2.20)
Universal Power Supply	—	—	●	Switch-able	●	●
Rechargeable Batteries	optional	optional	Yes/12 V	—	—	—
Certificates	CE	CE	CE/UL/ CUL	CE/ ETLus/cETL	CE/UL/ CUL	CE/UL/ CUL
Warranty	2 Years	2 Years	2 Years	2 Years	2 Years	2 Years

Portable Meters

	pHotoFlex® Series			Turb®	
	pHotoFlex® STD	pHotoFlex® pH	pHotoFlex® Turb	Turb® 430 IR/T	Turb® 355T/IR
Cuvette Size (mm)	16, 28	16, 28	16, 28	28	25
Internal Diagnostics	●	●	●	●	●
Waterproof Housing	IP 67	IP 67	IP 67	IP 67	—
Display	Graphic/ backlit	Graphic/ backlit	Graphic/ backlit	Graphic/ backlit	LCD
Temperature Display	—	●	●	—	—
pH/Turbidity	—/—	●/—	●/●	—/●	—/●
Keypad/ Acoustic Prompts	Silicone/●	Silicone/●	Silicone/●	Silicone/●	Foil with Prompts
User Selectable Languages	●	●	●	●	—
Memory: Data Sets	100	1000	1000	1000	—
Real Time Clock	●	●	●	●	—
GLP Supported Functions	●	●	●	●	—
Identification No.	●	●	●	●	—
Calibration Protocol	—	●	●	●	—
Calibration Interval	—	●	●	●	—
Interface	RS 232	RS 232	RS 232	RS 232	—
PC Connection	●	●	●	●	—
LabStation for Lab Use incl. Rech. Batt.	optional	optional	optional	optional	—
PC Software Support Optional	●	●	●	●	—
Alarm Function	●	●	●	●	—
Clock/Timer	●/●	●/●	●/●	●/—	—
Method Update via Internet	●	●	●	●	—
Firmware Update via Internet	●	●	●	●	—
Dimensions mm (in.) (H x W x D)	117x86 x236 (4.61x3.39 x9.29)	117x86 x236 (4.61x3.39 x9.29)	117x86 x236 (4.61x3.39 x9.29)	117x86 x236 (4.61x3.39 x9.29)	48x70 x165 (1.89x2.76 x6.50)
Weight kg (lb.)	0.6 (1.32)	0.6 (1.32)	0.6 (1.32)	0.6 (1.32)	0.420 (0.93)
Battery Operated	●	●	●	●	●
Rechargeable Batteries	—	optional	optional	optional	—
Certificates	CE/ ETLus/ cETL	CE/ ETLus/ cETL	CE/ ETLus/ cETL	CE/ ETLus/ cETL	CE
Sets	—	●	●	●	●
Warranty	2 Years	2 Years	2 Years	2 Years	2 Years

Typical Optical/BOD Applications

Environmental Monitoring

Photometric Measurements with pHotoFlex®

see pp. 117

Wastewater: COD

COD Determination in Wastewater with photoLab® S12

see pp. 115

Reaction Kinetics and Absorption Spectra

with photoLab® 6600 UV-VIS

see pp. 110

Food and Beverage Industry

Turbidity Measurement with Turb® 430 + LabStation

see pp. 142

Dilution BOD

with inoLab® Oxi 7310 and automatic documentation

see pp. 91

BOD Self-check Measurement

with OxiTop®

see pp. 92

Biodegradation according to OECD

OECD 301: Determination with OxiTop® Control

see pp. 102

Determination of Soil Respiration

with OxiTop® Control B6/BM6

see pp. 101

What can Xylem do for you?

We're 12,500 people unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

For more information on how Xylem can help you, go to www.xyleminc.com

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