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NEW

MultiLine® IDS

Premium multi-parameter systems with intelligent, digital sensors for pH, dissolved oxygen and conductivity measurement:

MultiLine® IDS

I Intelligent:

Intelligent sensors always have their identification data

D Digital:

Digital signal processing and transmission

S Sensor:

Sensors for every application

More information beginning on page 8

MultiLine® – a class of its own:

Three portable models with one, two or three universal measurement channels are available. Special features of MultiLine® devices include a brilliant color graphic display, two USB interfaces (USB-A and Mini-USB) and rechargeable batteries that can be charged directly in the device.

MultiLine® IDS

- Up to 3 parameters can be combined
- Automatic electrode identification
- Data transmission to USB stick or PC

More information beginning on page 8

FDO® 925

FDO® 925, the new, intelligent, optical IDS dissolved oxygen sensor for measuring in-the-field, in the process and in-the-laboratory. FDO® 925 is suited for a wide range of applications via the MultiLine® IDS system.

FDO® 925 IDS

- Calibration-free
- No incident flow required
- Low maintenance

The FDO® 925 is optimized for speed and precision. It delivers exact measurements, independent from any incident flow and without interferences by air bubbles, not only in lakes and pools, but also in a beaker.

More information beginning on page 8

NEW

The New ProfiLine Series

Single parameter devices for every user

Robust, multi-functional and convenient – for pH, conductivity measurement or dissolved oxygen measurement. The three models in the ProfiLine series cover all applications.

More information beginning on pages 19, 27, 47 and 55

The 3110 series

- 100 % waterproof
- Robust silicon keys
- Easy-to-clean

The 3210 series

- Backlit graphic display
- Data logger with GLP functions
- CMC function for reliable pH measurement

The 3310 series

- Interval-controlled logger function
- Waterproof USB interface
- Fast data output

NEW

SenTix® F, the New Electrode for pH Measurement in the Field

SenTix® F

- Temperature-stable
- Low maintenance
- Robust

SenTix® F with Iodine/Iodide reference system combines all the advantages of a low-maintenance and robust electrode for field measurement with the measurement characteristics of a high-precision laboratory electrode.

More information beginning on page 29

NEW Products for Field Measurement: Data Logger and Flow Measurement

Water Quality:

The WQL series

- Long life
- Reliable data recording
- Convenient configuration and data analysis

The WQL data logger fulfills all pre-conditions for continued pH/ORP or conductivity measurement in ground water, surface water and wastewater.

Small diameters and stainless steel finish make these instruments particularly suitable for measurements in hard-to-reach areas.

More information beginning on page 74

NEW

Flow Measurement:

The CP series

- Flow rate 0.1 ... 6.1 m/s real time readings
- Propeller protected from flotsam
- Telescoping, expandable rod for flexible use

Simple yet effective and robust measuring devices to determine the flow rate in running waters.

More information beginning on page 76

Level Measurement:

The WLL series

- Long-term monitoring
- USB output
- Software included

Efficient, cost-effective level logger system with USB interface and software. Integrated storage for over 80,000 entries with date and time for allocation of the measured values.

More information beginning on page 77

NEW

The photoLab® 6000 Series Outstanding Price-performance Ratio

photoLab® 6000 series

- IQ LabLink
- Method exchange via USB
- Definition of variables for user-defined methods
- Print to PDF file

IQ SENSOR NET « » LAB

Spectrophotometers photoLab® 6100 VIS and photoLab® 6600 UV-VIS offer the unique combination of systematic and spectral analysis. Many new functions and the bidirectional link to WTW Online-world support for the challenging tasks of today.

More information beginning on page 100

photoLab® Data *spectral*

Transfer measurement data to a PC including spectra and methods to meet GLP-compliance.

photoLab® Data *spectral*

- Import, manage and print data
- Export to LIMS and spreadsheet
- Export to spectra processing
- Method adjustment and software update of the meters

Price advantage! LSdata for the pHotoFlex® / Turb® 430 Series

As GLP-compliant documentation and measurement value output is becoming increasingly important, the new enhanced PC software LSdata supports reading, managing and exporting measurement data for the documentation of calibration logs. LSdata is now available in three versions:

- LSdata in field sets at no additional cost
- Included in the LabStation with rechargeable battery at no additional cost
- LSdata stand-alone package

More information beginning on page 108

MultiLine®

Multi-parameter Measurement Redefined

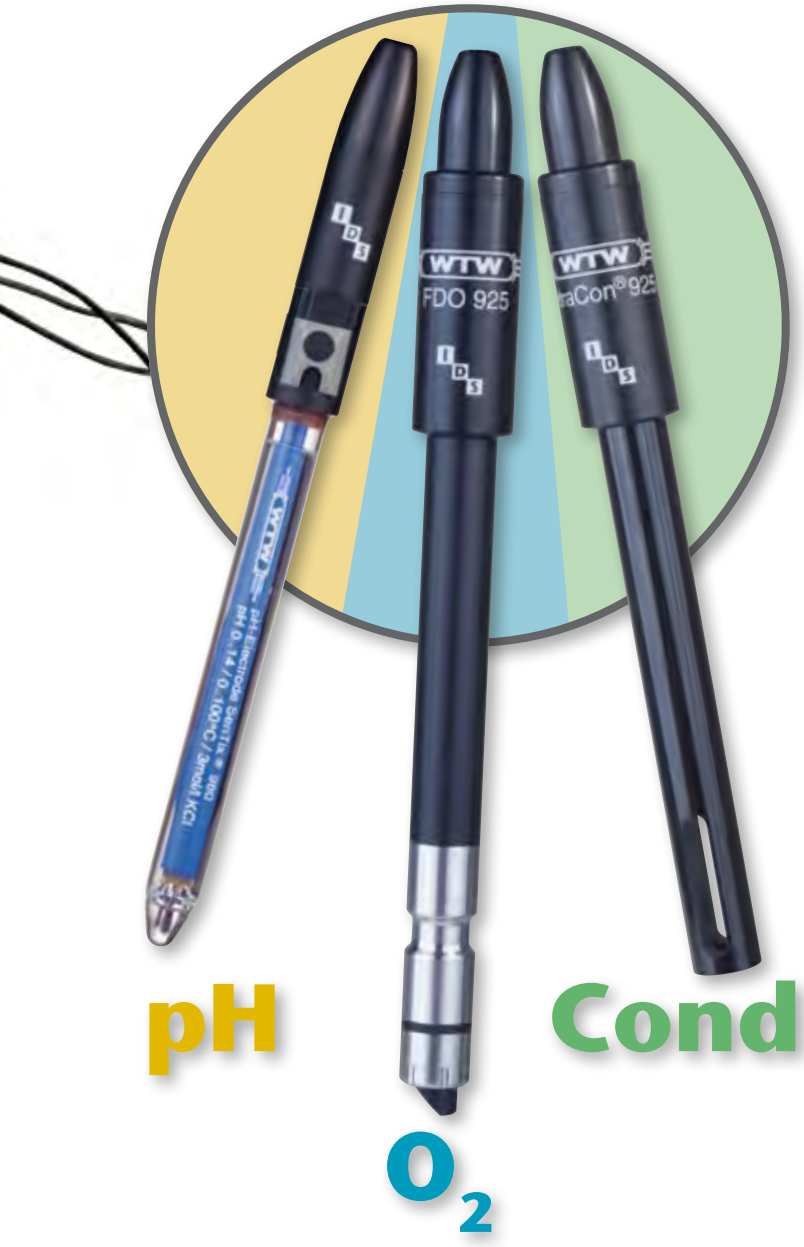
Multi 3410, 3420, 3430:
The new multi-parameter standard

The new multi-parameter systems with intelligent, digital sensors for pH, dissolved oxygen and conductivity measurement revolutionize multi-parameter measurement: The signal processing is completely located in the sensor, and the measuring signal is transmitted to the meter without interference and in a clearly identifiable manner via thin, high-strength cables. A wide range of sensors are available for virtually every application.

The MultiLine® meters are in a class of their own:
3 models with one, two or three universal channels measure every parameter either sequentially or simultaneously. Every model possesses a brilliant color graphic display, two USB interfaces (USB-A and Mini-USB), and rechargeable batteries that can be charged directly in the device.

- Universal multi-parameter devices for pH, dissolved oxygen and conductivity available as 1, 2 or 3-channel device
- Multi 3420/3430:
  Any combinations of the same or different sensors can be used
- High resolution color graphic display, safe data transmission to USB stick

INTELLIGENT DIGITAL SENSORS



I Intelligent:

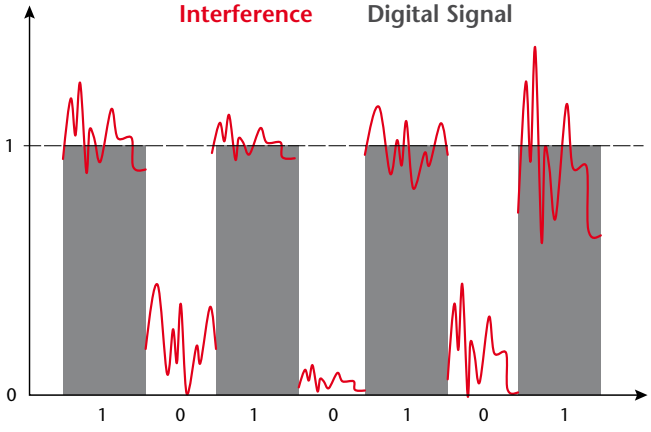
Intelligent sensors always store their identification data

- 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

One – Two – Three ...

Measure every parameter sequentially or simultaneously:

One – Multi 3410:

One measurement channel for different parameters: For those who need to measure mainly one parameter, but occasionally require a second or third.

Two – Multi 3420:

Two measurement channels: For simultaneous measurement with two similar or different sensors.

Three – Multi 3430:

Three measurement channels can be used in any combination for similar or different parameters: Simultaneous multi-measurement without compromise.

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.

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

Right:
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.

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.

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.

General Features

Model	**MultiLine®**
Data storage	Manually: 500 records / automatic: 10,000 records
Data logger	Manual/time-controlled
Interface	USB-A and Mini-USB
Power supply	Power supply with charging function or 4 x 1.2 V NiMH batteries
Continuous operation	100 h
IP protection class	IP 67

Ordering Information

MultiLine®		**Order No.**
Multi 3410	1 measurement channel	2FD 450
Multi 3420	2 measuring channels	2FD 460
Multi 3430	3 measurement channels	2FD 470

IP 67 CE cETLus 3 Year Warranty

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.

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
- Low maintenance

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.

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 **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 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

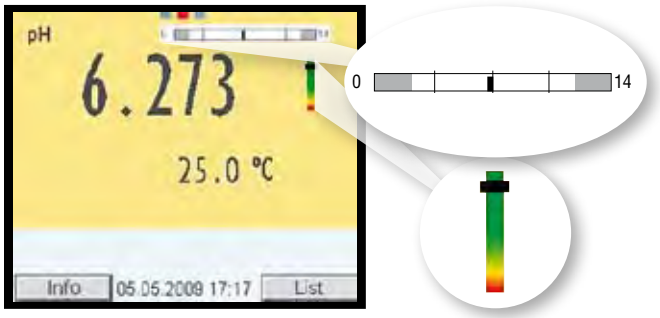
- Fail-safe measuring signal
- Calibration status in the electrode
- Proven reliability and accuracy

- 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.
- 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.

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.

Special electrodes such as spear-type or surface electrodes with an S7 connector head can be easily connected to a MultiLine® device with the ADA S7/IDS® adaptor.

QSC (Quality Sensor Control) is a process to assess the actual condition of a pH electrode. An initial calibration is performed with the precision buffers contained in the QSC kit. Each subsequent calibration is now compared with this initial calibration and the result is displayed graphically as a color bar with a gradient from green to red. The current condition of the electrode is displayed permanently.



IDS pH/ORP Electrodes

Model	SenTix® 940	SenTix® 940-3	SenTix® F 900	SenTix® F 900-3	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	103 785	103 786	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: 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 … 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		Gel		Polymer		3 mol/l KCl		3 mol/l KCl	Polymer	
Membrane shape	Cylinder		Cylinder		Cylinder		Cylinder	Cone	—		
Diaphragm	Fiber		Fiber		Hole		Ceramic	Platinum wire	Ceramic	Hole	
Shaft material	Plastic		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.)	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

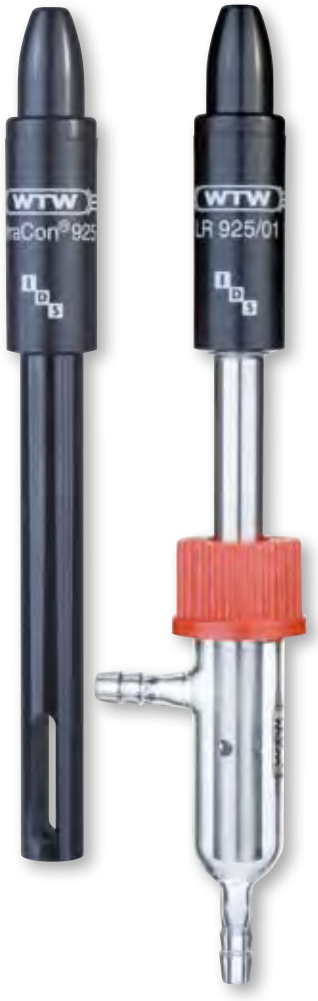
IDS Conductivity Cells

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.

Two models are available to cover the entire conductivity range:
The four electrode cell TetraCon® 925 for medium and high level conductivity samples, and the two electrode cell LR 925/01 with flow-through vessel for pure-water and low conductivity samples.

IDS Conductivity Cells

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



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 kΩ … 100 MΩ ±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.

A 925/S *A 925/K*

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

General Description of Meters

The inoLab® Laboratory Meters: Accurate and Reliable

The accurate and reliable inoLab® meter series offers outstanding features to achieve reliable and precise laboratory measurements, especially in challenging applications. Multiple function levels increase flexibility to meet all requirements for measuring safely and reliably.

inoLab® 750/7500*

- Two galvanically isolated pH inputs
- Four routines for special conductivity functions
- Menu navigation with backlit graphic display

Precise

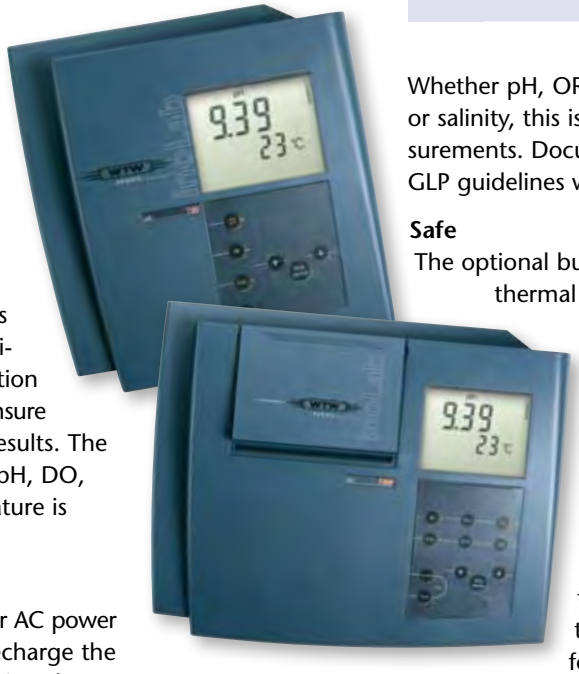
With its outstanding technical features, the inoLab® 750/7500* is the best choice for the high-demand laboratory. It offers easy operation for routine measurements, however its real capability is demonstrated in difficult measuring scenarios. A multitude of measuring combinations can easily be selected with the clearly structured menu. The instrument features password-protected operator levels and multi-level menu functions, and complies with requirements of the pharmaceutical industry including CFR 21 Part 11, pure water to pharmacopeia.

** North American version*

inoLab® 720/7200*

- Large, bright display
- Easy-to-clean surface
- Simple operation

Simple and reliable measurements. Ideal for measuring pH and ORP, dissolved oxygen, conductivity and temperature, this instrument is suitable for routine measurements.



Simple
The inoLab® function keys are designed for easy navigation. Automatic calibration and AutoRead functions ensure stable and reproducible results. The multifunction display for pH, DO, conductivity and temperature is large and easy-to-read.

Flexible
Choose between battery or AC power for maximum flexibility. Recharge the battery simply by connecting the instrument to AC power.

inoLab® 730/7300*

- Data transmission via bidirectional interface or optional built-in printer
- GLP/AQA
- Data logger and memory for 800 entries

Whether pH, ORP, ISE, dissolved oxygen, conductivity, TDS or salinity, this is the perfect system for all standard measurements. Document measured values according to AQA, GLP guidelines with use of printer.

Safe
The optional built-in printer incorporates high-quality thermal paper that is guaranteed not to fade for 10 years. Functions such as a real-time clock, a serial number, and a calibration protocol with sensor characteristics provide GLP-support. In addition to the bidirectional RS 232 interface, the data logger has memory for 800 data sets.

Convenient
A highly visible display for pH, DO, conductivity and temperature readings and the tactile keypad is easy-to-clean, well-suited for biological laboratories.

inoLab® 740/7400*

- Control via PC or terminal
- Comprehensive data acquisition
- Measurement functions for demanding laboratory analysis

Computer Compatible
inoLab® 740/7400* can be connected directly to a PC. The inoLab® 740/7400* comes complete with our MultiLab® pilot software package to transform any computer into a meter. Configuration, calibration, measurement: all functions are controlled by means of pull-down menus for simple user interface, similar to data base and export to PC standard formats. All measured data are available as tables and graphics, both online or offline.

Intelligent
The active multifunction box contains all measuring functions, numerous extension possibilities, connections, plug contacts and an electrically isolated interface for control via PC or terminal. The measuring procedure on the inoLab® 740/7400* is initiated by pressing either the Run/Enter or AutoRead key. The built-in electronics process all incoming measuring signals immediately and make them available for communication with other peripheral devices.

** North American version*

ProfiLine – Portable Field Meters

Indestructible and waterproof, reliable and safe:

Both the housing and the technical specifications of ProfiLine 1970i premium portable instruments are well suited for rough field operation as well as for use in laboratories.

These portable field meters are characterized by their extreme durability and shock-resistance. These instruments are waterproof (IP 66) and submersible (IP 67). Special probes with cable lengths of up to 100 m (330 ft) are available for extreme depth measurements.

WTW has incorporated a new built-in, environmentally-friendly NiMH rechargeable battery, which allows for 600 hrs of battery operation. With a carrying strap and handle, as well as the built-in electrode storage sleeve, the ProfiLine 1970i is a valuable tool for either field or laboratory applications.

ProfiLine 1970i has excellent technical specifications, data transmission by means of the MultiLab® pilot software and can be ordered with or without probes.

Whether measuring pH, dissolved oxygen, conductivity or multiple parameters, there is a suitable ProfiLine available for every measuring task.

ProfiLine 1970i

- Robust, waterproof
- Precise, versatile
- For measurements at depths down to 100 m (330 ft.)

Measurement of D.O. depth profiles

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

Use with battery-powered stirrer **BR 325** for depth measurement.

ProfiLine Single Parameter Portable Meters

Safe measurement under all conditions: the ProfiLine portable meter series 3110, 3205, 3210 and 3310 is designed for use in-the-field and in-the-laboratory. Handy and light at 400 g (0.9 lb.), it is shock-proof and waterproof according to IP 67.

3110/3205 (Oxi only)

- For routine measurements
- Simple and reliable

Simple operation guarantees reliable results

Perfect for those who need simple, reliable measurements. The keys, with a distinct pressure point, can easily be operated with gloves. Automatic calibration and automatic AutoRead functions provide safe and reliable measurements clearly visible on the large display.

3210

- For routine and standard measurements
- Wide selection of sensors
- Memory for 200 records

3310

- GLP supportive
- Mini B USB interface
- High capacity memory / data logger

Versatile for measuring tasks in changing applications

The meters can be easily operated and parameterized as plain text menu, controlled via a backlit graphic display. Up to 200 data points can be manually saved with time and date stamp, and can be read clearly on the display.

Perfectly manage and transfer large batches of measurements

These versatile meters are perfectly equipped for use in-the-laboratory and in-the-field. Besides battery power a USB power supply can be used in the laboratory. Memory capacity for 5000 data sets and logger intervals between 1 second and 60 minutes enable the recording of extensive data.

Multi 350i/3500i*

- Simultaneous measurement of 3 parameters + temperature
- Back-lit graphic display
- Menu-driven

Flexible and robust. Portable precision meter without compromise. For simultaneous measurement of up to 4 parameters. Graphic display with user-friendly menu navigation, as well as the highest level of accuracy and resolution, characterize this premium instrument as first-in-class.

Exclusively for the Multi 350i/3500i* – the multi-parameter probes from WTW:

ConOx:
Combined conductivity and dissolved oxygen sensor for laboratory and field applications

MPP 350:
Outdoor multi-parameter probe for pH, dissolved oxygen and conductivity

More information beginning on page 69.

The key word is MobiLab

Our professional case can be used as a mobile, portable laboratory. It contains a work surface with measuring beakers, a plug-in stand, all the necessary calibration and cleaning solutions – your all-inclusive laboratory in the field.

** North American version*

VARIO® – Simple Measurements

Simple measurements at your fingertips

You notice it right away: VARIO® has no keys, but features an innovative touch screen: all functions can easily be called up and set with one hand. A light fingertip touch on the display is enough – and the VARIO® switches itself on.

Placing the electrode in solution starts the measurement automatically. Even very small volumes can be measured with the optimized electrode.

The VARIO® also functions as a laboratory clock, with stop-watch and timer.

VARIO®

- Touch screen
- Up to 1000 hours continuous operation
- Laboratory clock with timer function

Pocket meter with added value

Their ruggedness and ergonomic design make VARIO® instruments well-suited for service applications. VARIO® is supplied with a convenient carrying case assuring trouble-free storage of the sensors.

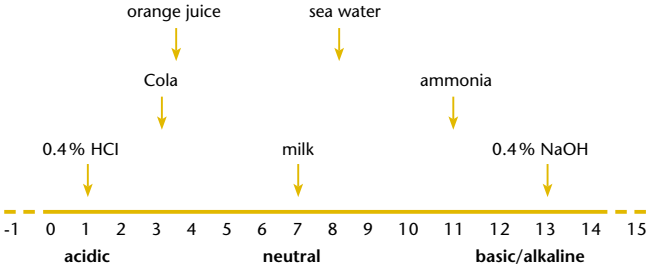
pH Value

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.

Application Range pH Measurement

● Recommended by WTW ❍ Conditionally applicable – Not recommended

Application range	inoLab®						ProfiLine pH 1970i	VARIO® pH	Portable meters			
									ProfiLine			
	pH 720/7200*	pH 730/7300*	pH/ION 735/ 7350*	pH 740/7400*	pH/ION 740/ 7400*	pH/ION/Cond 750/7500*			pH 3110	pH 3210	pH 3310	pH/ION 340i/ 3400i*
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	*24*	*24*	*38*	*25*	*39*	*39/66*	*26*	*28*	*27*	*27*	*27*	*41*

** North American version*

For pH measurement with multi-parameter instruments, see pages 8 and 62

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 720/7200*

- Routine meter for precise measurement values (0.001 pH)
- Large display
- Easy-to-clean membrane keypad

Simple and reliable

Easy-to-use routine laboratory pH/mV meter with large multi-functional display for pH and temperature, automatic temperature compensation, and MultiCal® calibration system. For battery or line power operation.

inoLab® pH 730/7300*

- Supports all GLP needs
- Optional built-in printer
- Data logger with memory for 800 data sets

Compact and precise

Precision pH/mV meter with large multifunctional display for pH and temperature, automatic temperature compensation, MultiCal® calibration system, built-in measurement storage with GLP-conforming documentation and digital interface. Shown with optional built-in printer.

** North American version*

inoLab® pH 740/7400*

- Computer-controlled precision meter
- EMC-stabilized
- Upgradeable firmware/software

Additional features

- 5-point calibration
- Selectable buffers
- Real-time graphic display
- Built-in digital recorder
- Connection for bar-code reader or PC keyboard
- User selectable languages
- Multi-level GLP functions
  - Password-protected operator levels
- Free-of-charge downloads for MultiLab® pilot or terminal

Flexible and powerful

High-performance pH/mV/ION meter with graphic display and digital recorder function for pH, temperature and ion-selective measurement, automatic temperature compensation, high resolution (0.001 pH), MultiCal® calibration system, built-in measurement storage with GLP-compliant documentation and digital interface. PC keyboard interface for connecting an external keyboard or barcode reader. Includes software for direct control by PC. Built-in printer option available.

Technical Data

Model		pH 720/7200*	pH 730/7300*	pH 740/7400*
Range/ Resolution	pH	-2.000 ... +19.999 pH -2.00 ... +19.99 pH		-2.000 ... +20.000 pH -2.00 ... +20.00 pH
	mV	-999.9 ... +999.9 mV -1,999 ... +1,999 mV		-999.9 ... +999.9 mV -2,000 ... +2,000 mV
	Temperature	-5.0 ... +105.0 °C (23 ... 221 °F)		-5.0 °C ... +105.0 °C (23 ... 221 °F)
Accuracy (±1 digit)	pH	±0.005 pH ±0.01 pH	±0.005 pH ±0.01 pH	±0.004 pH ±0.01 pH
	mV	±0.3 mV, ±1 mV	±0.3 mV, ±1 mV	±0.2 mV, ±1 mV
	Temperature	±0.1 K	±0.1 K	±0.1 K
Calibration		**MultiCal® automatic calibration:**	**MultiCal® automatic calibration:**	**MultiCal® automatic calibration:**
	AutoCal	2-/3-point	2-/3-point	2-/3-/4-/5-point
	AutoCal-Tec	2-/3-point	2-/3-point	2-/3-/4-/5-point
	ConCal®	1-/2-point	1-/2-point	1-/2-point
	ISECal	–	–	2- and 3-point

Ordering Information

inoLab® Laboratory pH Meter SETs		❑ Order No.	▲ Order No.
inoLab® pH 720/7200* SET	Simple and reliable pH meter, including SenTix® 42/41, including accessories, without passive multi-function box	1A10-2117	1A10-1112
inoLab® pH 730/7300* SET	Compact precision pH meter with serial interface, including SenTix® 82/81, passive multi-function box and accessories	1A20-2119	1A20-1114
inoLab® pH 740P/7400P* SET	The intelligent pH measuring station, terminal with integrated printer, including SenTix® 82/81 und accessories	1A31-2119	1A31-1114
inoLab® Box	Passive multi-function box, not included in inoLab® pH 720/7200* SETs	109 810	109 810

IP 43 | CE | cETLus | 3 Year Warranty

** North American version*

❑ with BNC plug, ▲ with DIN plug

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

Portable pH Meters

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

NEW

ProfiLine 3000 series

The **pH 3110** is the right choice for those looking for a simple, rugged and waterproof device for portable pH measurement. The keypad with only 6 buttons and the automatic AutoRead function for reproducible measured values provide safe pH measurements and prevent errors.

ProfiLine pH 3110

- pH or ORP measurements
- 3-point calibration
- Built-in calibration timer

A convenient pH/mV instrument for many applications: The **pH 3210** is a portable precision pH/mV meter with an intuitive user interface. The unique Continuous Measurement Control (CMC) feature ensures that measured values and calibration ranges are within the optimum range, particularly useful for someone less familiar with pH measurements.

The **pH 3310** is an elegant combination of a portable meter and data logger for those who automatically save measurement data and want to further process data on a PC. Measurement characteristics and ease-of-use correspond to those of the pH 3210.

ProfiLine pH 3210/3310

- 22 buffer pre-programmed sets
- CMC for measuring in the optimum measuring range
- 5-point calibration

Technical Data

Model	ProfiLine pH 3110	ProfiLine pH 3210	ProfiLine pH 3310
Range/ pH	-2.000 ... +19.999 ±0.005 pH	-2.000 ... +19.999 ±0.005 pH	
Resolution mV	-1200.0 ... +1200.0 ±0.3 mV	-1200.0 ... +1200.0 ±0.3 mV	
Accuracy	-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 200/5000 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 5	Robust and waterproof portable pH meter with data logger and USB Mini-B interface, for battery operation, in portable case set with SenTix® F	2AA315

IP 66 IP 67 CE cETLus 3 Year Warranty

For other electrodes in Sets 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.

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.

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.

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.
- Typical connections: Waterproof DIN connector, BNC connector, fixed cable (1 or 3 m, 3 ft. or 9 ft.) or connector head (S7 or SMEK).

IDS pH/ORP electrodes, see page 14

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.

New: The SenTix® F with temperature-stable iodine/iodide system, specifically for measurements at changing temperature conditions.

SenTix® pH Electrodes

Model	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	SenTix® F 103 676	SenTix® F-3 103 677
Measuring range pH	0 ...14 pH				0 ...14 pH			0 ... 14 pH	
Operating range °C (°F)	0 ... 80 °C (32 ... 176 °F)				0 ... 80 °C (32 ... 176 °F)			0 ... 80 °C (32 ... 176 °F)	
Reference electrolyte	Gel				Gel			Gel	
Membrane shape	Cylindrical				Cylindrical			Cylindrical	
Membrane resistance at 25 °C (77 °F)	<1 GΩ				<1 GΩ			<1 GΩ	
Diaphragm	Fiber				Fiber			Fiber	
Shaft material	Plastic				Plastic			Plastic	
Shaft length**	120 mm (4.72 in.)				120 mm (4.72 in.)			120 mm (4.72 in.)	
Shaft Ø***	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)	
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	② ④ ⑥+⑧	② ⑤ ⑥+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

Fast and precise – pH electrodes with liquid electrolyte

For demanding measurements in-the-laboratory. SenTix® electrodes with liquid electrolyte, an easy-to-clean glass shaft and platinum diaphragm can be used even for complicated samples. For those who need an electrode with liquid electrolyte for a portable measurement: The SenTix® 51/52 with plastic shaft, built-in temperature probe and ceramic diaphragm is suited for nearly any measuring task.

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)		10 ... 100 °C (50 ... 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
Membrane shape	Cylindrical		Conical			Conical		Spherical		Spherical
Membrane resistance at 25 °C (77 °F)	<1 GΩ		<600 MΩ			<600 MΩ		<600 MΩ		< 600 MΩ
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.)		170 mm (6.69 in.)		425 mm (16.73 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), 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 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® 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	Cut	Cut	Cut	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

SenTix® Special pH Electrodes

Model	SenTix® Mic 103 647	SenTix® Mic-D 103 660	SenTix® Mic-B 103 661	SenTix® RJS 103 663	SenTix® pH 103 667	SenTix® R 103 668	SenTix® B 103 669	SenTix® V 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	Cut	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 135, 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	APL 4/7/9 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® series 700/7000*, 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, 1-3, 42, RJS 940, F	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			F*		●	●	●		●			MIC-D/-B*		
Rainwater					❍	❍	❍		●					
Saliva	●										●	❍		
Salt solutions	❍	❍	❍	❍	●	●	●	❍	●					
Saltwater				❍	❍	❍	❍	❍	●					
Sausage										●			●	
Shampoo	❍								●				●	
Skin	❍										●			
Soil extract					●	●	●		●					
Solids (penetration)										●			❍	
Solids (surface)	❍										●			
Sulfide-containing liquids			RJS*, F*						●					PtR*
Surface water	❍	❍	❍	●	●	●	●	❍	❍					
Suspensions			RJS*						●					
Swimming pool water	●	●	●	●	❍	❍	❍							
Tap water	❍	❍	❍	●	●	●	●		❍					
Tris buffer solutions			F*		●	●	●		●					
Vegetable juice					●	●	●		❍				❍	
Vegetables										●			●	
Wastewater	❍	●	●	❍	❍	❍	❍							PtR*
Wine				●	❍	●	●							
Yogurt					●	●	●		●	●			●	
	SenTix® V	SenTix® 20 21-..., 22	SenTix® 41, 1-3, 42, RJS 940, F	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 34***

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.

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

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 current. 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 38 405. 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

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. 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.

Applications for Ion-selective and Gas-sensitive Electrodes

Electrode type	Membrane②	Determinable ions	ISE Type 500 (Half cell, reference electrode necessary)	Reference electrode	Combined ISE Type 800 (Built-in reference electrode)	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	For all ion-selective electrodes from the 500 series:	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 500		Br 800	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		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 500①		Ca 800①	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		Cl 800	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	**R 503/P** (2 mm pin plug) or **R 503 D** (4 mm banana plug)	CN 800	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		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 500		I 800	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		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 500	For all ion-selective electrodes from the 500 series:	Cu 800	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		NO 800①	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		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 500		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.

Application Range Ion-selective Measurements

● Recommended by WTW ❍ Suitable

Application Range	inoLab® benchtop meters				Portable meters
	pH/ION 735/ 7350*	pH/ION 740/ 7400*	pH 740/7400*, pH/Cond 740/ 7400*, Multi 740/7400*	pH/ION/Cond 750/ 7500*	pH/ION 340i/ 3400i*, Multi 350i/3500i*
Occasional, simple ISE measurement	❍	❍	●	❍	●
Routine and standard measurement	●	●	❍	●	❍
Advanced methods and procedures	●	●	–	●	–
see page	*38*	*39*	*25, 64*	*39, 66*	*41, 69*

Laboratory ISE Benchtop Meters

inoLab® pH/ION 735/7350*

- Precise pH and ISE measurement
- Advanced incremental methods
- Menu-driven user interface

pH, mV and ISE measurements with a single instrument

Whether routine measurements or demanding analysis, the pH/ION 735/7350* is the ideal precision instrument for all uses. A graphical user interface makes high-resolution pH and ISE measurement easy and convenient. 5-point calibration for pH and up to 7 calibration points for ISE measurements guarantees a high-precision measurement by calculating non-linear calibration curves. The Model pH/ION 735/7350* has user defined method capability as well as preprogrammed incremental techniques.

For those who need to document their results: a data logger with storage for 4,500 entries, bi-directional RS 232 interface, real-time clock, and GLP-supporting calibration protocols, as well as date, time and selectable sample identification number identify all data sets.

This instrument is also available with a built-in printer.

** North American version*

inoLab® pH/ION 740/7400*

- Advanced incremental methods
- Free software downloads
- Comprehensive documentation options

Flexible and powerful

High-performance pH/mV/ISE meter with graphic display and digital recorder function for pH, temperature and ion-selective measurement, automatic temperature compensation, high resolution (0.001 pH), MultiCal® calibration system, built-in measurement storage with GLP-conform documentation and digital interface. PC keyboard interface for connecting an external keyboard or barcode reader, and software for direct control by PC are included. Built-in printer option is available.

Features

- 5-point pH calibration by linear regression
- Selectable buffer sets
- Graphic evaluation possible
- Built-in digital recorder
- Connection for barcode reader or PC keyboard
- User selectable languages
- Multi-level GLP functions (password-protected operator levels)
- Free-of-charge downloads for MultiLab® pilot or terminal
- Four to seven point ISE calibration with a modified Nikolski algorithm
- Known addition, double-known addition and known subtraction
- Sample addition/subtraction
- Blank value addition

inoLab® pH/ION/Cond 750/7500*

- Two galvanically isolated pH/mV/ISE inputs
- Menu-operated with back-lit graphic display
- One pH and one ISE calibration record per each input

Premium instruments from WTW:

Two galvanically isolated inputs allow independent measurements of pH-value, ORP or ion concentration. For accurate measurements along the characteristic curve of the electrode, it is possible to carry out calibrations with up to seven standard solutions. The calculation of the calibration curve by using a modified Nikolski algorithm also takes the non-linear parts of the curve into account. The following methods are used to evaluate the ionic concentration:

- Known addition/known subtraction
- Sample addition/sample subtraction
- Double known addition
- Blank value correction
- Known addition with blank value correction
- Reference measurement

This instrument also features the option for conductivity measurements. Not only can specific resistance, salinity, and TDS be determined, but also sample-specific temperature coefficients. A wide range of additional functions like data administration, PC-operation using MultiLab® pilot, GLP-compliant calibration and data recording make this instrument essential in every laboratory.

For further details see page 66.

** North American version*

Technical Data inoLab® pH/ION 735/7350* and 740/7400*

Model		pH/ION 735/7350*	pH/ION 740/7400*
Range/ Resolution	pH	-2.000 ... +20.000 pH	-2.000 ... +20.000 pH
	mV	-999.9 ... +999.9 mV -2000 ... +2000 mV	-999.9 ... +999.9 mV -2000 ... +2000 mV
	Temperature	-5 ... +105 °C/0.1 °C (23.0 ... 221 °F)	-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	Measuring range 1 (Resolution): 0.000 ... 9.999 (0.001) mg/l Measuring range 2: 0.00 ... 99.9 (0.01) mg/l Measuring range 3: 0.0 ... 999.9 (0.1) mg/l Measuring range 4: 0 ... 1999 mg/l
Accuracy (±1 digit)	pH	±0.004 pH ±0.01 pH	±0.004 pH ±0.01 pH
	mV	±0.2 mV, ±1 mV	±0.2 mV, ±1 mV
	Temperature	±0.1 K	±0.1 K
Calibration		**MultiCal® automatic calibration:**	**MultiCal® automatic calibration:**
	AutoCal	2-/3-/4-/5-point	2-/3-/4-/5-point
	AutoCal-Tec	2-/3-/4-/5-point	2-/3-/4-/5-point
	ConCal®	1-/2-point	1-/2-point
	ISECal	2- to 7-point	2- to 7-point
		Special functions: Known addition (single) Known subtraction Sample addition Sample subtraction Blank value addition Standard addition with blank value correction	Special functions: Known addition (single and double) Known subtraction Sample addition Sample subtraction Blank value addition Blank value correction

Technical Data inoLab® pH/ION/Cond 750/7500*

Model		pH/ION/Cond 750/7500*
Range/ Resolution	pH	-2 ... 20.000 pH -2.00 ... 20.00 pH
	mV	-999.9 ... +999.9 mV -2000 ... +2000 mV
	Concentration (mg/l)	0.000 ... 10.000 0.00 ... 100.00 0.0 ... 1000.0 0 ... 2000
	Temperature	-5 ... +105 °C (23 ... 221 °F)
Accuracy (±1 digit)	pH	±0.004 pH ±0.01 pH
	mV	±0.2 mV. ±1 mV
Temperature compensation	Automatic	-5 ... +105 °C (23.0 ... 221 °F) -5.0 ... 100 °C (23.0 ... 212 °F)
	Manual	-20 ... +130 °C (-4 ... 266 °F)
	NTC	30 KOhm: ±0.1
	Pt 1000	±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- to 7-point
		Special functions: Known addition (single and double) Known subtraction Sample addition Sample subtraction Blank value addition, Blank value correction

Ordering Information

inoLab® Laboratory ISE Meters – with universal power supply 100-240 VAC (50/60 Hz) included		❑ Order No.	▲ Order No.
pH/ION 735P/7350P*	inoLab® pH/ION 735P/7350P* with built-in printer for GLP-compliant documentation	1G21-210	1G21-110
pH/ION 740P/7400P*	inoLab® pH/ION 740P/7400P* with built-in printer for GLP-compliant documentation; extended measuring and storage options	1G31-210	1G31-110
pH/ION/Cond 750/7500*	Flexible and powerful precision benchtop pH/mV/ISE/conductivity meter with two inputs, single instrument	1K30-210	1K30-110

IP 43 CE cETLus 3 Year Warranty

❑ with BNC plug ▲ with DIN plug
** North American version*

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*

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, etc.

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.

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.

Application Range Dissolved Oxygen Meters

● Recommended by WTW ❍ Conditionally applicable – Not recommended

Application Range	inoLab®			ProfiLine Oxi 1970i	Portable Meters		
	Oxi 730/ 7300*	Oxi 740/ 7400*	BSB/ BOD 740/ 7400*		Oxi 3205	Oxi 3210	Oxi 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	● ● –	● ● ●	● ● ●	● ● –	–	–	– ● –
BOD measurements with self-stirring sensor	●	●	●	●	–	–	–
BOD measurements with assessment program	–	–	●	–	–	–	–
see page	*44*	*45*	*80*	*46*	*47*	*48*	*48*

For dissolved oxygen measurement with multi-parameter instruments, see pages 8 and 62

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*	*MultiLine® 3410, 3420, 3430*	*Multi 350i/3500i**	*Oxi 3xxi/3xxxi*, ProfiLine Oxi, Multi 350i/3500i**	*all, except MultiLine® series*	*inoLab®, 1970i, 197i*	*1970i, 197i*

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.

The inoLab® Oxi 740/7400* instrument is particularly suitable for monitoring such processes. For routine measurements the inoLab® Oxi 730/7300* is equipped with all the necessary functions required for documentation according to GLP.

inoLab® Oxi 730/7300*

- GLP documentation
- Comprehensive data logging (800 data sets)
- Interface for self-stirring DO sensor StirrOx® G

Compact and communicative

Standard laboratory dissolved oxygen meter with large multifunctional display for routine use in the laboratory. Automated functions such as air pressure correction, temperature compensation and OxiCal® rapid calibration make work easier. Data logger, analog and digital output RS 232, as well as the optional built-in printer, guarantee QA-compliant documentation.

Features

- Simplified operator convenience
- Easy-to-clean touch-sensitive keypad
- Optional built-in printer

The StirrOx® G can be operated by the inoLab® Oxi 730/7300* for BOD_5 determination according to DIN EN 1899-1 resp. DIN EN 1899-2 with manual start/stop functions.

** North American version*

inoLab® Oxi 740/7400*

- Precision instrument
- Firmware/Software update
- External control (MultiLab® pilot)

Features

- Built-in digital recorder
- Graphic evaluation possible
- Connection for bar-code reader or PC keyboard
- Automatic memory function if bar-code reader is used
- User selectable languages
- Multi-level GLP functions (password-protected operator levels)
- Limit input with acoustic alarm
- Free-of-charge software downloads for MultiLab® pilot or terminal

inoLab® Oxi 740/7400* with terminal or PC software: flexible and powerful

High-performance dissolved oxygen meter with graphic display and digital recorder function for DO measurement in the laboratory. Automated functions such as air pressure correction, temperature compensation by the IMT method and OxiCal® rapid calibration make work easier. The built-in measurement store, the digital output RS 232 and the optional built-in printer (paper width 112 mm resp. 4.4") guarantee QA-compliant documentation.

Technical Data

Model		Oxi 730/7300*	Oxi 740/7400*
Range/ Resolution	O_2 Conc.	0.00 ... 19.99 mg/l. 0.0 ... 90.0 mg/l**	0.00 ... 20.00 mg/l, 0.0 ... 90.0 mg/l**
	O_2 saturation	0.0 ... 199.9%. 0 ... 600%**	0.0 ... 200.0%. 0 ... 600%**
	O_2 part. pressure	0.0 ... 199.9 mbar. 0 ... 1250 mbar	0.0 ... 200.0 mbar. 0 ... 1250 mbar
	Temperature	-5.0 ... +50.0 °C (23 ... 122 °F)	-5.0 ... +50.0 °C (23 ... 122 °F)
Accuracy (±1 digit)	O_2 Conc.	±0.5% of value	
	O_2 saturation	±0.5% of value	
	Temperature	±0.1 K	
Temperature compensation		0 ... +50 °C (32 ... 122 °F) automatic via IMT compensation	
Salinity correction		Automatic from 0.0 ... 70.0 adjustable via display	
Calibration		OxiCal® rapid calibration in OxiCal®-SL	

Ordering Information

inoLab® Laboratory Dissolved Oxygen Meter SETs – with universal power supply 100-240 VAC (50/60 Hz) included		Order No.
inoLab® Oxi 730P/7300P* SET 1	With built-in printer, including CellOx® 325, passive multi-function box and accessories	1B21-0111
inoLab® Oxi 740/7400* SET 1	Including terminal, PC software, CellOx® 325 and accessories	1B30-0111

IP 43 CE cETLus 3 Year Warranty

** North American version*
*** = depends on DO sensor and medium*

Portable Dissolved Oxygen Meters

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

NEW

ProfiLine 3000 Series

Dissolved oxygen measurements made easy: The Oxi 3205 is an easy-to-use, rugged and waterproof portable meter for the measurement of dissolved oxygen. It is suitable for galvanic DO sensors, with adjustable automatic salinity correction. The readings are displayed as saturation or concentration.

ProfiLine Oxi 3205

- CellOx® and DurOx® can be connected
- Backlit graphic display
- Automatic air pressure compensation

D.O. measurement with ProfiLine Oxi 3205 and DurOx® incl. protection cap in fish farming

NEW

ProfiLine Oxi 3210/3310

- Convenient user interface
- Manual memory
- Allows for calibration against external standards (Oxi 3310)

ProfiLine Oxi 3310

The **Oxi 3210** is a portable first class dissolved oxygen meter with intuitive, user-friendly interface. Measured values are displayed as concentration, saturation or partial pressure, individual values can also be manually saved and displayed on the screen.

Ideal for automatically recording and transmitting large amounts of data: The **Oxi 3310** technically corresponds with the Oxi 3210, with the addition of an interval-controlled data logger and memory for 5000 entries – ideal for automatic data collection in-the field.

Complete as SET

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 35solid	Automatic from 0.0 … 70.0, adjustable via display	
Calibration	OxiCal® rapid calibration in OxiCal®-SL or OxiCal®-D		
Memory/Logger	–	Manual 200	Manual 200/5000 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*

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 D.O. sensors. WTW D.O. sensors are equipped with preassembled membrane caps preventing sensor prep errors caused by improper membrane installation, and have built-in temperature compensation capabilities.

Dissolved Oxygen Sensors

- **NEW**: Optical Dissolved Oxygen Sensor FDO® 925 *s. page 12*
- Immediately ready for measurement
- Simple air calibration using calibration vessel

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**

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**

StirrOx® G

For inoLab® Oxi 730/7300*, inoLab® Oxi 740/7400* 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**

Accessories

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

see WTW Product Details

** North American version*

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

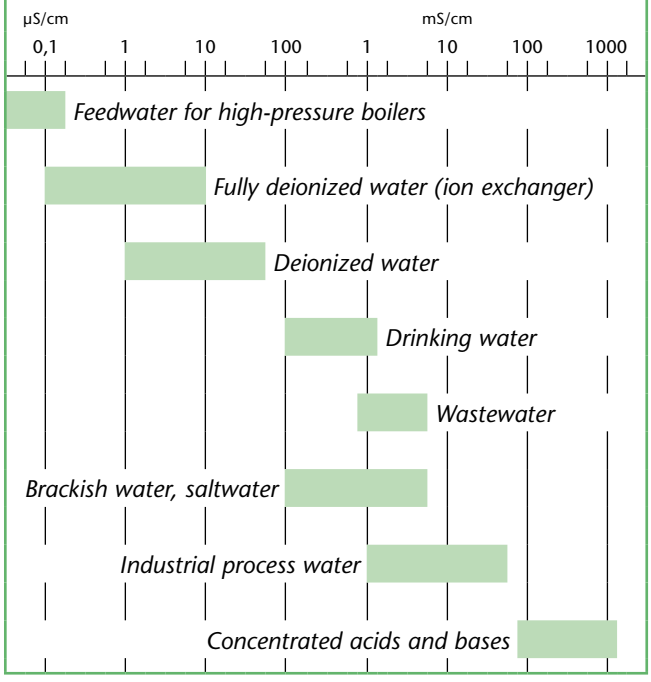
Conductivity is a parameter used to measure electrical properties of a solution. The more salt, acid or alkali in a solution, the greater its conductivity. The unit of conductivity is S/m, often also S/cm.

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}	Portable meters		
	Cond 720/ 7200*	Cond 730/ 7300*	Cond 740/ 7400*	pH/ION/ Cond 750/ 7500*			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	●	●	●	●	●	●	only SAL	●	●
Specific resistance	●	●	●	●	–	–	–	●	●
Suitable for pharmacopeia	●	●	●	●	●	–	–	●	●
Measurement of ultrapure water	●	●	●	●	●	●	–	●	●
Trace conductivity	●	●	●	●	●	–	–	●	●
see page	*52*	*52*	*53*	*66*	*54*	*57*	*55*	*56*	*56*

For conductivity measurements with multi-parameter instruments, see pages 8 and 62

Application Range / Sensors	KLE 325	TetraCon® 325	TetraCon® 325/S	TetraCon® DU/T	LR 325/01	LR 325/001	TA 197 LF	TetraCon® 925	LR 925/01
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	*only MultiLine® IDS*	

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

* *North American version*

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® Cond 720/7200*

- Application specific displays
- Touch-sensitive keypad with pressure point and tactile response
- Battery or AC power operation

Simple and reliable

Routine laboratory conductivity meter with large multifunctional display, simultaneous display of temperature and automatic temperature compensation. 20 °C or 25 °C (68 °F or 77 °F) can be set as reference temperature. Both TDS and salinity measurements are possible as well as conductivity and temperature. The ability to set different cell constants means that other special conductivity cells can be connected, including the TetraCon® 325 4-electrode conductivity cell and LR 325/01 ultrapure water conductivity cell.

inoLab® Cond 730/7300*

- Simplified operator convenience
- GLP documentation via PC or optional built-in printer
- Meets all the requirements according to pharmacopeia

Compact and precise

Standard laboratory conductivity meter with large multifunctional display, simultaneous display of temperature and automatic temperature compensation. The data logging capability and the real-time clock allows for all GLP functions. Data output can take place via the optional built-in printer on thermal paper accepted for use for official documents or via the built-in RS 232 digital interface via a PC or external printer.

20 °C or 25 °C (68 °F or 77 °F) can be set as reference temperature. Both TDS and salinity measurements are possible as well as conductivity and temperature. The ability to set different cell constants means that other special conductivity cells can be connected as well as the TetraCon® 325 4-electrode conductivity cell and LR 325/01 ultrapure water conductivity cell.

** North American version*

inoLab® Cond 740/7400*

- Meets all the requirements according to pharmacopeia
- TDS and salinity measurement
- External control with MultiLab® pilot via PC

With Terminal or PC software: flexible and powerful
High-performance laboratory conductivity meter with graphic display and digital recorder function, simultaneous display of temperature, and automatic temperature compensation. A built-in data logger and a real-time clock allows for all QA conforming functions. The optional built-in printer allows data printout on thermal paper accepted for use in official documents. 20 °C or 25 °C (68 °F or 77 °F) can be set as reference temperature. Both TDS and salinity measurements are possible as well as conductivity and temperature. The ability to set different cell constants means that other special conductivity cells can be connected as well as the TetraCon® 325 4-electrode conductivity cell and LR 325/01 ultrapure water conductivity cell.

A PC keyboard interface allows an external keyboard or a barcode reader to be connected.

Additional features
- Built-in digital recorder
- Real-time graphic display
- User selectable languages
- Multi-level GLP functions (password-protected operator levels)
- Limit input with acoustic alarm
- Meets all the requirements according to pharmacopeia
- Free-of-charge software downloads for MultiLab® pilot or terminal

Technical Data

Model		Cond 720/7200* and Cond 730/7300*	Cond 740/7400*
Range/ Resolution	Conductivity	0.0 µS/cm ... 500 mS/cm in 5 measuring ranges or AutoRange additionally for K = 0.1 cm^{-1}: 0.00 µS/cm ... 19.99 µS/cm K = 0.01 cm^{-1}: 0.000 µS/cm ... 1.999 µS/cm	0.0 µS/cm ... 2000 mS/cm in 5 measuring ranges or AutoRange additionally for K = 0.1 cm^{-1}: 0.00 µS/cm ... 20.00 µS/cm K = 0.01 cm^{-1}: 0.000 µS/cm ... 2.000 µS/cm
	Temperature	-5.0 ... +105.0 °C (23 ... 221 °F)	-5.0 ... +105.0 °C (23 ... 221 °F)
	Salinity	0.0 ... 70.0	0.0 ... 70.0
	TDS	0 ... 1999 mg/l	0 ... 2000 mg/l
	Resistivity	0.000 ... 1999 MΩcm	0.000 ... 2000 MΩcm
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 or switched off	
Temperature coefficient		• Non-linear function for natural water to EN 27 888 • Linear compensation from 0.001 ... 2.999%/K • No compensation	
Calibration		With 0.01 mol KCl	

Ordering Information

inoLab® Laboratory Conductivity Meter SETs – with universal power supply 100-240 VAC (50/60 Hz) included		Order No.
inoLab® Cond 720/7200* SET 1	Simple and reliable conductivity meter, including TetraCon® 325, including accessories, without passive multi-function box	1C10-0111
inoLab® Cond 730/7300* SET 1	Compact precision conductivity meter, including TetraCon® 325, passive multi-function box and accessories	1C20-0111
inoLab® Cond 740P/7400P* SET 1	The intelligent conductivity measuring station, terminal with integrated printer, including TetraCon® 325 und accessories	1C31-0111
inoLab® Box	Passive multi-function box, not included in inoLab® Cond 720/7200* SETs	109 810

IP 43 CE cETLus 3 Year Warranty

** North American version*

Portable Conductivity Meters

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

NEW

ProfiLine 3000 Series

Conductivity measurement made simple: the Cond 3110 is a rugged and waterproof device for portable conductivity measurement. Easy-to-use, with preset nLF temperature compensation according to EN 27888 for measuring in wastewater and natural waters.

ProfiLine Cond 3110

- For KLE 325 or TetraCon® 325 cells
- Automatic temperature compensation
- Salinity measurement

Complete as SET

NEW

ProfiLine Cond 3210/3310

- Special cells can be connected
- Also measures specific resistance and TDS
- For measurements according to pharmacopeia

The versatile Cond 3210: Easily perform conductivity measurements in a wide variety of samples with either two- and/or four-electrode cells using this flexible meter, which offers the additional option of measuring with linear or without temperature compensation.

Automatically store or transmit data series: The Cond 3310 corresponds with the Cond 3210, with the added feature of an interval-controlled data logger. With a large memory capacity and a waterproof USB interface, the Cond 3310 is ideal for collecting large amounts of data, such as pumping tests that require date, time and ID number.

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

VARIO® C_{ond}

- 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

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	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	301 962	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 15

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

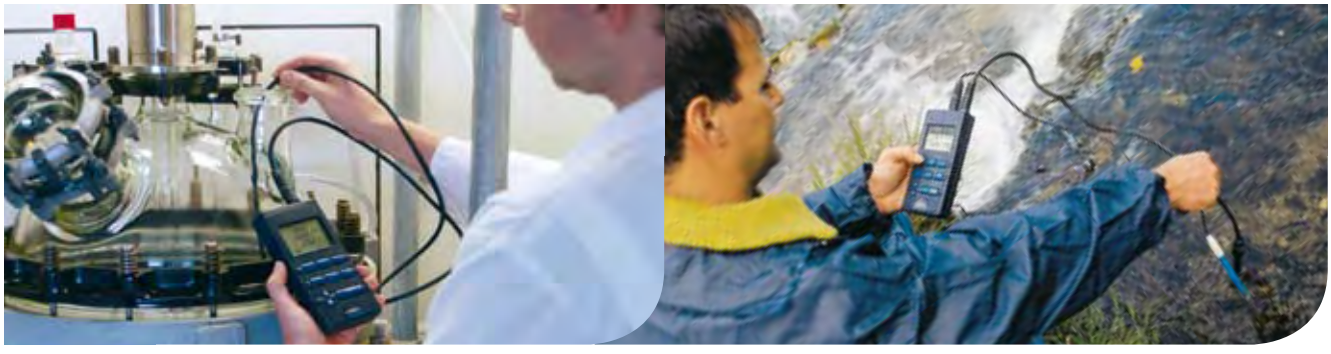
V = filling volume without sensor*

pH, Dissolved Oxygen and Conductivity Measurements

Multi-parameter Instruments

WTW multi-parameter instruments solve the problem of multiple electrode interference by utilizing our advanced sensor technology. With simultaneous functions for pH, ORP, dissolved oxygen, conductivity, salinity and temperature, these compact meters are complete, all in one laboratories, making it possible to measure oxygen, conductivity and pH simultaneously in the same sample vessel or field location.

Long battery life or optional line adaptors allows WTW's multi-parameter instruments to be used either in the laboratory or in the field. The data logging function insures accurate reporting. Our standard automatic documentation storage, user defined calibration procedures and GLP functions provide comprehensive quality assurance.



Application Range Multi-parameter Measurements

● Recommended by WTW ❍ Conditionally applicable – Not recommended

Application range	inoLab®					ProfiLine Multi 1970i	Portable meters				
	pH/Cond 720/7200*	Multi 720/ 7200*	pH/Cond 740/7400*	Multi 740/ 7400*	pH/ION/ Cond 750/ 7500*		pH/Cond 340i/3400i*	pH/Oxi 340i/3400i*	Multi 340i/ 3400i*	Multi 350i/ 3500i*	MultiLine® IDS
Routine measurement	●	●	❍	❍	❍	–	❍	❍	–	❍	❍
Routine measurement with documentation	–	–	●	●	●	●	●	●	●	●	●
AQS with documentation	–	–	●	●	●	●	●	●	●	●	●
R&D high resolution and precision	–	–	●	●	●	–	–	–	–	●	●
Control measurements	●	●	●	●	●	●	●	●	●	●	●
LIMS connection	–	–	●	●	●	●	❍	❍	❍	●	●
Quality assurance	●	●	●	●	●	●	●	●	●	●	●
Training	●	●	❍	❍	❍	❍	●	●	❍	❍	❍
Service	–	–	–	–	–	●	●	●	●	●	●
Laboratory measurements	●	●	●	●	●	●	❍	❍	❍	●	●
Field measurements	–	–	–	–	–	●	●	●	●	●	●
Depth measurements	–	–	–	–	–	●	–	–	–	up to 100 m (330 ft)	up to 25 m (82 ft)
External control/PC connection/PC control	–/–/–	–/–/–	●/●/●	●/●/●	●/●/●	●/●/–	●/●/–	●/●/–	●/●/–	–/●/–	–/●/–
BOD measurements with self-stirring sensor	–	–	–	●	–	–	–	–	–	–	–
BOD measurements with assessment program	–	–	–	–	–	–	–	–	–	–	–
pH/ION function	–	–	●	●	●	–	–	–	–	●	–
Ion-specific measurement programs	–	–	–	–	●	–	–	–	–	–	–
Salinity/TDS measurement	●/●	●/●	●/●	●/●	●/●	●/–	●/–	–/–	●/–	●/●	●/●
Specific resistance	●	●	●	●	●	–	–	–	–	●	●
Suitable for pharmacopeia	●	●	●	●	●	–	–	–	–	●	–
Measurement of ultrapure water	●	●	●	●	●	–	–	–	–	●	●
Trace conductivity	●	●	●	●	●	–	–	–	–	●	–
see page	*64*	*64*	*64*	*64*	*66*	*68*	*72*	*72*	*72*	*69*	*8*

Application Range Sensors

Application range sensors	TetraCon® 325	TetraCon® 925	LR 325/01	LR 925/01	LR 325/001	FDO® 925	DurOx®	CellOx® 325	ConOx	MPP	TA 197 pH	TA 197 LF	TA 197 Oxi
Ultrapure water (pharmacopeia)	–	–	●	–	●	–	–	–	–	–	–	–	–
Chemical water	❍	❍	–	–	–	❍	❍	❍	❍	❍	–	–	–
Ground water	●	●	–	–	–	●	❍	–	❍	●	●	●	●
Surface water	●	●	–	–	–	●	●	●	●	●	●	●	●
Depth measurements (barrages)	up to 20 m (66 ft)	up to 25 m (82 ft)	–	–	–	up to 25 m (82 ft)	–	up to 20 m (66 ft)	up to 20 m (66 ft)	up to 100 m (330 ft)	up to 100 m (330 ft)		
Laboratory measurements	●	●	●	●	●	●	❍	●	●	–	–	–	–
BOD measurements	–	–	–	–	–	●	–	●	–	–	–	–	–
Fish farming	–	–	–	–	–	❍	●	❍	●	●	–	–	–
Swimming pools	●	●	–	–	–	●	●	●	●	❍	–	–	–
Food industry (juices)	●	●	–	–	–	●	–	❍	❍	–	–	–	–
Pharmaceuticals	●	●	●	●	❍	●	❍	●	●	–	–	–	–
Cosmetics/detergents	❍	❍	–	–	–	–	–	–	–	–	–	–	–
Semi-conductor industry	–	–	●	●	●	–	–	–	–	–	–	–	–
Process technology	❍	❍	–	–	–	❍	❍	❍	–	–	–	–	–
Biotechnology (non-autoclavable)	–	–	–	–	–	●	●	●	●	–	–	–	–
Wastewater treatment plant: aeration tank	–	–	–	–	–	●	●	❍	❍	❍	–	–	–
Wastewater treatment plant: inflow	●	●	–	–	–	●	●	❍	❍	●	–	–	–
applicable instruments:	①	⑥	②	⑥	②	⑥	④	③	④	④	⑤	⑤	⑤

** North American version*

① *all with Cond Measurement except MultiLine® IDS*
② *Multi 350i/3500i*, inoLab® pH/Cond 700/7000 series*, inoLab® Multi 700/7000 series**
③ *all with D.O. Measurement except MultiLine® IDS*
④ *Multi 350i/3500i**
⑤ *Multi 1970i / 197i*
⑥ *only MultiLine® IDS*

Laboratory Multi-parameter Instruments

With the growing number of measurements required by today's laboratory, instruments need to be able to perform multiple functions. The inoLab® multi-parameter instruments provide the essential features and functions for safe and reliable measurements.

inoLab® 720/7200*

- Compact
- Versatile
- Easy-to-use

inoLab® pH/Cond 720/7200* and inoLab® Multi 720/7200*

The **inoLab® pH/Cond 720/7200*** is a meter for initial processing of routine pH/conductivity measurements. The **inoLab® Multi 720/7200*** allows the measurement of pH and ORP, dissolved oxygen, conductivity and salinity as well as temperature. The instruments are suitable for standard measurements where GLP-documentation is not required.

Additional features:

- Easy-to-clean, touch-sensitive keypad
- Simplified operator convenience
- Bench and wall-mounted models
- Can also be operated on battery power
- Country-specific units
- Application-oriented displays

inoLab® 740/7400*

- Multi-functional
- Precise
- Communicative

inoLab® pH/Cond 740/7400* and inoLab® Multi 740/7400*

As high-end instruments, the **inoLab® pH/Cond 740/7400*** and the **inoLab® Multi 740/7400*** have a resolution of 0.001 pH units. They also have all the functions necessary for making ion selective measurements. With the **inoLab® Multi 740/7400*** dissolved oxygen is measured as %, mg/l or mbar. The **pH/Cond 740/7400*** and the **inoLab® Multi 740/7400*** can be used to measure the salinity and TDS (Total Dissolved Solids) as well as conductivity and specific resistance.

The optional built-in printer as well as the graphic display with operator guidance increase the measuring convenience and allow QA-compliant documentation.

Additional features:

- 5-point calibration by linear regression
- Freely selectable buffer sets
- Graphic evaluation possible
- Built-in digital plotter
- Connection for bar-code reader or PC keyboard
- User selectable languages
- Limit input with acoustic alarm
- Multi-level GLP functions including password-protected operator levels
- Free-of-charge downloads for MultiLab® pilot or terminal

** North American version*

Technical Data inoLab® 720/7200*

Model	pH/Cond 720/7200*, Multi 720/7200*	Multi 720/7200*	pH/Cond 720/7200*, Multi 720/7200*
	pH measurement	**Dissolved oxygen measurement**	**Conductivity measurement**
Range/ Resolution	pH: -2.00 ... +16.00 pH mV: -199.9 ... +199.9 mV -1999 ... +1999 mV Temp.: -5.0 ... +105.0 °C (23 ... 221 °F)	O_2 concentration: 0.00 ... 19.99 mg/l 0.0 ... 90 mg/l** O_2 saturation: 0.0 ... 199.9% 0 ... 600%** O_2 partial press.: 0.0 ... 199.9 mbar 0 ... 1250 mbar Temp.: 0.0 ... 50.0 °C (32 ... 122 °F)	0.0 µS/cm ... 500 mS/cm in 5 ranges or AutoRange, in addition at: K = 0.01 cm^{-1} 0.000 ... 1.999 µS/cm K = 0.1 cm^{-1} 0.00 ... 19.99 µS/cm Temperature: -5.0 ... +105.0 °C (23 ... 221 °F) Salinity: 0.0 ... 70.0 TDS: 0 ... 1999 mg/l Spec. restistivity: 0.000 ... 1999 MΩcm
Accuracy (±1 digit)	pH: ±0.01 pH mV: ±0.3 mV. ±1 mV	±0.5% of value	±0.5% of value
Temperature compensation	Automatic -5 ... +105.0 °C (23 ... 221 °F) with TFK 325 or built-in temperature probe manual -20 °C ... +130 °C (-4 ... 266 °F)	Automatic via IMT compensation from 0 ... 40 °C (32 ... 104 °F)	Linear and non-linear function for ultrapure water and natural water to EN 27 888, can be switched off
Calibration	MultiCal® 2-point ConCal® 1-/2-point	With OxiCal®-SL	Calibration with 0.01 mol KCl

Technical Data inoLab® 740/7400*

Model	pH/Cond 740/7400*, Multi 740/7400*	Multi 740/7400*	pH/Cond 740/7400*, Multi 740/7400*
	pH measurement	**Dissolved oxygen measurement**	**Conductivity measurement**
Range/ Resolution	pH: -2.000 ... +20.000 pH -2.00 ... +20.00 pH mV: -999.9 ... +999.9 mV -2000 ... +2000 mV ISE: Conc.: 0.01 ... 2000 mg/l Temp.: -5.0 ... +105.0 °C (23.0 ... 221.0 °F)	O_2 concentration: 0.00 ... 20.00 mg/l 0.0 ... 90 mg/l** O_2 saturation: 0.0 ... 200.0% 0 ... 600%** O_2 partial press.: 0.0 ... 200.0 mbar 0 ... 1250 mbar Temp.: 0.0 ... 50.0 °C (32.0 ... 122.0 °F)	0.0 µS/cm... 2000 mS/cm in 5 ranges or AutoRange, in addition at: K = 0.01 cm^{-1} 0.000 ... 2.000 µS/cm K = 0.1 cm^{-1} 0.00 ... 20.00 µS/cm Temperature: -5.0 ... +105.0 °C (23 ... 221 °F) Salinity: 0.0 ... 70.0 TDS: 0 ... 1999 mg/l Spec. restistivity: 0.000 ... 1999 MΩcm
Accuracy (±1 digit)	pH: ±0.004 pH ±0.01 pH mV: ±0.2 mV. ±1 mV	±0.5% of value	±0.5% of value
Temperature compensation	Automatic -5 ... +105.0 °C (23 ... 221 °F) with TFK 325 or built-in temperature probe manual -20 °C ... +130 °C (-4 ... 266 °F)	Automatic via IMT compensation from 0 ... 40 °C (32 ... 104 °F)	Linear and non-linear function for ultrapure water and natural water to EN 27 888, can be switched off
Calibration	MultiCal® 2-. 3- and 5-point ISECal 2- and 3-point ConCal® 1-/2-point	With OxiCal®-SL	Calibration with 0.01 mol KCl

Ordering Information

inoLab® Multi-parameter SETs – with universal power supply 100-240 VAC (50/60 Hz) included		**Order No.**
inoLab® Multi 720/7200* SET 2	Simple and reliable multi-parameter meter, including SenTix® 41, CellOx® 325, TetraCon® 325, including accessories, without passive multi-function box	1F10-111211
inoLab® Multi 740/7400* SET 4	Flexible and powerful – the intelligent pH, dissolved oxygen and conductivity measuring station consisting of multi-function box and universal terminal, with PC software/connection cable, SenTix® 81, CellOx® 325, TetraCon® 325 and accessories	1F30-111411
inoLab® Box	Passive multi-function box, not included in inoLab® Multi 720/7200* SETs	109 810

IP 43 CE cETLus 3 Year Warranty

For other multi-parameter SETs see WTW Product Details.

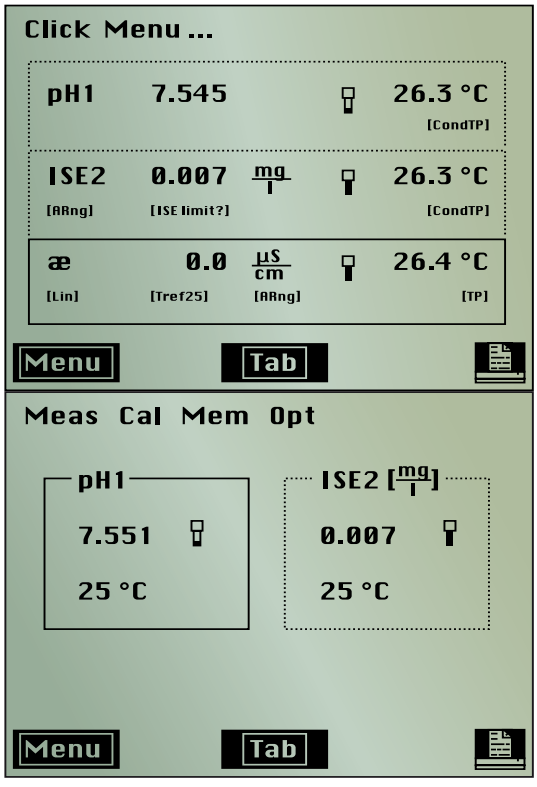
** North American version* *** depends on DO sensor and medium*

inoLab® pH/ION/Cond 750/7500*

- Two galvanically isolated pH inputs
- Multiple conductivity functions
- Menu-driven with backlit graphic display

The ultimate measurement technology by WTW:

This ultimate multi-parameter meter with its two galvanically isolated pH inputs allows independent and simultaneous measurements of pH, ORP or ion concentrations. Calibrations with up to 7 standard solutions can be performed to achieve precise measurements across the entire characteristic curve of an ISE electrode. The wide range of calibration procedures allows for even the non-linear portion of the calibration curve to be accurately defined.



Display with menus

In addition to direct potentiometric methods, the following advanced methods are also included:

- Known addition/subtraction
- Addition/subtraction of samples
- Double known addition
- Blank correction
- Known addition with blank correction
- Reference measurement

** North American version*

In addition to pH and ISE capability, and with features such as the ability to measure salinity, TDS, specific conductance, resistance and temperature coefficients, this versatile meter can perform all required conductivity measurements. Temperature coefficients are pre-programmed for NaOH, HCl, KCl, and NaCl. Plus, individual (non-) linear coefficients can be entered into the instrument. Additional features include the measurement of sample concentrations by conductivity and two dimensional temperature concentration field to determine accurate reference conductivities. Comprehensive additional functions such as measurement data management, PC-connection via MultiLab® pilot, GLP-compliant calibration and measurement data acquisition and a bidirectional RS 232 interface permit seamless integration into contemporary laboratory routines.

Technical Data inoLab® pH/ION/Cond 750/7500*

	pH/ION measurement	Conductivity measurement
Range/ Resolution	pH: -2 … 20.000 pH -2.00 … 20.00 pH mV: -999.9 … +999.9 mV -2000 … +2000 mV Conc.: 0.01 mg/l … 200 g/l Temperature: -5.0 … +105.0 °C (23.0 … 221.0 °F)	0.0 µS/cm … 2000 mS/cm in 5 ranges or AutoRange, 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 (23.0 … 221.0 °F) 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	Conductivity: ± 0.5% of value
Temperature compensation	Automatic -5 … +105.0 °C (23 … 221 °F) Manual -20 … +130 °C (-4 … 266 °F) NTC30 KOhm: ±0.1 K Pt 1000: ±0.1 K	-5.0 … 100 °C (23 … 212 °F) • Linear and non-linear functions for ultrapure water and natural waters to EN 27 888 • Linear compensation from 0.01% … 3.00%/K • Compensation can be switched off Special functions: non-linear temperature coefficients, pre-programmed coefficients, concentration determination, non-linear reference conductivity
Salinity correction	—	20 °C/25 °C (68 °F/77 °F) selectable
Calibration	—	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}

Ordering Information

inoLab® Multi-parameter SETs – with universal power supply 100-240 VAC (50/60 Hz) included		❑ Order No.	▲ Order No.
inoLab® pH/ION/Cond 750/7500* SET	Flexible and powerful – the intelligent pH, ISE and conductivity measuring station consisting of multi-function box, with PC software/connection cable, SenTix® 81/82, TetraCon® 325 and accessories	1K30-211901	1K30-111401

IP 43 CE cETLus 3 Year Warranty

** North American version* ❑ *with BNC plug,* ▲ *with DIN plug*

For other multi-parameter SETs, see WTW Product Details.

Portable Multi-parameter Instruments

ProfiLine 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

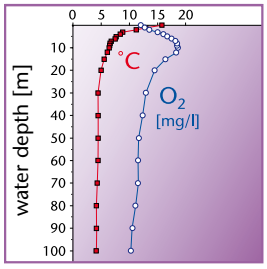
- Robust, shockproof
- Waterproof, submersible
- Most versatile multi for depth measurements

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.

Portable Multi-parameter Instruments

Multi 350i/3500i*

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

MultiLine® IDS

Digital Multi-parameter instruments see page 8

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.

** 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*

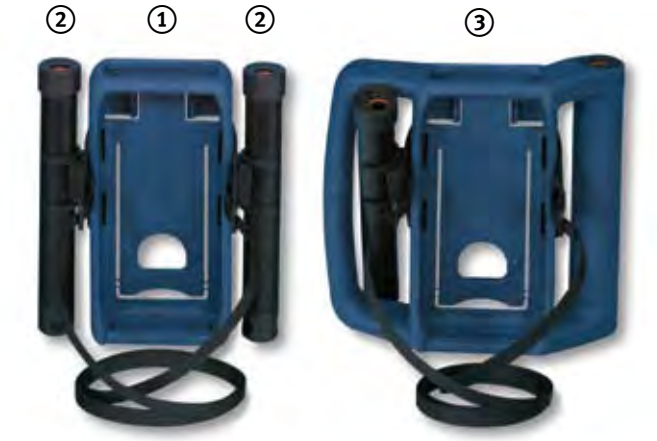
Protective Armor

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

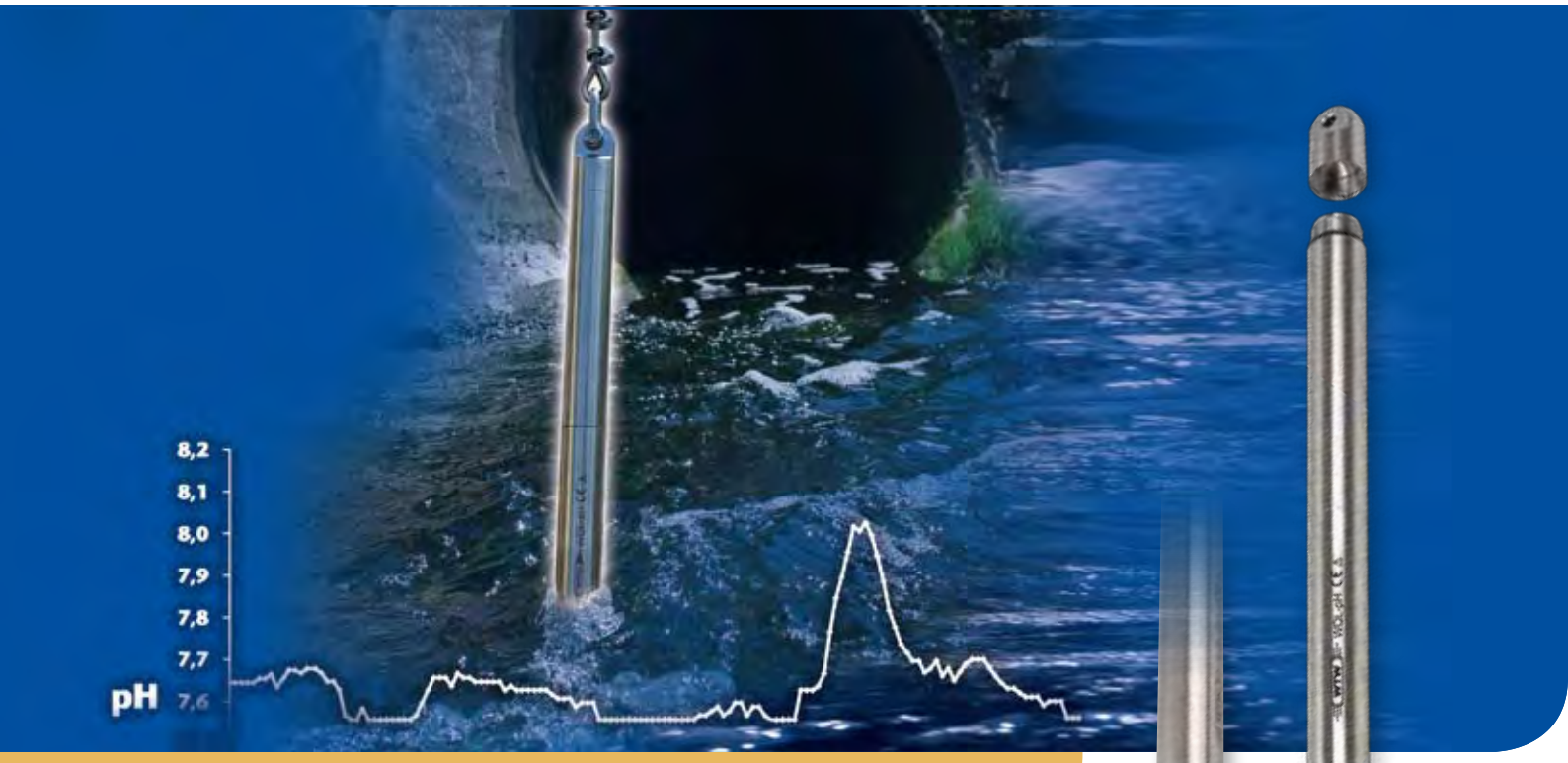
Ordering Information

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*



Data Logger & Flow Measurement

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-	±0.5% of the
	mV	≤0.2			tivity	measured value
	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® BSB/BOD 740/7400 with StirrOx® G*

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® BSB/BOD 740/7400*	With easy-to-use analysis program, with PC control.	*80*
With ProfiLine Oxi 1970i	Recommended electrode: self-stirring dissolved oxygen sensor StirrOx® G	*81*

** 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	*84*
OxiTop® Control	Routine, standard and special measurement, with automatic sample management	*85*

Depletion/Respiration

Special measurements		*see page*
OxiTop® Control OC 110	Respiration	*86/90*
	Biogas determination	
	Soil respiration	
	Biodegradability	

Accessories/Incubators

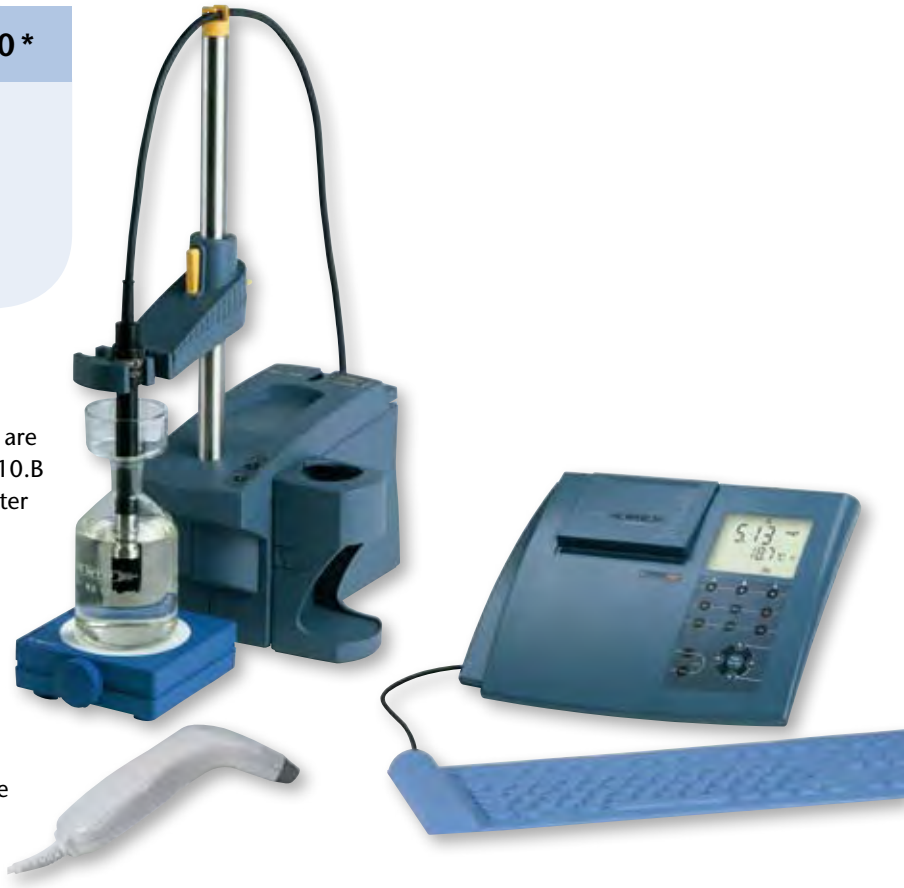
	see page
Upgrading and general accessories	*88*
Incubators/thermostat cabinets	*94*

Dilution BOD

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

inoLab® BSB/BOD 740/7400*

- Simple sample management
- Automatic BOD calculation
- EPA approved



Flexible and powerful

This laboratory dissolved oxygen meter has been developed especially for BOD_n measurements, which are determined by regulation EN 1899-1 and Chapter5210.B of the "Standard Methods for the Examination of Water and Wastewater". You can store up to 7 of your own routines for frequently occurring dilution ratios. A maximum of 30 measuring samples, each with 18 dilutions, allows the management of up to 540 diluted samples. The inoLab® BSB/BOD 740/7400* can also be used as a conventional high-end DO meter (for technical data such as inoLab® Oxi 740/7400*, refer to page 45). Additional memory and editing options are available when operated using the MultiLab® pilot. The entire measurement and sample management can easily be handled via PC.

In combination with StirrOx® G with its automatic start/stop function the inoLab® BSB/BOD 740/7400* is the ideal measuring system for routine DO measurement in the BOD_5 determination according to DIN EN 1899-1 and DIN EN 1899-2.

Special features:

- BOD/depletion
- Determination of the biochemical oxygen demand according to DIN EN 1899-1
- Determination of oxygen depletion according to DIN 38 414 P6
- Up to 5 samples for dilution water
- Up to 30 measuring samples
- Up to 18 dilutions per measuring sample
- Up to 7 routines can be stored
- Adjustable incubation time, from 5 to 30 days

Additional features when using the MultiLab® pilot:

- Management of an arbitrary number of samples
- Max. of 32 dilutions per measuring sample
- Max. of 32 dilution waters (blank solutions)
- Adjustable incubation period, 1 to 32 days
- Allocation of names for dilution waters, samples, diluted samples and routines (max. of 255 characters per name)
- Warning indication for BOD values that are too high or too low
- Calculations by mouse click
- Automatic protocols

** North American version*

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.

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

Ordering Information

BOD measurement		Order No.
inoLab® BSB/BOD 740P/7400P* SET 4	High-end dissolved oxygen/BOD meter including terminal with built-in printer, active multi-function box, with self-stirring DO sensor StirrOx® G, wide range power pack and accessories	1H31-0114
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® BSB/BOD 740/7400:*
IP 43 | CE | cETLus | 3 Year Warranty

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

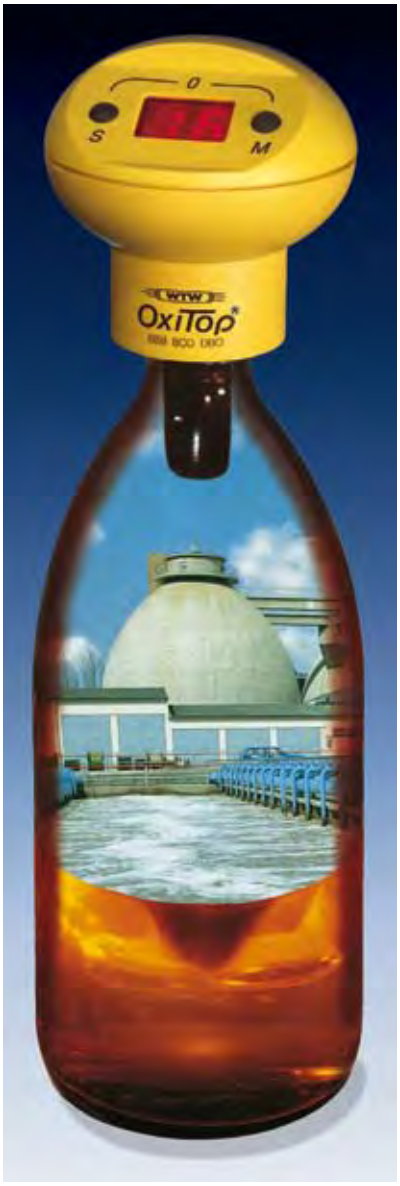
For technical data on the inoLab® Oxi 740/7400, refer to page 45*

For technical data on ProfiLine Oxi 1970i, see page 46

** North American version*

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	*84*	*85*	*91*	*92*	*92*	*93*

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 92).

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 88: 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. 90 – 93
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 19 737	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 19 737.

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

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.

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

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®

... for all-purpose use

Cell Tests without barcodes

Powder Tests

Portable and powerful – Ideal for field use

p. 112

pHotoFlex®

p. 106

Cases / Sets

The portable lab for field use

p. 108

LabStation

The small lab solution: pHotoFlex® plus LabStation

p. 108

photoLab® & photoLab® 6000 Series

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

photoLab®

p. 104

NEW

photoLab® 6000 series

p. 100

Thermoreactors

Convenient and secure digestions

p. 110

Reagents/ accessories

p. 112

Systematic and Spectral Analysis – Routine Measurement and Photometric Testing

Photometric identification can be split into two groups:

The **routine measurement of standard parameters** – 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 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®	pHotoFlex® Turb	photoLab® S6	photoLab® S12	photoLab® 6100	photoLab® 6600
Application areas	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: 436, 517, 557, 594, 610, 690, 860 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	Filter/Reference beam	Monochromator/Single Beam + AutoCheck	
Special functions	pH measurement	pH measurement, turbidity (IR)	—	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)					
User-defined methods	100		No	50	100, 20 profiles	
Cuvettes	Round: 16 mm (height: 91 – 104 mm), 28 mm		Round 16 mm	Round / rectangular 10, 20, 50 mm	Round and rectangular 10, 20, 50 mm	

NEW

The photoLab® 6000 Series
Spectral analysis – universal and flexible

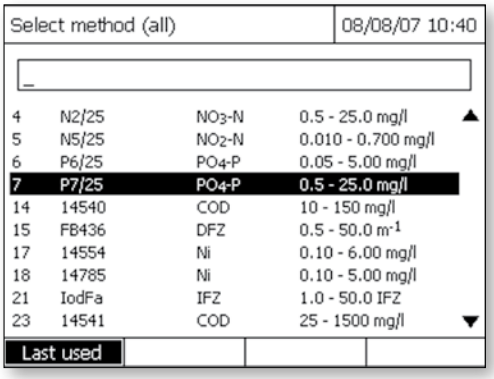
The spectrophotometers of the photoLab® 6000 series for VIS and UV/VIS range offer the unique combination of systematic and spectral analysis with the proven analytical quality assurance AQA and the convenience of a filter photometer.

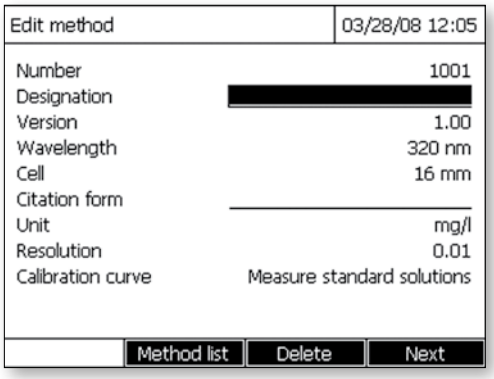
photoLab® 6000 Series

- 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 (***see p. 98***) 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

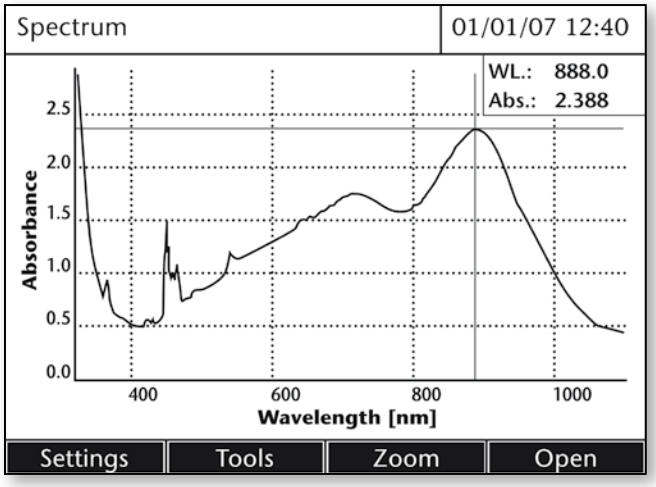
PhotoCheck

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**
  Linear and non-linear applications can be entered via entry mask over pairs of variates or functions, with AQA support
- **Special tasks / entry of formulas for complex measurement** procedures
- **Spectra:**
  Over a definable wavelength area with graphical evaluation
- **Multi-wavelength measurement:**
  Up to 4 different wavelengths
- **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.



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

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
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 rapid results for routine operation:

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, UL, CUL	CE, UL, CUL
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 UL CUL 2 Year Warranty

Note: versions for other power supplies/countries on request

pHotoFlex®: The Portable Photometers

The pHotoFlex® series offers the most robust optics, combining precision with low power consumption achieved through optical filters together with the LEDs. The instruments are equipped with 6 wavelengths. Additionally, the pH measuring and the optional turbidity measuring (IR range) are integrated, 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 automatic temperature compensation
- Turbidity measurement with infrared light source according to DIN 27027/ISO 7027 (optional)
- 100 program storage places for user-defined routine measurements

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. When necessary, especially in the field, all other test sets can also be traced. To further enhance in-the-field operation, use the field case with convenient, integrated laboratory tray.
(*see p. 108 for details).*

Beneficial: Measurements and data evaluation can be processed conveniently in the laboratory with LabStation and LSdata. (*see p. 108 for details).*

The constant ambient conditions and permanent power supply provide convenient operation via barcode and without repeated zeroing. Barcodes are included in the analysis descriptions.

pHotoFlex® – Portable Photometer with pH

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

pHotoFlex®

- More than 160 methods available
- Integrated pH measurement
- Color measurements

with pH sensor 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 sensors 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 29.

pHotoFlex® Turb – Total Capability

The pHotoFlex® Turb is analogous to the pHotoFlex®, 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.

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

The AMCO Clear® standards enable highest precision for the sensitive testing of drinking water.

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
- Convenient

pHotoFlex® series 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, making it practical for transport.
Complete sets with:

- pH electrode SenTix® 41 for all pHotoFlex® models
- 1 variable pipette with 5 ml volume for all pHotoFlex® models
- Calibration standards for pHotoFlex® Turb and Turb® 430 IR/T
- 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 for battery change
- Space for other accessories

LabStation and LSdata

Smart data management

The LabStation – holding the instrument – upgrades the portable pHotoFlex® and Turb® 430 models (*see p. 128)* 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®	pHotoFlex® Turb
Light source	LED	LED
Wavelengths nm	436, 517, 557, 594, 610, 690	436, 517, 557, 594, 610, 690 + 860
User-defined methods	100	100
Methods/software update	Via Internet	Via Internet
Data storage	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 ±0.01 pH —	< 2 nm wavelength accuracy, 0.005 abs. reproducibility ±0.01 pH 0.01 NTU/FNU or ±2% of the measured value
Auto-zero adjustment/calibration: Photometry pH / Turbidity	 With start of new method, with LabStation once a day 3 point	 With start of new method, with LabStation once a day 3 point
Interface	RS 232, USB via adapter (optional)	RS 232, USB via adapter (optional)
Measuring parameters	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
Rechargeable battery	Optional: rechargeable battery or LabStation	Optional: rechargeable battery or LabStation
Test marks	cETLus	cETLus
Warranty	2 years	2 years

Ordering Information

pHotoFlex®		Order No.
pHotoFlex®	Portable photometer with pH	251 100
pHotoFlex® Turb	Portable photometer with pH and turbidity	251 110
pHotoFlex®/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 all pHotoFlex® models and Turb® 430 IR/T with universal plug	251 300

IP 67 CE cETLus 2 Year Warranty

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 x12	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. Every concentration determination is accurate only within the linear absorption range. At the limits of the measuring range, the given tolerance 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	**0.00 - 0.25 mg/l**	28	20	251 400	100	–	–	–	–	–	–	●
Ammonia NH_3 (subject to pH value)													
●	14544	**0.5 - 16.0 mg/l NH_4-N 0.7 - 20.6 mg/l NH_4**	16	0.5	250 329	25	–	–	–	–	–	–	●
■	14752/1	**0.02 - 1.50 mg/l NH_4-N 0.03 - 1.93 mg/l NH_4**	16, 28	5	250 426	500	–	–	–	–	–	–	●
■	14752/2	**0.02 - 1.50 mg/l NH_4-N 0.03 - 1.93 mg/l NH_4**	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	**0.00 - 0.50 mg/l NH_4-N 0.00 - 0.64 mg/l NH_4^+**	28	10	251 408	200	–	–	–	–	–	–	●
TC	NH_4-2 TC (LR)	**0.00 - 2.50 mg/l NH_4-N 0.00 - 3.20 mg/l NH_4^+**	16	2	251 997	50	–	–	–	–	–	–	●
TC	NH_4-3 TC (HR)	**0 - 50 mg/l NH_4-N 0 - 64 mg/l NH_4^+**	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								
Ascorbic acid: Please ask for application brochures													
BOD Biochemical oxygen demand O_2													
●	00687	**0.5 - 3000 mg/l BOD**	16	–	252 028	50	–	✔	●	●	●	●	–

● = 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®
Boron B													
■	14839	**0.050 - 0.800 mg/l B**	10, 20	5	250 427	60	–	–	–	●	●	●	–
●	00826	**0.05 - 2.00 mg/l B**	16	4	252 041	25	–	✔	–	●	●	●	–
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	–	–	●	●	●	●	–
Chlorine Cl_2		*(f = free, t = total)*											
●	00595	**0.03 - 6.00 Cl_2, f**	16	5	250 419	200	–	–	●	●	●	●	●
●	00597	**0.03 - 6.00 Cl_2, f+t**	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+t**	10, 20, 50	10	252 012	200	–	–	–	●	●	●	–
■	00602/1	**0.010 - 6.00 Cl_2, t**	10, 20, 50	10	252 013	200	–	–	–	●	●	●	–
■	00602/2	**0.010 - 6.00 Cl_2, t**	10, 20, 50	10	252 055	1200	–	–	–	●	●	●	–
TP	Cl-1 TP	**0.00 - 2.00 mg/l Cl_2, f**	28	10	251 401	100	–	–	–	–	–	–	●
TP	Cl-2 TP	**0.00 - 5.00 mg/l Cl_2, f**	28	25	251 402	100	–	–	–	–	–	–	●
TP	Cl-3 TP	**0.00 - 2.00 mg/l Cl_2, t**	28	25	251 414	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							
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													

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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®
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	✔	–	●	●	●	●	–
●	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	✔	–	●	●	●	●	●
TC	COD1 TC (LR)	**0 - 150 mg/l COD (148 °C/298.4 °F, 2 h)**	16	2	251 990	25	–	–	–	–	–	–	●
TC	COD2 TC (MR)	**0 - 1500 mg/l COD (148 °C/298.4 °F, 2 h)**	16	2	251 991	25	–	–	–	–	–	–	●
TC	COD3 TC (HR)	**0 - 15000 mg/l COD (148 °C/298.4 °F, 2 h)**	16	0,2	251 992	25	–	–	–	–	–	–	●
COD Chemical oxygen demand (HG free, Cl^- partly detected) O_2													
●	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	✔	–	●	●	●	●	●
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	**0.00 - 5.00 mg/l Cu**	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	**2 - 160 mg/l Cyanuric Acid**	20	5	252 088	100	–	–	–	●	●	●	–
DEHA/Oxygen Scavengers													
■	19251	**0.020 - 0.500 mg/l DEHA**	20	10	252 089	200	–	–	–	●	●	●	–
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, I_2, ClO_2, O_3													
Hazen: See reagent-free tests: Coloration													

● = 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®
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	–	–	–	●	●	●	–
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	–	–	–	●	●	●	–
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	**0.00 - 1.80 mg/l Fe**	16, 28	10	251 404	100	–	–	–	–	–	–	●
TP	Fe-2 TP	**0.00 - 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, 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	**0.0 - 20.0 mg/l Mn**	16, 28	10	251 406	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	**0.0 - 35.0 mg/l Mo**	16, 28	10	251 407	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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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®
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	**0.1 - 25.0 mg/l NO_3-N** **0.4 - 110.7 mg/l NO_3**	10, 20, 50	0.5	250 421	90	✔	–	–	●	●	●	–
■	09713/2	**0.1 - 25.0 mg/l NO_3-N** **0.4 - 110.7 mg/l NO_3**	10, 20, 50	0.5	252 085	250	✔	–	–	●	●	●	–
TC	NO3-1 TC	**0 - 30.0 mg/l NO_3-N** **0.0 -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	**0.00 - 0.33 mg/l NO_2-N** **0.00 - 1.08 mg/l NO_2**	16, 28	10	251 409	100	–	–	–	–	–	–	●
TC	NO_2-2 TC	**0.03 - 0.60 mg/l NO_2-N (LR)** **0.10 - 2.00 mg/l NO_2 (LR)**	16	2	251 994	24	–	–	–	–	–	–	●
		0.30 - 3.00 mg/l NO_2-N (HR) **0.99 - 9.90 mg/l NO_2**	16	0,5									
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	–	–	●	●	●	●	–
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	–	–	–	●	●	●	●
■	14732	replaced by ClO_2 00608 and ozone 00607											
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	–	✔	–	●	●	●	●

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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®
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	**0.00 - 0.80 mg/l PO_4-P** **0.00 - 2.45 mg/l PO_4**	28	10	251 410	100	–	–	–	–	–	–	●
TC	PO_4-2 TC	**0.00 - 1.60 mg/l PO_4-P** **0.00 - 4.91 mg/l PO_4**	16	5	251 989	50	–	–	–	–	–	–	●
TC	PO_4-3 TC	**0.00 - 1.10 mg/l PO_4-P** **0.00 - 1.10 mg/l P_{Total} (digestion)** **0.00 - 3.37 mg/l PO_4**	16	5	251 988	50	–	–	–	–	–	–	●
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** **0.11 - 10.70 mg/l SiO_2**	10, 20, 50, 16, 28	5	250 438	300	–	✔	–	●	●	●	●
■	00857	**0.5 - 500 mg/l Si** **1.1 - 10.70 mg/l Si**	10, 16	4/0.5	252 046	100	–	–	–	●	●	●	●
TP	Si-1 TP (LR)	**0.00 - 0.75 mg/l Si** **0.00 - 1.60 SiO_2**	28	10	251 411	100	–	–	–	–	–	–	●
TP	Si-2 TP (HR)	**0 - 46.7 mg/l Si** **0 - 100.0 mg/l SiO_2**	16, 28	10	251 412	100	–	–	–	–	–	–	●
Silver Ag													
■	14831	**0.25 - 3.00 mg/l Ag**	10, 20, 16	10	250 448	100	–	–	–	●	●	●	●
		(total-Ag: 100 °C/212 °F or 120 °C/248 °F, 1 h) Digestion reagents are contained in the test set											
Sodium Na													
●	00885	**10 - 300 mg/l Na**	16	0.5	252 044	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®
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**	16, 28	10	251 413	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	–	–	–	●	●	●	–
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 - 25.0 mg/l N_{Total} (120°C/248 °F, 30 min.)**	16	2; 2	251 995	50	–	–	–	–	–	–	●
TC	N_{tot}2 TC (HR)	**5 - 150 mg/l N_{Total} (120°C/248 °F, 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							

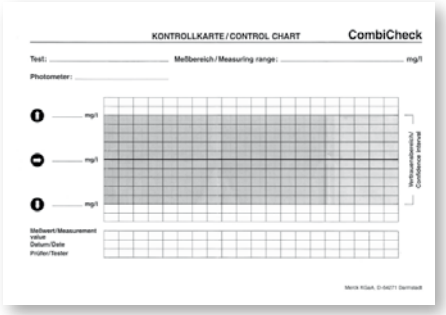
● = Cell Tests ■ = Reagent tests TC = Cuvette Tests TP = Powder Pillows CC = CombiCheck SW = Saltwater ml = Sample volume (photoLab®) 1) Ø 16, 28 □ 10, 20, 50

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	90
		14558	90
Chloride	25.0 mg/l Cl	14730	90
COD	80 mg/l CSB	C3/25	30
		14540	30
Nitrate	2.5 mg/l NO_3-N	14556	45
		14773	60
Phosphate	0.80 mg/l PO_4-P	P6/25	18
		14543	18
		14848	9
Sulfate	100 mg/l SO_4	14548	18
		14791	40
		00617	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	30
		14541	30
Nitrate	9.0 mg/l NO_3-N	N2/25	90
		14542	60
		14563	90
		14773	60
		14942	60
		09713	180
Phosphate	8.0 mg/l PO_4-P	P7/25	90
		14729	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	19
		14767	19
Iron	1.00 mg/l Fe	14549	19
		14761	9
		00796	12
Manganese	1.00 mg/l Mn	14770	9
		00816	13
14692 CombiCheck 40			250 485
Aluminum	0.75 mg/l Al	14825	19
Nickel	2.00 mg/l Ni	14554	19
		14785	19
Lead	2.00 mg/l Pb	14833	19
		09717	11
Zinc	2.00 mg/l Zn	14566	190
14695 CombiCheck 50			250 486
Ammonium	1.00 mg/l NH_4-N	14739	19
		14752	19
Nitrogen	5.0 mg/l N_{ges}	14537	9
		00613	9
COD	20.0 mg/l CSB	14560	32
14696 CombiCheck 60			250 487
COD	250 mg/l CSB	14690	48
		14895	48
Chloride	125 mg/l Cl	14897	96
14689 CombiCheck 70			250 488
Ammonium	50.0 mg/l NH_4-N	14559	950
		00683	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	95
		P7/25	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

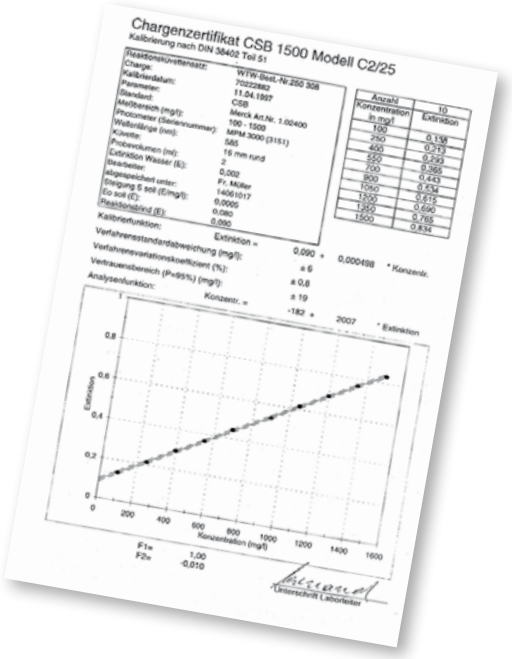
The appropriate test solution is diluted with distilled water using the pipette to be checked, and the extinction of the dilute solution is compared with that of a reference solution. Pipettes with a variation in volume of more than ±2.5% must be regarded as being faulty.

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).

FAU turbidity
(EN ISO 7027) Determination of turbidity
Turbidity is caused in liquids by suspended particles. These undissolved finely dispersed particles can be measured by the resulting reduction of light intensity when either passing through the liquid, or by scattered light.
According to EN ISO 7027, all instruments that measure at 860 nm are suitable. The results are given in FAU units (Formazin Attenuation Units) for a measurement with light passing through at 180°.

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.

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
- Values displayed in
  – NTU
  – EBC
  – FNU, FAU (Turb® 555 IR)
  – Nephelos (Turb® 550)
- Flow-through measurement

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

High-precision laboratory turbidity meter with a wide measuring range of 0.0001 to 10 000 NTU (automatic measuring range switching) for all turbidity measuring applications from ultrapure and drinking water measurements, through quality assurance in soft drinks and wastewater treatment. 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. Accurate measurements in the lower range, e.g. in drinking water, are easily achieved.

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 108)***.

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 30 offers easy, rapid and reliable counting of bacterial colonies with very simple handling.

BZG 30

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

The **colony counter BZG 30** is easy-to-use, and allows fatigue-free and safe work thanks to its problem-free counting mechanism: The surface on which the Petri dish is placed is pressure-sensitive; marking the colonies on the Petri dish with the marker pen activates the counter. The pressure sensitivity is adjustable for optimal adaptation to the operator.

Intelligent counting technology

The colony counter **BZG 30** has an acoustic check signal and automatically compensates for the weights of different Petri dishes; the pressure sensor is also uniformly sensitive over the whole working area. Zero-voltage protection guards against power interruptions.

The ring-shaped lamp provides uniform illumination; the magnifier offers distortion-free optics and can be precisely positioned on its extremely flexible arm.

The user is able to select direct or indirect illumination. Direct illumination is particularly suitable for nutrient agars with a dark background; indirect illumination for lighter agars. Colony counter **BZG 30** has an additional counter input for counter marker KS 30 and is supplied with an interchangeable Wolffhügel grid.

Technical Data

Counter	LED display (0 ... 999) with reset to 0
Standard magnifier	1.7-fold surface magnification, 100 mm (3.34 in) dia.
Illumination	20 W ring lamp
Power supply	230 V ± 15%, 50 ... 60 Hz or 115 V ± 15%, 50 ... 60 Hz, as selected
Power consumption	21 W
Dimensions	300 x 325 x 90 mm (11.81 x 12.80 x 3.54 in) (B x D x H) with magnifier arm
Weight	5.6 kg (12.346 lb)
Test certificate	CE
Warranty	1 year

Ordering Information

Colony Counter		**Order No.**
BZG 30	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
BZG 30/115V	Same as above, but for 115 V / 50/60 Hz	803 315

CE 1 Year Warranty

WTW Software – Simple and Convenient

MultiLab® Importer

- Data transfer directly into Excel®
- Easy and convenient
- Free-of-charge download from the internet

Free-of-charge software for transferring data from MultiLine® and ProfiLine portables directly into Excel®

(See also synoptical table Meters/Cables/Software)

MultiLab® Importer is a free-of-charge Excel® add-in for easy transfer of measuring data from the digital MultiLine® as well as ProfiLine portable meters.

When clicking the "Import Data" button, the meter will be automatically recognized. The data is transferred in a formatted way and can be processed directly. The only prerequisite is Excel®.

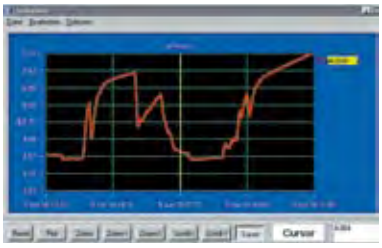
MultiLab® pilot

- Digital online recorder
- Export function for Word, Excel, Access and other programs
- Free-of-charge download from the internet

The free-of-charge software package for all laboratory and portable instruments, can be downloaded from the internet

(See also synoptical table Meters/Cables/Software)

"MultiLab® pilot" controls the measurement and carries out data transfer and storage. The data can be shown online as a table or graph, or off-line transferred to a printer. The inoLab® 740/7400* and 750/7500* can be controlled actively.



ACHAT OC

- Min. software requirements:
  Windows 3.1 update options on request.
- Necessary accessories:
  Connection cable AK 540/B.

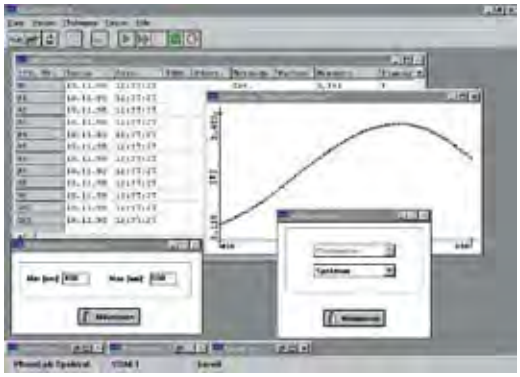
Communication program for BOD Measurement with OxiTop® Control

Stored measuring data can be easily transferred from the OxiTop® Control system to a PC with the communication program ACHAT OC. These transferred data can be processed by PC or the Controller OC 100/OC 110.

** North American version*

Multi/ACHAT II

- dBASE format
- Sorting according to measurement parameter
- Windows program with context-sensitive menus and help programs



PC-Software Multi/ACHAT II: PC Communication with WTW Photometers photoLab® S6/S12

Adapter for USB to serial interfaces

PC-Software photoLab® Data *spectral*
Convenient data management for the photoLab® 6000 series *see page 102*

PC-Software LSData
Convenient data management for the pHotoFlex®/Turb® 430 series *see page 108*

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® 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
MultiLine® 3410/3420/3430	MI	AK USB A-Mini	b

Instrument	Software	Interface cables	Type
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	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

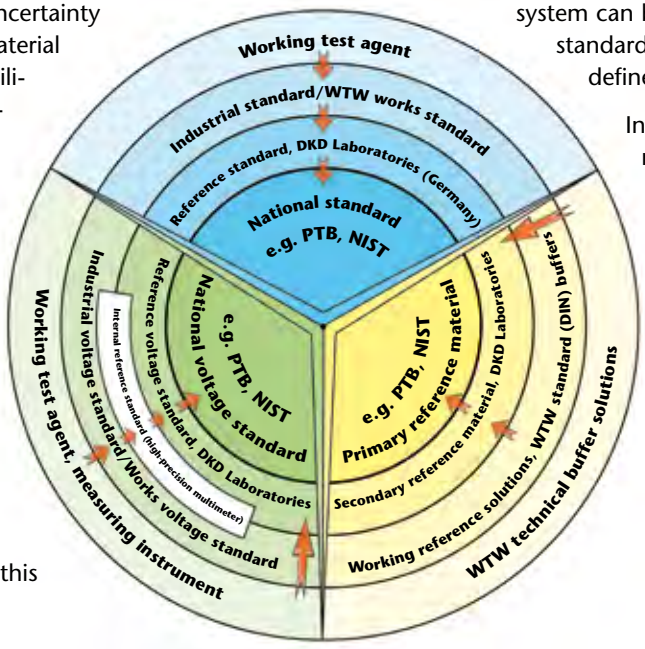
We are active...

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

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 certificate

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.

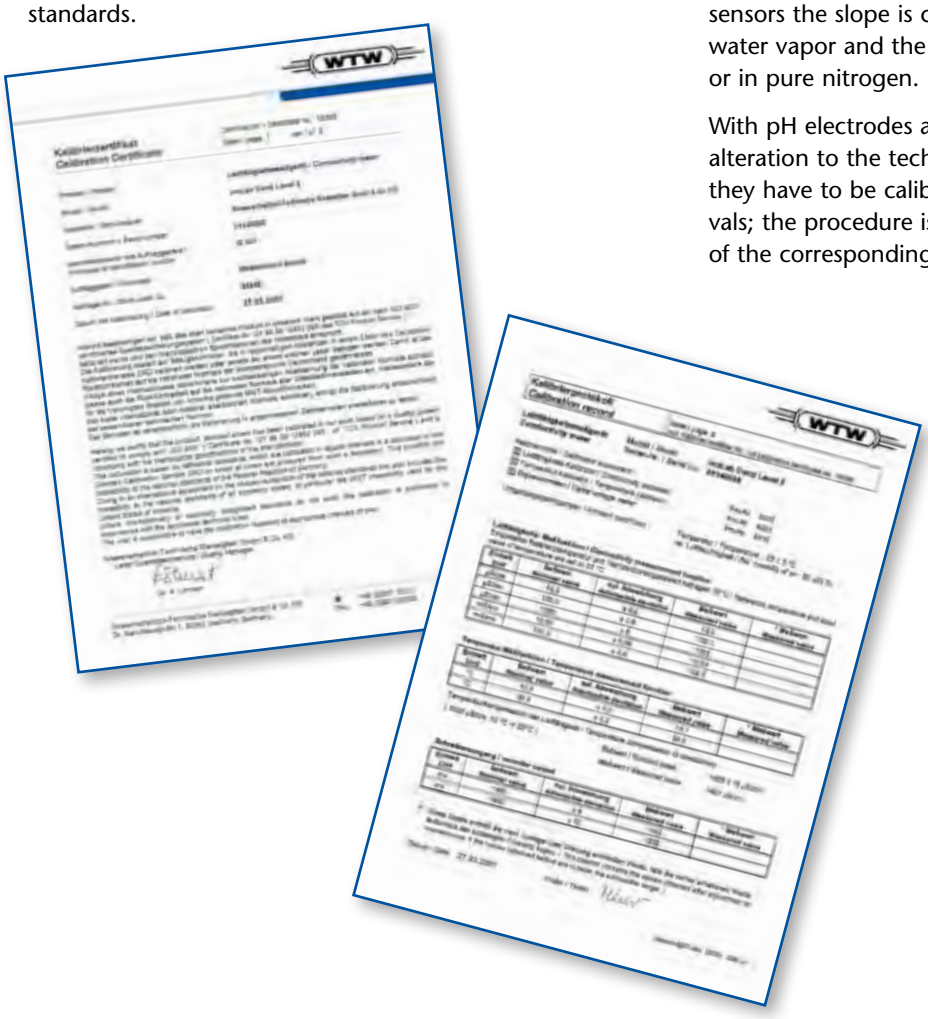
Manufacturer's certificate for calibration solutions

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

Through expertise and innovative technology, WTW continues to demonstrate its commitment to providing our customers with solutions to their most challenging problems.

Over the last 2 years, WTW has developed and launched two new product lines, building upon WTW's proven sensor technology.

WTW has once again taken the opportunity to improve and set new industry standards. This remains a core element of the WTW strategy.

Sean Donnelly,
CEO WTW GmbH

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.

The new ProfiLine portable single parameter instruments feature new technology and combine simple, easy-to-use features with exceptional durability for extreme conditions. 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 digital IDS sensors 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. The terminal/controller MIQ/TC 2020 XT is the new and extremely high-performance core of each IQ SENSOR NET system 2020. The dual-processor function integrated with every MIQ/TC 2020 XT increases the system stability, and therefore also the availability of the entire system. The integrated USB interface facilitates a considerably faster data exchange using a USB memory stick or connecting directly to an external system. The new 182 XT-4 system is the economic solution for up to 4 sensors, perfectly suitable for central measuring points, e.g. locations with multiple parameters being measured. 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*

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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Internet: www.WTW.com

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** North American version*

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** North American version*

General Technical Data ...

Electrochemistry

Laboratory Meters

	inoLab®				
	720/7200*	730/7300*	735/7350*	740/7400*	750/7500*
Internal Diagnostics	●	●	●	●	●
Splash Proof Housing	●	●	●	●	●
Display	LCD	LCD	Graphic/ backlit	Graphic/ backlit	Graphic/ backlit
Simultaneous Temperature Display	●	●	●	●	●
Temperature Compensation	●	●	●	●	●
TFK 325 Attachable (pH)	●	●	●	●	●
Membrane Keyboard with Defined Pressure Point	●	●	●	●	●
Keypad with Acoustic Prompts	—	—	●	●	●
Control via Terminal	—	—	—	●	●
Control via PC	—	—	—	●	●
User Selectable Languages	—	—	●	●	●
Memory: Data Sets	—	800	4500	2000/ unlimited	2000/ unlimited
Real Time Clock	—	●	●	●	●
GLP Supported Functions	—	●	●	●	●
Identification No.	—	●	●	●	●
Calibration Protocol	—	●	●	●	●
Calibration Interval Selectable 1 ... 999 days	—	●	●	●	●
Password Protection	—	—	—	●	●
RS 232 Interface Digital/Analog	—	● / ●	● / —	● / —	● / —
PC Connection	—	●	●	●	●
Software MultiLab® pilot	—	●	●	●	●
Alarm Function	—	●	●	●	●
Limit Values Setting	—	●	●	●	●
Real Time Digital Recorder	—	●	●	●	●
Software Update via Internet	—	●	●	●	●
Firmware Update via Internet	—	—	●	●	●
Built-in Printer Option	—	●	●	●	●
Sensor Validation	●	●	●	●	●
Dimensions mm (in.) (H x W x D)	230x210 x70 (9.06x8.27 x2.76)	250x300 x70 (9.06x11.81 x2.76)	250x300 x70 (9.06x11.81 x2.76)	250x300 x70 (9.06x11.81 x2.76)	250x300 x70 (9.06x11.81 x2.76)
Weight kg (lb.)	0.85 (1.87)	1.3 (2.87)	1.3 (2.87)	1.3 (2.87)	1.3 (2.87)
Universal Power Supply	●	●	●	●	●
Battery Operated (not with Built-in Printer)	●	●	recharg. (NiMH)	—	—
Certificates	CE/UL/ CUL	CE/UL/ CUL	CE/UL/ CUL	CE/UL/ CUL	CE/UL/ CUL
SET Available	●	●	—	●	●
Warranty	3 Years	3 Years	3 Years	3 Years	3 Years

Portable and Field Meters

		ProfiLine Portable Meters			Multi	ProfiLine	MultiLine®
	VARIO®	3110	3210	3310	350i/3500i*	1970i	
Internal Diagnostics	●	●	●	●	●	●	●
Waterproof Housing	IP 65	IP 67	IP 67	IP 67	IP 67	IP 66/ IP 67	IP 67
Display	LCD	LCD	Graphic/ backlit	Graphic/ backlit	Graphic/ backlit	LCD	Color Graphic
Simultaneous Temperature Display	●	●	●	●	●	●	●
Temperature Compensation	●	●	●	●	●	●	●
TFK 325 Attachable (pH)	●	●	●	●	—	●	—
Silicone Keypad	—	●	●	●	●	●	●
Touch Screen	●	—	—	—	—	—	—
Keypad with Acoustic Prompts	●	—	—	—	●	—	●
User Selectable Languages	—	—	●	●	●	—	●
Memory: Data Sets	50	—	200	5000	1800	800	10000
Real Time Clock	●	—	●	●	●	●	●
GLP Supported Functions	●	—	●	●	●	●	●
Identification No.	●	—	●	●	●	●	●
Calibration Protocol	●	—	●	10	●	●	10
Calibration Interval Selectable 1 ... 999 days	●	—	●	●	●	●	●
RS 232 Interface Digital/Analog	—	—	—	USB Mini-B	●	●	USB A, USB Mini-B
PC Connection	—	—	—	●	●	●	●
Software MultiLab® pilot	—	—	—	—	●	●	—
Software MultiLab® Importer	—	—	—	●	—	—	●
Clock/Timer	●	—	—	—	—	—	—
Firmware Update via Internet	—	—	—	●	●	—	●
Sensor Validation	●	●	●	●	●	●	●, QSC
Dimensions mm (in.) (H x W x D)	140x80 x33 (5.51x3.15 x1.30)	180x80 x55 (7.09x3.15 x2.17)	180x80 x55 (7.09x3.15 x2.17)	180x80 x55 (7.09x3.15 x2.17)	172x80 x37 (6.77x3.15 x1.46)	230x85 x90 (9.06x3.35 x3.54)	180x80 x55 (7.09x3.15 x2.17)
Weight kg (lb.)	0.1 (0.22)	0.4 (0.88)	0.4 (0.88)	0.4 (0.88)	0.4 (0.88)	1.5 (3.31)	0.4 (0.88)
Universal Power Supply	—	—	—	USB, optional	●	●	●
Battery Operated/ Rechargeable Batteries	● / —	● / ●	● / ●	● / ●	recharg. (NiMH)	recharg. (NiMH)	recharg. (NiMH)
Certificates	CE/UL/ CUL	CE/ cETLus	CE/ cETLus	CE/ cETLus	CE/UL/ CUL	CE/UL/ CUL	CE/ cETLus
SET Available	●	●	●	●	●	—	●
Warranty	3 Years	3 Years	3 Years	3 Years	3 Years	3 Years	3 Years

** North American version*

Portable Multi-parameter Systems

Overview Capabilities/Functions of Portable Multi-parameter Systems

Measuring Capabilities	Analog Multi-parameter Systems			Digital Multi-parameter Systems			
	MultiLine®			Series 300i/3000i*			
	Multi 3410	Multi 3420	Multi 3430	pH/Oxi 340i/3400i*	pH/Cond 340i/3400i*	Multi 340i/3400i*	Multi 350i/3500i*
Main Parameter	pH/D.O./Cond	pH/D.O./Cond	pH/D.O./Cond	pH/D.O.	pH/Cond	pH/D.O./Cond	pH/D.O./Cond
Simultaneous Measurement of up to x Main Parameters	1	2	3	2	2	2	3
Optical D.O. Measurement with FDO® 925	●	●	●	–	–	–	–
Usage of Special Sensors (pH/D.O./Cond)	●/–/●	●/–/●	●/–/●	●/–	●/–	●/–/–	●/●/●
Digital Signal Transmission (without Interferences)	●	●	●	–	–	–	–
Digital Sensor Recognition with Additional Information (Calibration Data/History etc.)	●	●	●	–	–	–	–
Analog Sensor Recognition	–	–	–	–/–	–/–	–/●/●	–/●/●
Analog Multi-parameter Probe MPP 350 Useable	–	–	–	–	–	–	●
Special Functions							
GLP support	●	●	●	●	●	●	●
Extended GLP with Sensor/ User Data	●	●	●	–	–	–	–
Additional Functions: CMC, QSC	CMC / QSC	CMC / QSC	CMC / QSC	–	–	–	–
Standardized, Easy-to-use Cable and Connector Technology	●	●	●	–	–	–	–
Cable Length pH > 3 m	●	●	●	–	–	–	with MPP 350
Calibration Data Stored in Sensor	●	●	●	–	–	–	–
Data Transfer to USB Stick	●	●	●	–	–	–	–
Function Updates via Firmware Update							
Update of Meter Functions	●	●	●	–	–	–	●
Update of New Measurement Parameters	●	●	●	–	–	–	–

** North American version*

Typical Optical/BOD Applications

Environmental Monitoring

Photometric Measurements with pHotoFlex®

see pp. 106

Wastewater: COD

COD Determination in Wastewater with photoLab® S12

see pp. 104

Reaction Kinetics and Absorption Spectra

with photoLab® 6600 UV-VIS

see pp. 100

Food and Beverage Industry

Turbidity Measurement with Turb® 430 + LabStation

see pp. 128

Dilution BOD

with inoLab® BSB/BOD 740/7400 and Analysis Program*

see pp. 80

BOD Self-check Measurement

with OxiTop®

see pp. 82

Biodegradation according to OECD

OECD 301: Determination with OxiTop® Control

see pp. 92

Determination of Soil Respiration

with OxiTop® Control B6/BM6

see pp. 91

** North American version*

General Technical Data ...

Optical Instruments

Laboratory Meters

	photoLab® Series		photoLab® 6000 Series	Thermo-reactor	Turb®	
	S6	S12	6100 6600	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 RS 232	RS 232	RS 232	RS 232
PC Connection	●	●	●	●	●	●
PC Software	—	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)	2.9/3.6/3.6 (6.39/7.94/7.94)	1 (2.20)	1 (2.20)
Universal Power Supply	—	—	●	Switch-able	●	●
Rechargeable Batteries	Optional	Optional	Yes/12 V	—	—	—
Certificates	CE/UL/ CUL	CE/UL/ CUL	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®	pHotoFlex® Turb	Turb® 430 IR/T	Turb® 355T/IR
Cuvette Size (mm)	16, 28	16, 28	28	25
Internal Diagnostics	●	●	●	●
Waterproof Housing	IP 67	IP 67	IP 67	—
Display	Graphic/ backlit	Graphic/ backlit	Graphic/ backlit	LCD
Temperature Display	●	●	—	—
Temperature Compensation pH	●	●	—	—
Keypad/ Acoustic Prompts	Silicone/●	Silicone/●	Silicone/●	Foil with Prompts
User Selectable Languages	●	●	●	—
Memory: Data Sets	1000	1000	1000	—
Real Time Clock	●	●	●	—
GLP Supported Functions	●	●	●	—
Identification No.	●	●	●	—
Calibration Protocol	●	●	●	—
Calibration Interval	●	●	●	—
Interface	RS 232	RS 232	RS 232	—
PC Connection	●	●	●	—
LabStation for Lab Use incl. Rech. Batt.	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)	48x70 x165 (1.89x2.76 x6.50)
Weight kg (lb.)	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
Sets	●	●	●	●
Warranty	2 Years	2 Years	2 Years	2 Years

WTW Product Families ...

Optical / BOD

Photometers p. 96

photoLab® 6100 VIS / 6600 UV-VIS
photoLab® S6/S12
pHotoFlex®

- Photometrical Tests

Wide range of tests available

Turbidity Meters p. 124

Turb® 430 / 355 / 550 / 555

- NTU

Respirometer OxiTop® p. 78

OxiTop®/OxiTop® Control

- BOD
- Respiration

Soil respiration, biodegradation OECD, Biogas determination, respiration rate