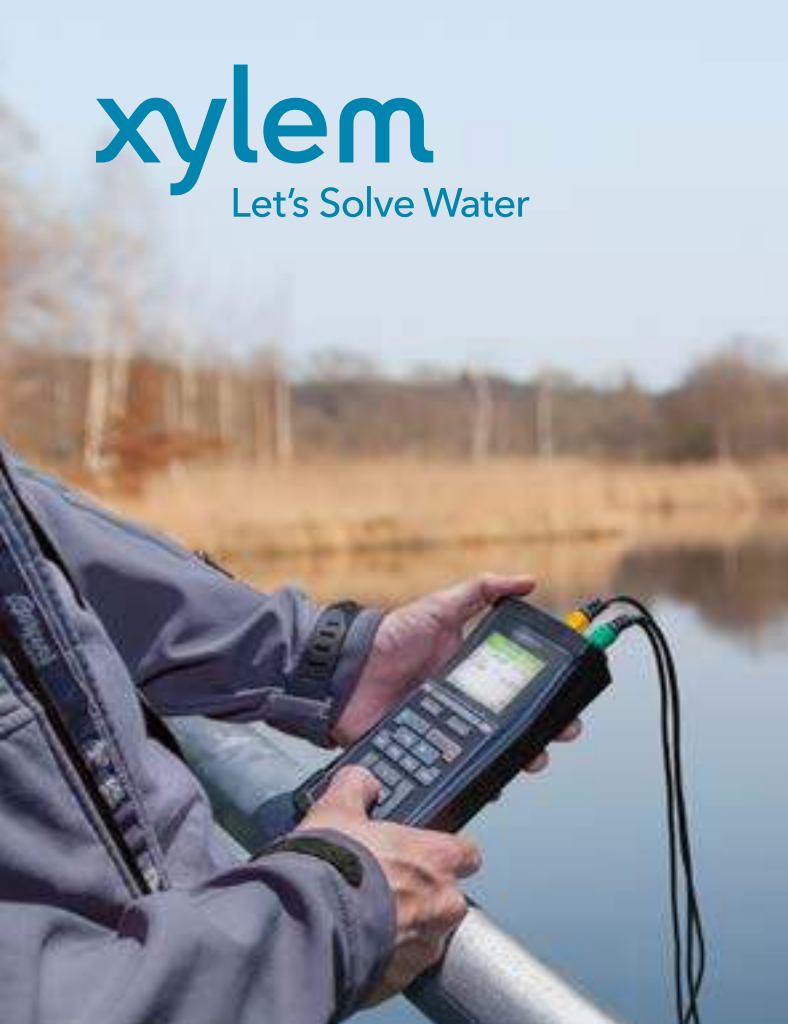




# Lab and Field Instrumentation

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

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## Publisher



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# IDS goes wireless – the new portable and laboratory meters with wireless data transfer

Wireless measurement – Perfect for anywhere where cables or meters can be inconvenient, such as when using fume hoods or laminar flow benches, in confined space conditions, or simply in any place where you want to have an additional hand free.

- **Wireless measurement**
- **Securely connected**
- **A wireless module for all parameters**



## New: Specific applications need specific sensors

There are new SenTix® IDS electrodes for measuring pH of solid and semi-solid samples, small sample volumes, emulsions and suspensions, as well as highly precise low-maintenance types.

New conductivity cells based on tried and tested TetraCon® technology: The TetraCon® 925/C with acid-resistant sensor head from PEEK for special applications, such as in galvanic baths. The TetraCon® 925/LV with forked electrode holder is suitable for small volumes or viscous media.

All IDS sensors are available as a plug head version for wireless transmission!

*see from page 28*





### inoLab® Multi IDS benchtop meters: The perfect partners in the IDS wireless system

The new inoLab® Multi IDS meters and IDS sensors – the perfect combination for efficient and precise work in the laboratory. Regardless of whether connected by cable or equipped with the new wireless modules for IDS plug head sensors, reliable measurements with comprehensive documentation are guaranteed with all meter and sensor data.

And the new MultiLab® user software enables GLP/GMP-compliant user management with different authorization levels. Modern communication interfaces ensure smooth data transfer.

*see from page 40*



### Portable, robust, digital – the new MultiLine® IDS Series

MultiLine® IDS guarantees robust, waterproof and reliable portable meters for mobile measurement.

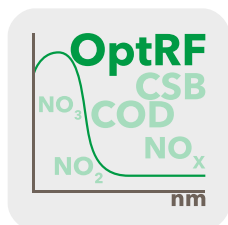
With three different designs, there is one for every customer's need, from reliable entry-level to professional three-channel meters. The new wireless technology is available on each of these meters as well!

*see from page 43*



# photoLab® 7600 UV-VIS with innovative reagent-free measurement

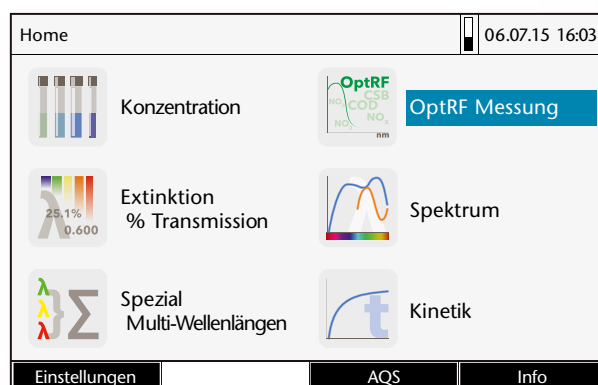
OptRF – the optical reagent-free measurement



- **Fast and direct**
- **Reagent-free and environmentally friendly**
- **Does not pose a health hazard**

With spectral scanning in the UV range, WTW has brought optical reagent-free measurement from process instruments into the laboratory. COD, nitrate and nitrite from communal waste water can be recorded, calculated, and immediately displayed as a measurement value using a spectral scan in a quartz cell.

*see page 139*



photoLab color – color measurement instead of color perception



- **PC-controlled**
- **Conforming to standard**
- **CSV and PDF export**

photoLab® color offers PC-controlled color measurement with the spectral photometers from the photoLab® 6000 and 7000 Series for the quality control of substances from water to wine, and from resin to sugar.

photoLab® Data *spectral* comes in a package with photoLab® color and facilitates the GLP-compliant data management of all other photometric measurement data.

*see page 137*

## photoLab® 7600 UV-VIS - the “universal genius” for routine and spectral analysis

- **OptRF: Reagent-free COD, nitrate, nitrite**
- **Routine and special analysis**
- **Barcode and AQA support**

The new spectral photometers in the photoLab® 7000 Series offer proven routine analysis functions with approx. 250 standard methods. Alongside the innovative OptRF measurement, special methods from glucose to chlorophyll, and user programming for research, industry, and service laboratories are available.

*see page 139*



# Descriptions

## Benchtop and portable meters



### Content

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- 7 IDS goes wireless
- 8 Benchtop meters inoLab® Multi IDS - digital
- 11 Portable meters MultiLine® IDS - digital
- 14 Benchtop meters inoLab® - analogue
- 18 Portable meters ProfiLine - analogue



# IDS - Intelligent digital sensors

IDS focuses on the sensors. The unique WTW IDS sensors offer three main advantages:

- Reliable measurement results through clear assignment of the measured value to the sensor. Each IDS sensor transmits its description, serial number, and current calibration status
- Correct measurement results due to direct signal processing in the sensor and digital transmission of the values. Cable lengths up to 100 m for all parameters are easily possible
- High-quality, long-term proven sensors as a basis for IDS technology

Unique quality functions such as the intelligent sensor evaluation (QSC) at pH support operational safety by information about the actual state of the electrode.

IDS sensors are available for pH, ORP, dissolved oxygen, conductivity and turbidity.

## IDS goes wireless



We have set another milestone in the measurement of pH/ORP, dissolved oxygen, conductivity and turbidity with the wireless transmission of measured parameters!

With the plug head IDS sensors and universal rechargeable wireless modules, all measurement problems in hard-to-reach locations such as fume hoods, safety workbenches, or any other place cables are convenient, can be mastered in no time at all. With a range of up to 10 meters, you can keep the instrument in a safe place and have a hand free.

Universal wireless modules for meters and sensors make working very easy.

- Each meter requires only one IDS WLM-M module
- One meter measures up to three sensor modules simultaneously, depending on the model
- A sensor module IDS WLM-S can be used with any IDS plug head sensor

Suitable for all new MultiLine® Multi 3630 IDS, Multi 3620 IDS, Multi 3510 IDS and inoLab® Multi 9630 IDS inoLab® Multi 9620 IDS and inoLab® Multi 9310 IDS.





# Digital benchtop meters inoLab® IDS



Trusted measurements with the most modern multi-channel meters **inoLab® Multi 9630 IDS**, **inoLab® Multi 9620 IDS**, **inoLab® Multi 9310 IDS** All meters have the following:

|                                                                                |                                                          |    | Digital     |            |            |
|--------------------------------------------------------------------------------|----------------------------------------------------------|----|-------------|------------|------------|
|                                                                                |                                                          |    | inoLab® IDS |            |            |
|                                                                                |                                                          |    | Multi 9630  | Multi 9620 | Multi 9310 |
| ✓ yes                                                                          |                                                          |    |             |            |            |
| ● yes                                                                          |                                                          |    |             |            |            |
| ✓ recommended                                                                  |                                                          |    |             |            |            |
| ✓ recommended for some applications                                            |                                                          |    |             |            |            |
| – not recommended/not available                                                |                                                          |    |             |            |            |
| 2 parameters simultaneously                                                    |                                                          |    | ✓           | ✓          |            |
| 3 parameters simultaneously                                                    |                                                          |    | ✓           |            |            |
| pH                                                                             | IDS-pH electrodes: SenTix® 9xx, SensoLyt® 900            | 28 | ●           | ●          | ●          |
|                                                                                | All SenTix® electrodes with DIN or BNC plug              | 65 | ● *         | ● *        |            |
| ORP                                                                            | IDS ORP electrodes: SenTix® ORP 900-T, SensoLyt® ORP 900 | 32 | ●           | ●          | ●          |
|                                                                                | All SenTix® electrodes with DIN or BNC plug              | 73 | ● *         | ● *        | ● **       |
| ISE (pH/ION function)                                                          | ISE electrodes                                           | 81 | ● *         | ● *        |            |
|                                                                                | Ion-specific measurement programs                        | 40 | ●           | ●          |            |
| Dissolved oxygen                                                               | IDS Optical dissolved oxygen sensor: FDO® 925            | 33 | ●           | ●          | ●          |
| Conductivity                                                                   | IDS Conductivity cells: TetraCon® 925, LR 925/01         | 34 | ●           | ●          | ●          |
| Turbidity                                                                      | IDS turbidity sensor VisoTurb® 900                       | 36 | ●           | ●          | ●          |
| Routine measurements                                                           |                                                          |    | ✓           | ✓          | ✓          |
| Routine measurement with documentation                                         |                                                          |    | ✓           | ✓          | ✓          |
| AQA with documentation                                                         |                                                          |    | ✓           | ✓          | ✓          |
| R&D High resolution and precision                                              |                                                          |    | ✓           | ✓          | ✓          |
| Control measurements                                                           |                                                          |    | ✓           | ✓          | ✓          |
| LIMS connection                                                                |                                                          |    | ✓           | ✓          | ✓          |
| Quality assurance                                                              |                                                          |    | ✓           | ✓          | ✓          |
| Education                                                                      |                                                          |    | ✓           | ✓          | ✓          |
| Service                                                                        |                                                          |    | –           | –          | –          |
| Laboratory measurements                                                        |                                                          |    | ✓           | ✓          | ✓          |
| Field measurements                                                             |                                                          |    | –           | –          | –          |
| Depth measurements                                                             |                                                          |    | –           | –          | –          |
| Measurement according to pharmacopoeia:                                        | Conductivity                                             |    | ✓***        | ✓***       | ✓***       |
|                                                                                | diss. Oxygen                                             |    | ✓           | ✓          | ✓          |
| PC connection                                                                  |                                                          |    | ✓           | ✓          | ✓          |
| Memory                                                                         |                                                          |    | ✓           | ✓          | ✓          |
| USB interface                                                                  |                                                          |    | ✓           | ✓          | ✓          |
| Printer option                                                                 |                                                          |    |             |            | ✓          |
| Graphic display                                                                |                                                          |    |             |            | ✓          |
| Color graphic display                                                          |                                                          |    | ✓           | ✓          |            |
| * analogue electrodes can also be connected via an insertable DIN-/BNC adapter |                                                          |    |             |            |            |
| ** analogue electrodes with S7 plug head connectable via ADA S7/IDS            |                                                          |    |             |            |            |
| *** via comparison measurement                                                 |                                                          |    |             |            |            |

see page 40 40 41

# inoLab® Multi 9630 IDS/Multi 9620 IDS

The inoLab® Multi 9630 IDS and 9620 IDS are the top in their class. They are wireless ready and measure three (9630) or two (9620) of the following parameters simultaneously: pH, ORP, ISE, dissolved oxygen, conductivity or turbidity.

Complete GMP/GLP compliant documentation is possible.

## Housing

High-quality housing with die-cast zinc lower case, large color display and antibacterial keyboard.

## Display

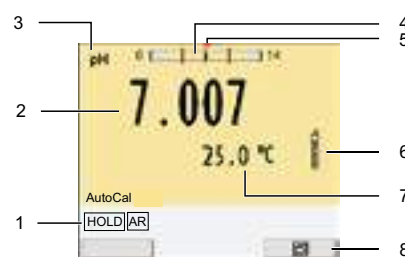
Large color graphic display in 16: 9 format, with CMC, QSC and measurement channel display, as well as soft keys for additional functions. Depending on the number of channels present, two or three main parameters are shown simultaneously. Individual presentation is also possible. Hygienic, easy-to-clean glass pane.

## Connectors

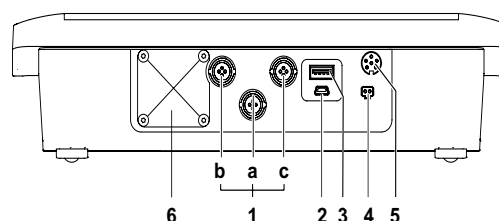
High-quality, tightly sealed socket field with moulded connectors for IDS sensors. There are three connections on the inoLab® Multi 9630, and two connections on the inoLab® Multi 9620.

## Keyboard

Easy-to-clean, antibacterial membrane keypad with clear pressure points for convenient operation and hygienic work.



- 1 Status information
- 2 Measurement value (with unit)
- 3 Measured parameter
- 4 Continuous measurement value control (CMC function; with pH measurement)
- 5 Display of the active sensor connection (measurement channel display)
- 6 Sensor symbol (calibration evaluation)
- 7 Temperature measurement value (with unit)
- 8 Soft keys and date/time



- 1 Three or two universal IDS sensor connectors (measurement channels) also for IDS wireless module
- 2 Mini USB-B for the connection to a PC (data transfer, firmware update, set up of a user management, power supply via USB)
- 3 USB-A socket for the connection of USB memory stick or selected printers
- 4 Connection for power supply through AC adapter
- 5 Service interface
- 6 Plug location for analogue pH/mV/ISE module

Order information see page 42

# inoLab® Multi 9310 IDS

The compact all-rounder of the IDS family: With one measuring channel and wireless ready pH, ORP, dissolved oxygen, conductivity and turbidity can be measured.

Comes with all the advantages of IDS technology, such as complete GLP documentation of all meter and sensor data.

## Housing

Smooth plastic housing with rounded edges and stand base for bolting on. A version with a built-in thermal printer (58 mm) is available.

## Display

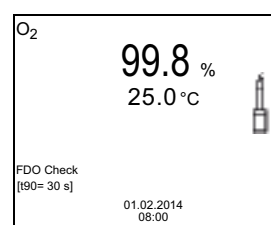
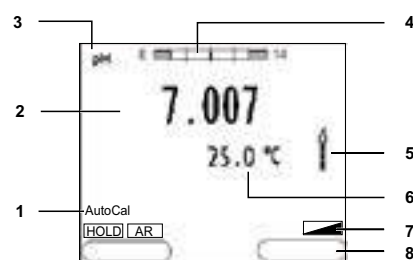
Bright and high-contrast black and white graphic display with soft keys and clear presentation.

## Connectors

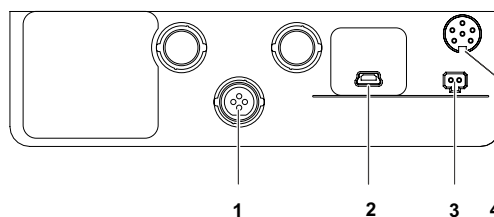
High-quality socket field with tightly sealed connection for IDS sensors (one connection).

## Keyboard

Smooth and easy-to-clean membrane keypad in a user-friendly layout with clear pressure points.



- 1 Status information
- 2 Measurement value (with unit)
- 3 Measured parameter
- 4 Continuous measurement value control (CMC function; with pH measurement)
- 5 Sensor symbol (calibration evaluation)
- 6 Temperature measurement value (with unit)
- 7 Status information (meter)
- 8 Soft keys and date/time



- 1 Universal IDS sensor connections (measurement channels), also for IDS wireless module
- 2 Mini USB-B for the connection to a PC (data transfer, firmware update, set up of a user management, power supply via USB)
- 3 Connection for power supply through AC adapter
- 4 Service interface

Order information see page 42



# Digital portable meters MultiLine® IDS

The digital portable meters for IDS sensors: **Multi 3630 IDS**, **Multi 3620 IDS**, **Multi 3510 IDS**: State-of-the-art portable measurement pH/mV, dissolved oxygen, conductivity and turbidity as well as depth profile measurement (Multi 3630 IDS). Robust, field-suitable and prepared for wireless measurement. Also available in a sets with various sensors.

|                                                                                |                                                          |    | Digital        |            |            |
|--------------------------------------------------------------------------------|----------------------------------------------------------|----|----------------|------------|------------|
|                                                                                |                                                          |    | MultiLine® IDS |            |            |
|                                                                                |                                                          |    | Multi 3630     | Multi 3620 | Multi 3510 |
| ✓ yes                                                                          |                                                          |    |                |            |            |
| ● yes                                                                          |                                                          |    |                |            |            |
| ✓ recommended                                                                  |                                                          |    |                |            |            |
| ✓ recommended for some applications                                            |                                                          |    |                |            |            |
| 2 parameters simultaneously                                                    |                                                          |    | ✓              | ✓          |            |
| 3 parameters simultaneously                                                    |                                                          |    | ✓              |            |            |
| pH                                                                             | IDS-pH electrodes: SenTix® 9xx, SensoLyt® 900            | 28 | ●              | ●          | ●          |
|                                                                                | All SenTix® electrodes with S7 plug head                 | 65 | ● **           | ● **       | ● **       |
| ORP                                                                            | IDS ORP electrodes: SenTix® ORP 900-T, SensoLyt® ORP 900 | 32 | ●              | ●          | ●          |
|                                                                                | All SenTix® electrodes with S7 plug head                 | 73 | ● **           | ● **       | ● **       |
| Dissolved oxygen                                                               | IDS dissolved oxygen sensor: FDO® 925                    | 33 | ●              | ●          | ●          |
| Conductivity                                                                   | IDS measuring cells: TetraCon® 925, LR 925/01            | 34 | ●              | ●          | ●          |
| Turbidity                                                                      | IDS turbidity sensor: VisoTurb® 900-P                    | 36 | ●              | ●          | ●          |
| Multi-parameter                                                                | IDS Depth sonde MPP 930                                  | 38 | ●              |            |            |
| Routine measurements                                                           |                                                          |    | ✓              | ✓          | ✓          |
| Routine measurements with documentation                                        |                                                          |    | ✓              | ✓          | ✓          |
| AQA with documentation                                                         |                                                          |    | ✓              | ✓          | ✓          |
| R&D: High resolution and precision                                             |                                                          |    | ✓              | ✓          | ✓          |
| Control measurements                                                           |                                                          |    | ✓              | ✓          | ✓          |
| LIMS connection                                                                |                                                          |    | ✓              | ✓          | ✓          |
| Quality assurance                                                              |                                                          |    | ✓              | ✓          | ✓          |
| Education                                                                      |                                                          |    | ✓              | ✓          | ✓          |
| Service                                                                        |                                                          |    | ✓              | ✓          | ✓          |
| Laboratory measurements                                                        |                                                          |    | ✓              | ✓          | ✓          |
| Field measurements                                                             |                                                          |    | ✓              | ✓          | ✓          |
| Depth measurements                                                             |                                                          |    | ✓              | ✓          | ✓          |
| PC connection                                                                  |                                                          |    | ✓              | ✓          | ✓          |
| Memory                                                                         |                                                          |    | ✓              | ✓          | ✓          |
| USB interface                                                                  |                                                          |    | ✓              | ✓          | ✓          |
| Graphic display                                                                |                                                          |    |                |            | ✓          |
| Color graphic display                                                          |                                                          |    | ✓              | ✓          |            |
| * analogue electrodes can also be connected via an insertable DIN-/BNC adapter |                                                          |    |                |            |            |
| ** analogue electrodes with S7 plug head connectable via ADA S7/IDS            |                                                          |    |                |            |            |
|                                                                                |                                                          |    | Multi 3630     | Multi 3620 | Multi 3510 |

see page 44 45 46

# Multi 3630 IDS/Multi 3620 IDS

Highest measurement safety and comfort in the field: The Multi 3630 IDS and 3620 IDS wireless ready portable meters are waterproof, robust and leave nothing to be desired in terms of parameter selection, operating comfort and data transmission options.

## Housing

Water- and dust-tight housing according to IP 67 for use outdoors and in a facility The armor SM Pro (component of the sets, as well as in the individual scope of delivery) offers additional protection.

## Display

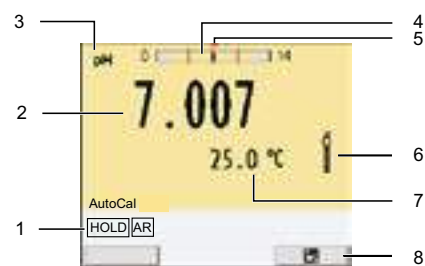
Brilliant color graphic display with clear plastic pane, with CMC, QSC and channel display, as well as soft keys for additional functions. Depending on the number of channels present, two or three main parameters can be shown simultaneously, or a single channel may be displayed alone if prefer.

## Connectors

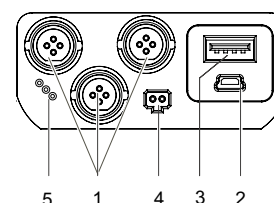
Inwardly waterproof sealed socket field with three or two universal sensor connectors, when plugged in IP 67 (also for IDS wireless module).

## Keyboard

Silicon keyboard that can also be operated with gloves made of one piece with embossed keys and tactile and acoustic feedback. waterproof and easy to clean.



- 1 Status information
- 2 Measurement value (with unit)
- 3 Measured parameter
- 4 Continuous measurement value control (CMC function; with pH measurement)
- 5 Display of the active sensor connection (measurement channel display)
- 6 Sensor symbol (calibration evaluation)
- 7 Temperature measurement value (with unit)
- 8 Soft keys and date/time



- 1 Three or two universal IDS sensor connections (measurement channels) also for IDS wireless module
- 2 Mini USB-B for the connection to a PC (data transfer, firmware update, set up of a user management, power supply via USB)
- 3 USB-A socket for the connection of USB memory stick or selected printers
- 4 Connection for power supply through AC adapter
- 5 Service interface

3 year  
warranty

IP 67



Order information see page 46

# Multi 3510 IDS

Simply Multi: With one measuring channel and wireless ready, pH, ORP, dissolved oxygen, conductivity and turbidity can be measured sequentially. Robust and reliable in the field with IDS technology for complete documentation of all meter and sensor data.

## Housing

Water- and dust-proof housing according to IP 67 for use outdoors and in a facility.

## Display

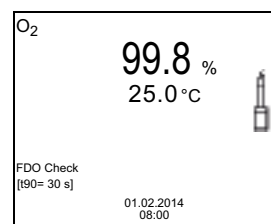
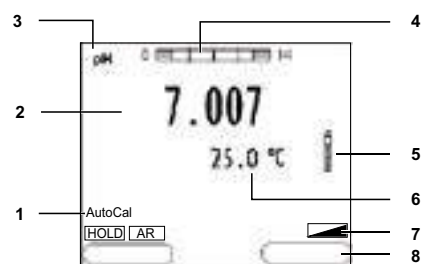
Backlit black/white graphic display, also for use in challenging lighting conditions. Supports QSC and CMC display, contains soft keys for additional functions.

## Connectors

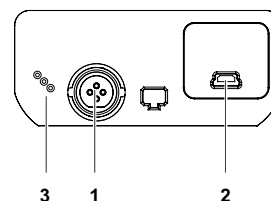
Waterproof sealed socket field with a sensor connection, when plugged in IP 67 (also for IDS wireless module).

## Keyboard

Silicon keyboard that can be operated with gloves and has tactile and acoustic feedback. One piece molded design is waterproof and easy to clean.



- 1 Status information
- 2 Measurement value (with unit)
- 3 Measured parameter
- 4 Continuous measurement value control (CMC function; with pH measurement)
- 5 Sensor symbol (calibration evaluation)
- 6 Temperature measurement value (with unit)
- 7 Battery display
- 8 Soft keys and date/time



- 1 Universal IDS sensor connections (measurement channels), also for IDS wireless module
- 2 Mini USB-B for the connection to a PC (data transfer, firmware update, set up of a user management, power supply via USB)
- 3 Service interface

Order information see page 46

# Analogue benchtop meters inoLab®

**inoLab**  
Innovations that make sense

The inoLab® family has long been a well-known term for first-class benchtop meters for the measurement of standard parameters such as pH/mV, ion concentrations, dissolved oxygen and conductivity. **The inoLab® 7320, inoLab® 7310 and inoLab® 7110 lines leave nothing to be desired during measurement.** All meters of the 7310 and 7110 lines are also available in sets with sensors.

|                                         | analogue |           |         |          |           |             |
|-----------------------------------------|----------|-----------|---------|----------|-----------|-------------|
|                                         | inoLab®  |           |         |          |           |             |
|                                         | pH 7110  | Cond 7110 | pH 7310 | Oxi 7310 | Cond 7310 | pH/ION 7320 |
| ✓ yes                                   |          |           |         |          |           |             |
| ● yes                                   |          |           |         |          |           |             |
| ✓ recommended                           |          |           |         |          |           |             |
| ✓ recommended for some applications     |          |           |         |          |           |             |
| – not recommended/not present           |          |           |         |          |           |             |
| 2 parameters simultaneously             |          |           |         |          |           | ✓           |
| pH                                      | ●        |           | ●       |          |           | ●           |
| ORP                                     | ●        |           | ●       |          |           | ●           |
| ISE                                     |          |           |         |          |           | ●           |
| Dissolved oxygen                        |          |           |         | ●        |           |             |
| Conductivity                            |          | ●         |         |          | ●         |             |
| Routine measurements                    | ✓        | ✓         | ✓       | ✓        | ✓         | ✓           |
| Routine measurements with documentation |          |           | ✓       | ✓        | ✓         | ✓           |
| AQA with documentation                  |          |           | ✓       | ✓        | ✓         | ✓           |
| R&D – high resolution and precision     |          |           | ✓       | ✓        | ✓         | ✓           |
| Control measurements                    | ✓        | ✓         | ✓       | ✓        | ✓         | ✓           |
| LIMS connection                         |          |           | ✓       | ✓        | ✓         | ✓           |
| Quality assurance                       |          |           | ✓       | ✓        | ✓         | ✓           |
| Education                               | ✓        | ✓         | ✓       | ✓        | ✓         | ✓           |
| Service                                 | –        | –         | –       | –        | –         | –           |
| Laboratory measurements                 | ✓        | ✓         | ✓       | ✓        | ✓         | ✓           |
| Field measurements                      |          |           |         |          |           |             |
| PC connection                           |          |           | ✓       | ✓        | ✓         | ✓           |
| Memory                                  |          |           | ✓       | ✓        | ✓         | ✓           |
| USB interface                           |          |           | ✓       | ✓        | ✓         | ✓           |
| Graphic display                         |          |           | ✓       | ✓        | ✓         | ✓           |
| Compatible sensor systems               |          |           |         |          |           |             |
| Analogue electrodes                     |          |           |         |          |           |             |
| pH electrodes                           | 65       | ✓         | ✓       |          |           | ✓           |
| ORP electrodes                          | 73       | ✓         | ✓       |          |           | ✓           |
| ISE electrodes                          | 81       |           |         |          |           | ✓           |
| Dissolved oxygen sensors                | 92       |           |         | ✓        |           |             |
| Conductivity cells                      | 105      | ✓         |         |          | ✓         |             |
|                                         | pH 7110  | Cond 7110 | pH 7310 | Oxi 7310 | Cond 7310 | pH/ION 7320 |
| see page                                | 57       | 99        | 57      | 88       | 98        | 42          |



# inoLab® 7310

Reliable, conveniently operated benchtops with documentation functions for GLP measurement in the laboratory with analogue sensors for pH/ORP, dissolved oxygen and conductivity. Also available with a built in printer.

## Housing

Smooth plastic housing with rounded edges and attachable stand. Available with built-in thermal printer (58 mm).

## Display

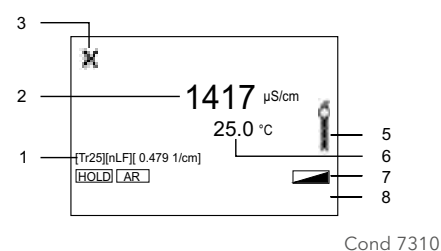
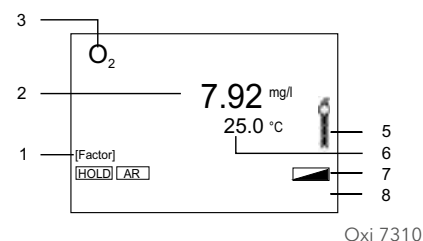
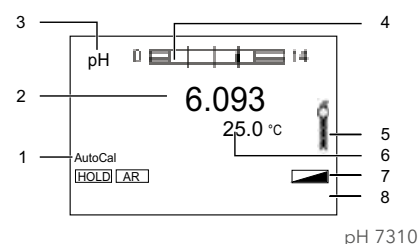
Backlit graphic display with clearly structured menus for comfortable and safe operation.

## Connectors

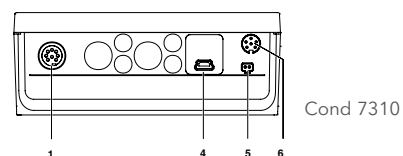
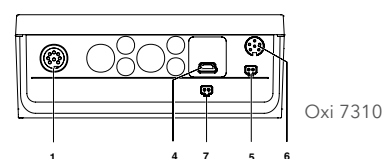
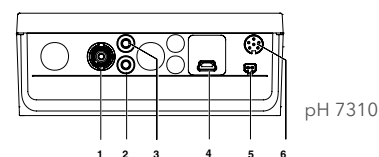
High-quality socket field with a connector for analogue pH/ORP or oxygen or conductivity sensors.

## Keyboard

Smooth and easy to clean membrane keypad with convenient pressure points and acoustic feedback. Clear layout to support optimal operation.



- 1 Status information
- 2 Measurement value (with unit)
- 3 Measured parameter
- 4 Continuous measurement value control (CMC function; with pH 7310)
- 5 Sensor symbol (calibration evaluation)
- 6 Temperature measurement value (with unit)
- 7 Status information (meter)
- 8 Soft keys and date/time



- 1 Connection for pH electrode or conductivity or dissolved oxygen sensor
- 2 Reference electrode (with pH 7310)
- 3 Temperature sensor (with pH 7310)
- 4 Mini USB-B interface for data transfer and firmware update
- 5 Connection for power supply
- 6 Service interface
- 7 Power supply for StirrOx dissolved oxygen sensor (with Oxi 7310)

Order information see page

57 (pH) 88 (Oxi) 99 (Cond)

# inoLab® pH/ION 7320

Precise 2-channel benchtop meter for pH/ISE/ORP measurement with analogue sensors and GLP-supporting documentation functions. With preprogrammed ISE incremental functions and on request with built-in printer.

## Housing

Smooth plastic housing with rounded edges and stand to be fixed at the meter. If required with installed thermal printer (58 mm).

## Display

Backlit graphic display for simultaneous display of the two measuring inputs. Clearly structured menus for convenient and safe operation.

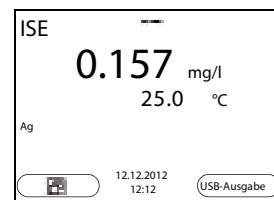
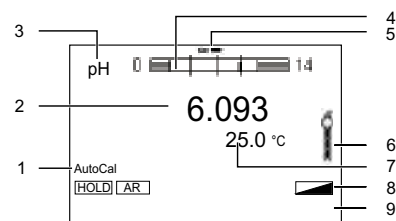
## Connectors

DIN or BNC sockets for pH/mV sensors, with additional inputs for reference electrodes and temperature sensor; 8 pin inputs for conductivity and oxygen electrodes.

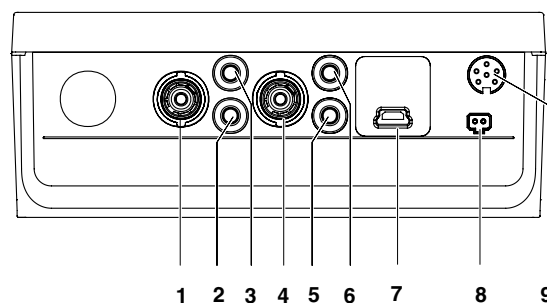
Mini USB-B interface for data transfer and firmware update, socket for power supply.

## Keyboard

Smooth and easy to clean membrane keypad with pleasant pressure points and acoustic feedback.



- 1 Status information
- 2 Measurement value (with unit)
- 3 Measured parameter
- 4 Continuous measurement value control (CMC function; with pH measurement)
- 5 Channel display Plug position of the sensor
- 6 Sensor symbol (calibration evaluation)
- 7 Temperature measurement value (with unit)
- 8 Status information (meter)
- 9 Soft keys and date/time



- 1 Connection for pH electrode or ISE electrode (channel 1)
- 2 Reference electrode (with pH /ISE measurement)
- 3 Temperature probe (with pH /ISE measurement)
- 4 Connection for pH electrode or ISE electrode (channel 2)
- 5 Reference electrode (with pH /ISE measurement)
- 6 Temperature probe (with pH /ISE measurement)
- 7 Mini USB-B interface for data transfer and firmware update
- 8 Connection for power supply through AC adapter
- 9 Service interface

Order information see page 78

# inoLab® 7110

Easy-to-use benchtop meters for the routine measurement of pH/ORP or conductivity. With a smooth, easy-to-clean surface and large, clear display.

## Housing

Compact plastic housing with rounded edges and smooth surface. With separate attachable electrode stand.

## Display

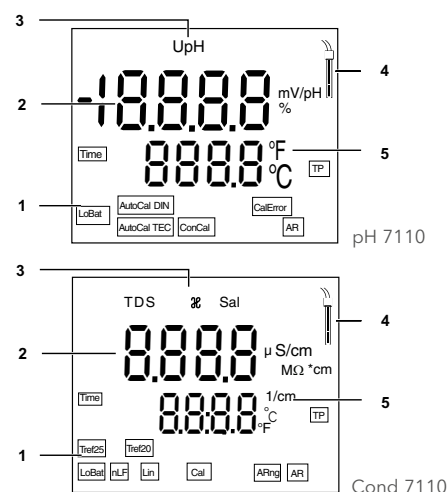
Large, clear and easy-to-read LCD segment display.

## Connectors

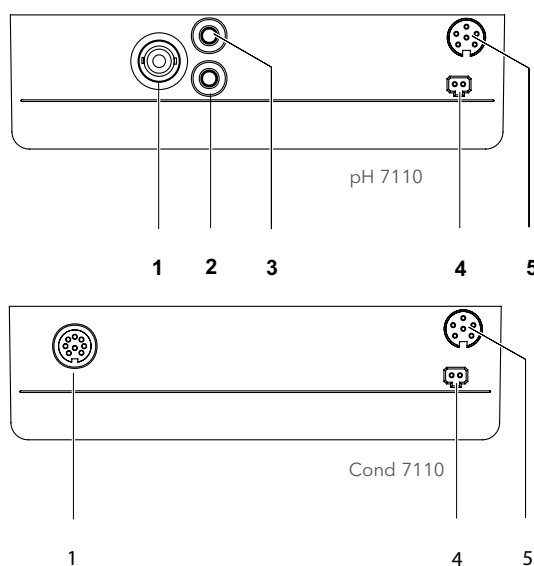
Quality is also the top priority for these meters. High-quality socket field made of one cast, DIN or BNC sockets for pH/mV sensors, with additional inputs for reference electrodes and temperature sensors; 8 pin inputs for conductivity electrodes, socket for plug power supply.

## Keyboard

Smooth, easy to clean membrane keypad with convenient pressure points and acoustic feedback. Reduced numbers of keys for easy and safe operation.



- 1 Status information
- 2 Measurement value (with unit)
- 3 Measured parameter
- 4 Sensor symbol (calibration evaluation))
- 5 Temperature measurement value (with unit)



- 1 Connection for pH electrode or conductivity cell
- 2 Reference electrode (with pH measurement)
- 3 Temperature probe (with pH measurement)
- 4 Connector for power supply through AC adapter
- 5 Service interface

Order information see page  
57 (pH) 99 (Cond)

# Analogue portable meters ProfiLine

The proven ProfiLine family of analogue portable meters for the mobile measurement of pH/mV, dissolved oxygen and conductivity. Robust, field-suitable multi and ISE single parameter meters. On request available in sets with proven sensors.

✓ yes

● yes

✓ recommended

✓ recommended for some applications

|                                         |     | analogue                 |          |           |         |          |           |             |            |              |
|-----------------------------------------|-----|--------------------------|----------|-----------|---------|----------|-----------|-------------|------------|--------------|
|                                         |     | ProfiLine                |          |           |         |          |           |             |            |              |
|                                         |     | pH 3110                  | Oxi 3205 | Cond 3110 | pH 3310 | Oxi 3310 | Cond 3310 | pH/ION 3310 | Multi 3320 | pH/Cond 3320 |
| 2 parameters simultaneously             |     |                          |          |           |         |          |           |             | ✓          | ✓            |
| pH/ORP                                  |     | ●                        |          |           | ●       |          |           | ●           | ●          | ●            |
| ISE                                     |     |                          |          |           |         |          |           | ●           | ●          | ●            |
| Dissolved oxygen                        |     |                          | ●        |           |         | ●        |           |             | ●          |              |
| Conductivity                            |     |                          |          | ●         |         |          | ●         |             | ●          | ●            |
| Routine measurements                    |     | ✓                        | ✓        | ✓         | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| Routine measurements with documentation |     |                          |          |           | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| AQA with documentation                  |     |                          |          |           | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| R&D: high resolution and precision      |     |                          |          |           | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| Control measurements                    |     | ✓                        | ✓        | ✓         | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| LIMS connection                         |     |                          |          |           | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| Quality assurance                       |     |                          |          |           | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| Education                               |     | ✓                        | ✓        | ✓         | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| Service                                 |     | ✓                        | ✓        | ✓         | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| Laboratory measurements                 |     | ✓                        | ✓        | ✓         | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| Field measurements                      |     | ✓                        | ✓        | ✓         | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| PC connection                           |     |                          |          |           | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| Memory                                  |     |                          |          |           | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| USB interface                           |     |                          |          |           | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
| Graphic display                         |     |                          | ✓        |           | ✓       | ✓        | ✓         | ✓           | ✓          | ✓            |
|                                         |     | Compatible sensor system |          |           |         |          |           |             |            |              |
|                                         |     | Analogue electrodes      |          |           |         |          |           |             |            |              |
| pH electrodes                           | 65  | ✓                        |          |           | ✓       |          |           | ✓           | ✓          | ✓            |
| ORP electrodes                          | 73  | ✓                        |          |           | ✓       |          |           | ✓           | ✓          | ✓            |
| ISE electrodes                          | 81  |                          |          |           |         |          |           | ✓           | ✓          | ✓            |
| Dissolved oxygen sensors                | 92  |                          | ✓        |           |         | ✓        |           |             | ✓          | ✓            |
| Conductivity cells                      | 106 |                          |          | ✓         |         |          | ✓         |             | ✓          | ✓            |
|                                         |     | pH 3110                  | Oxi 3205 | Cond 3110 | pH 3310 | Oxi 3310 | Cond 3310 | pH/ION 3310 | Multi 3320 | pH/Cond 3320 |
| see page                                |     | 62                       | 91       | 104       | 61      | 91       | 103       | 80          | 49         | 50           |

# ProfiLine 3320

Robust, waterproof multi-parameter instruments with extensive measuring functions for mobile use, available in the combinations pH, ORP, ISE, conductivity and pH, ORP, ISE, conductivity dissolved oxygen.

## Housing

IP 67 rated, water- and dust-tight housing for use outdoors and in facilities. Compatible with the SM Pro protective case.

## Display

Backlit BW graphic display, also for use in low light conditions for the simultaneous display of two measured parameters.

## Connectors

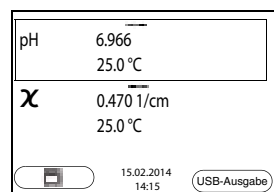
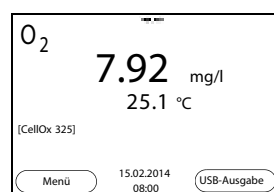
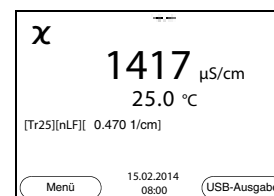
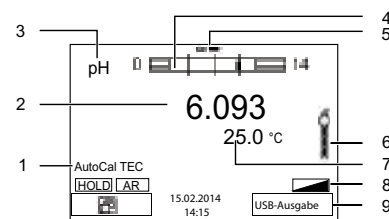
Waterproof socket field suitable for field use with two sensor connections.

DIN or BNC sockets for pH/mV sensors, with additional input for temperature sensor; 8-pin inputs for conductivity and oxygen electrodes.

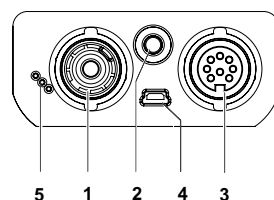
Mini USB-B interface for data transfer and firmware update, socket for power supply.

## Keyboard

Silicon keyboard that can also be operated with gloves with raised keys, with tactile and acoustic feedback. Waterproof and easy to clean.



- 1 Status information (sensor)
- 2 Measurement value (with unit)
- 3 Measured parameter
- 4 Continuous measurement value control (CMC function; with pH measurement)
- 5 Channel display Plug position of the sensor
- 6 Sensor symbol (calibration evaluation)
- 7 Temperature measurement value (with unit)
- 8 Status information (meters)
- 9 Soft keys and date/time



- 1 Connection for pH or ISE electrode
- 2 Reference electrode (with pH measurement)
- 3 Connection for conductivity or oxygen electrode
- 4 Mini USB-B interface for data transfer and firmware update
- 5 Service interface

Order information see page 50 (multi and pH/Cond)



# ProfiLine 3310

Robust, waterproof single-parameter meters with extensive measuring functions for mobile use, available in the variants pH, ORP, ISE, conductivity and dissolved oxygen.

## Housing

IP 67 rated Water- and dust-tight housing for use outdoors and in facilities. Compatible with the SM Pro protective case.

## Display

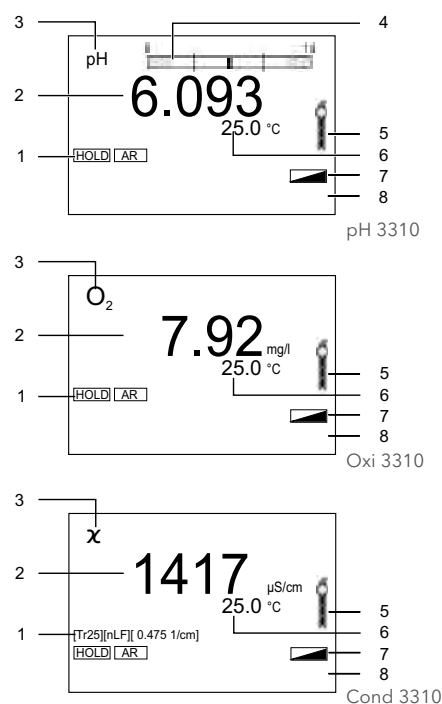
Backlit black/white graphic display, for use in challenging lighting conditions.

## Connectors

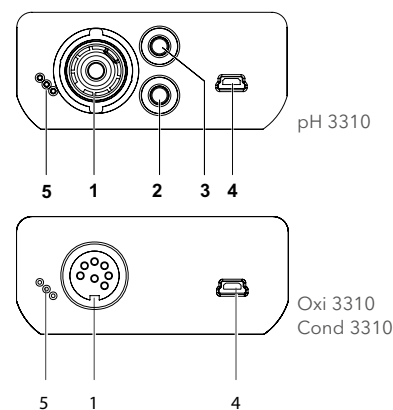
The 3310 has a waterproof DIN socket for pH/mV/ISE electrodes including reference and temperature sensor input, or a waterproof 8-pin socket for connecting WTW conductivity cells or dissolved oxygen sensors.

## Keyboard

Silicon keyboard that can be operated with gloves and has tactile and acoustic feedback. One piece molded design is waterproof and easy to clean.



- 1 Status information
- 2 Measurement value (with unit)
- 3 Measured parameter
- 4 Continuous measurement value control (CMC function; with pH 3310)
- 5 Sensor symbol (calibration evaluation)
- 6 Temperature measurement value (with unit)
- 7 Battery display
- 8 Soft keys and date/time



- 1 Connection for pH or ISE electrode or conductivity or dissolved oxygen sensor
- 2 Reference electrode (with pH measurement)
- 3 Temperature probe (with pH measurement)
- 4 Mini USB-B interface for data transfer and firmware update
- 5 Connection for power supply through AC adapter
- 6 Service interface

Order information see page  
62 (pH) 90 (Oxi) 104 (Cond)

# ProfiLine 3110/3205

Easy to use, robust and waterproof meters for portable use, for pH/ORP or conductivity measurement. Ideal for occasional measurements without documentation.

## Housing

IP 67 rated Water- and dust-tight housing for use outdoors and in facilities. Compatible with the SM Pro protective case.

## Display

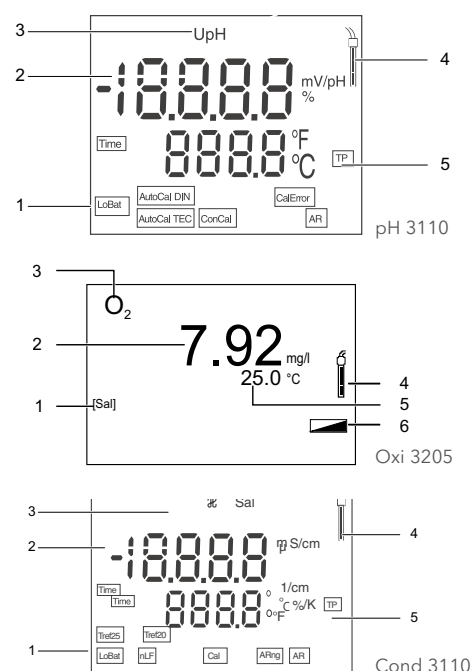
The 3110 meter have a clearly structured and easy-to-read segment display. The 3205 has a backlit BW graphic display, for use in challenging lighting conditions.

## Connectors

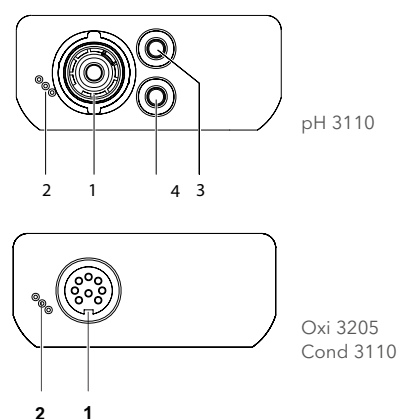
All sensor connections are IP 67 rated dust and waterproof. This ensures optimal signal transmission.

## Keyboard

Silicon keyboard that can be operated with gloves and has tactile and acoustic feedback. One piece molded design is waterproof and easy to clean.



- 1 Status information
- 2 Measurement value (with unit)
- 3 Measured parameter
- 4 Sensor symbol (calibration evaluation)
- 5 Temperature measurement value (with unit)
- 6 Battery display



- 1 Connection for pH electrode or conductivity or dissolved oxygen sensor
- 2 Reference electrode (with pH measurement)
- 3 Temperature probe (with pH measurement)
- 4 Service interface

Order information see page  
62 (pH) 90 (Oxi) 104 (Cond)

# Multi-parameter measurement



## Content

- 23 *Applications and meters overview*
- 24 *The IDS World*
  - 26 *IDS goes wireless - freely connected*
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  - 32 *IDS ORP electrodes*
  - 33 *IDS Optical dissolved oxygen sensor*
  - 34 *IDS Conductivity cells*
  - 36 *IDS Turbidity sensor*
  - 38 *IDS depth sonde MPP 930*
- 40 *Benchtop meters inoLab® Multi IDS - digital*
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- 43 *Portable meters MultiLine® IDS -digital*
- 47 *Portable meters ProfiLine analogue*
- 51 *Analogue sensors overview*

# Applications and meters overview

pH, ORP potential, ion concentration, dissolved oxygen, conductivity, turbidity - if at least two of these main parameters have to be measured, a multi-parameter instrument can make sense.

|                                         |                   |            |            |             |               |            |            |            |              |
|-----------------------------------------|-------------------|------------|------------|-------------|---------------|------------|------------|------------|--------------|
| ✓ yes                                   | Digital           |            |            | Analogue    | Digital       |            |            | Analogue   |              |
| ● yes                                   | inoLab® Multi IDS |            |            | inoLab®     | MultiLine IDS |            |            | ProfiLine  |              |
| ✓ recommended                           | Multi 9630        | Multi 9620 | Multi 9310 | pH/ION 7320 | Multi 3630    | Multi 3620 | Multi 3510 | Multi 3320 | pH/Cond 3320 |
| ✓ recommended for some applications     |                   |            |            |             |               |            |            |            |              |
| – not recommended                       |                   |            |            |             |               |            |            |            |              |
| 2 parameters simultaneously             | ✓                 | ✓          |            | ✓           | ✓             | ✓          |            | ✓          | ✓            |
| 3 parameters simultaneously             | ✓                 |            |            |             | ✓             |            |            |            |              |
| pH/ORP                                  | ●                 | ●          | ●          | ●           | ●             | ●          | ●          | ●          | ●            |
| Ion-selective measurement (ISE)         | ●                 | ●          |            | ●           |               |            |            | ●          | ●            |
| Dissolved oxygen                        | ●                 | ●          | ●          |             | ●             | ●          | ●          | ●          |              |
| Conductivity                            | ●                 | ●          | ●          |             | ●             | ●          | ●          | ●          | ●            |
| Turbidity                               | ●                 | ●          | ●          |             | ●             | ●          | ●          |            |              |
| Routine measurements                    | ✓                 | ✓          | ✓          | ✓           | ✓             | ✓          | ✓          | ✓          | ✓            |
| Routine measurements with documentation | ✓                 | ✓          | ✓          | ✓           | ✓             | ✓          | ✓          | ✓          | ✓            |
| Wireless ready                          | ✓                 | ✓          | ✓          |             | ✓             | ✓          | ✓          |            |              |
| AQA with documentation                  | ✓                 | ✓          | ✓          | ✓           | ✓             | ✓          | ✓          | ✓          | ✓            |
| R&D - high resolution and precision     | ✓                 | ✓          | ✓          | ✓           | ✓             | ✓          | ✓          | ✓          | ✓            |
| Control measurements                    | ✓                 | ✓          | ✓          | ✓           | ✓             | ✓          | ✓          | ✓          | ✓            |
| LIMS connection                         | ✓                 | ✓          | ✓          | ✓           | ✓             | ✓          | ✓          | ✓          | ✓            |
| Quality assurance                       | ✓                 | ✓          | ✓          | ✓           | ✓             | ✓          | ✓          | ✓          | ✓            |
| Education                               | ✓                 | ✓          | ✓          | ✓           | ✓             | ✓          | ✓          | ✓          | ✓            |
| Service                                 | –                 | –          | –          | –           | ✓             | ✓          | ✓          | ✓          | ✓            |
| Laboratory measurements                 | ✓                 | ✓          | ✓          | ✓           | ✓             | ✓          | ✓          | ✓          | ✓            |
| Field measurement                       | –                 | –          | –          | –           | ✓             | ✓          | ✓          | ✓          | ✓            |
| Depth measurements                      | –                 | –          | –          | –           | ✓             | ✓          | ✓          | –          | –            |
| PC connection                           | ✓                 | ✓          | ✓          | ✓           | ✓             | ✓          | ✓          | ✓          | ✓            |
| Memory                                  | ✓                 | ✓          | ✓          | ✓           | ✓             | ✓          | ✓          | ✓          | ✓            |
| USB interface                           | ✓                 | ✓          | ✓          | ✓           | ✓             | ✓          | ✓          | ✓          | ✓            |
| Graphic display                         |                   |            | ✓          | ✓           |               |            | ✓          | ✓          | ✓            |
| color graphic display                   | ✓                 | ✓          |            |             | ✓             | ✓          |            |            |              |
| Compatible sensor system                |                   |            |            |             |               |            |            |            |              |
| IDS pH/ORP electrodes 28/32             | ✓                 | ✓          | ✓          |             | ✓             | ✓          | ✓          |            |              |
| IDS Optical dissolved oxygen sensors 33 | ✓                 | ✓          | ✓          |             | ✓             | ✓          | ✓          |            |              |
| IDS conductivity cells 34               | ✓                 | ✓          | ✓          |             | ✓             | ✓          | ✓          |            |              |
| IDS Turbidity sensor 36                 | ✓                 | ✓          | ✓          |             | ✓             | ✓          | ✓          |            |              |
| IDS Depth Sonde 38                      |                   |            |            |             | ✓             |            |            |            |              |
| Analogue pH/ORP electrodes 65/73        | *)                | *)         | *)         |             | *)            | *)         | *)         | ✓          | ✓            |
| Analogue ISE electrodes 81              | *)                | *)         |            |             |               |            |            | ✓          |              |
| Analogue dissolved oxygen sensors 92    |                   |            |            |             |               |            |            | ✓          |              |
| Analogue conductivity cells 106         |                   |            |            |             |               |            |            | ✓          | ✓            |
|                                         | Multi 9630        | Multi 9620 | Multi 9310 | pH/ION 7320 | Multi 3630    | Multi 3620 | Multi 3510 | Multi 3320 | pH/Cond 3320 |
| see page                                | 40                | 40         | 41         | 56          | 44            | 45         | 46         | 49         | 50           |

\*) with adapter

# The WTW IDS world: Digital and innovative

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

The IDS system consists of two components: Digital sensors and matching portable and laboratory meters. The essential innovation is that the processing of the measured signals no longer takes place in the meters, but exclusively in the sensor.

## WTW IDS sensors: Digital, unique, distinctive

Based on the proven electrochemical WTW sensors, combined with state-of-the-art electronics, the new IDS sensors can store their serial number and calibration data in the sensor leerzeichen. This store information makes it easy to use one sensor on multiple meters.

However, the IDS sensors do not only store data but also process signals and thereby improve data quality. This also allows an evaluation of the sensor quality with pH electrodes by means of the QSC (Quality Sensor Control) function.

## Benefits of IDS

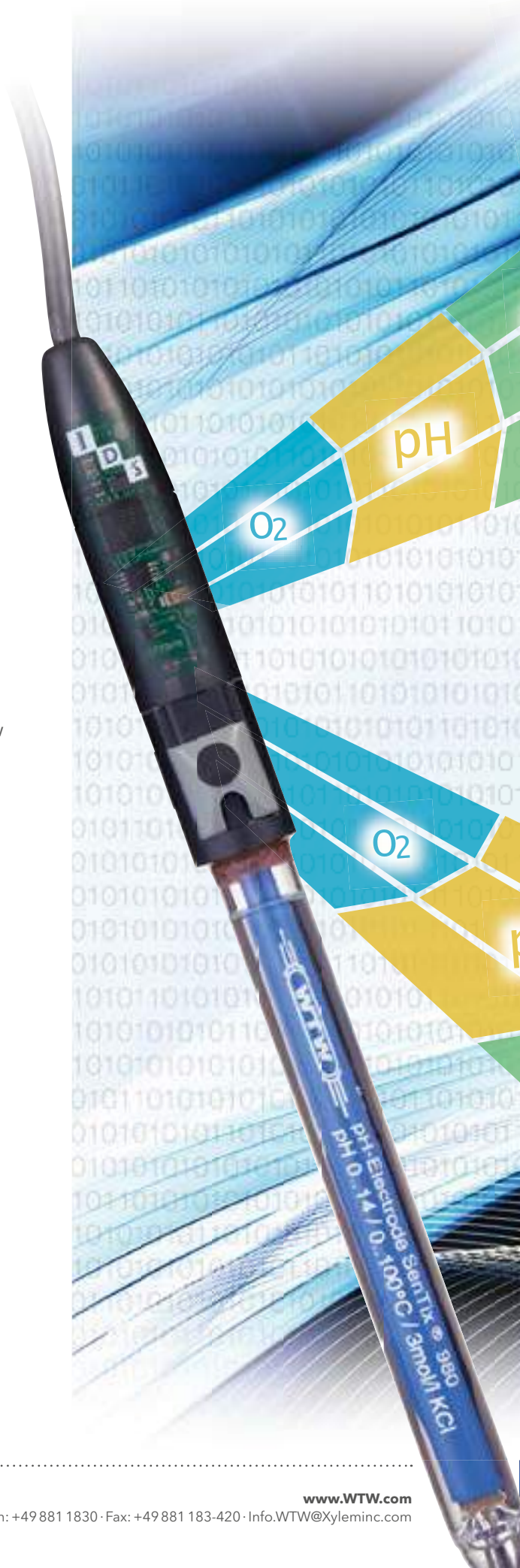
- Fail-safe measurement data by direct conversion of the raw signal in the sensor.
- All sensor, meter and user data are available for automatic documentation.
- Calibration data are stored directly in the sensor independently of the meter, and are therefore not lost.
- In addition to the measurement and calibration data, further additional information can be transmitted.

## Proven sensor technology

Based upon the tens of thousands of proven WTW sensors of the SenTix®, SensoLyt® and TetraCon® series, the IDS sensors provide more precision and reliability and cover almost any application.

## Freely connected - IDS goes wireless

Trend-setting for the digital laboratory: The meters of the IDS system can now also be expanded with wireless measured value transmission. New, universal wireless modules simplify work wherever cables and meters get in the way or there is simply too little space available.





Cond

pH

Cond



### **I** as intelligent:

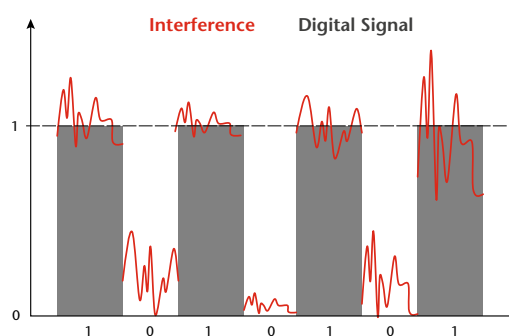
IDS sensors are intelligent. They log into the meter automatically, submit their description, serial number, calibration status and history, as well as all other parameters.

### **D** as digital:

IDS sensors convert the sensitive measuring signals in the sensor head into digital signals and transmit them to the meter without interference and errors, no matter if using a cable or a wireless module.

### **S** as sensor:

IDS sensors are based on proven and continuously enhanced WTW sensors. They cover almost any application, including pH, conductivity, dissolved oxygen or turbidity measurement.





# IDS goes wireless: freely connected



## Measure with wireless sensors where ever you want!

The new wireless modules for IDS plug head sensors are simply plugged onto the sensor and automatically connect to the meter- safely and clearly. No cables, no tugging, just freedom to move where a meter would usually be in the way. Even with portable field measurements under difficult conditions, one hand is always free. Recording measurement values is as easy as simply pressing a button on the sensor module!

-  **Wireless measurement**
-  **Securely connected**
-  **One module for all parameters**

## Wireless pH/ORP measurements

The pH measurement as the most important electrochemical measurement is carried out practically everywhere. And therefore most often in confined conditions in the laboratory, in the wet area, under laminar flow benches or fume hoods - just where cables are cumbersome to handle and meters are not desirable.

- Flexible - Plug head electrodes work with both cables as well as with wireless modules
- Easy processing of long measurements series in life science applications
- Penetration measurements in the food industry

## Wireless oxygen measurements

- BOD measurement in Karlsruher or Winkler bottles
- Full freedom of movement for sensor user
- Safe handling without cable tugging

## Wireless conductivity measurement

- Measurement under fume hoods, laminar flow benches or in confined spaces
- Series measurement in wastewater laboratory
- Flow-through measurements with groundwater pumping tests



## Unleash your sensor!

Plug the wireless module onto the IDS plug head sensor, confirm wireless connection - that's it!

All WTW-IDS sensors with plug head can be used.



## Intelligent module on the meter

The module on the IDS meter receives either one, two or three parameters simultaneously, depending on the number of available channels.



## Exchangeable modules for multiple sensors

Exchange the module from sensor to sensor or use a separate module for each sensor.

Cascadable charging stations and complete sets are available.



## Technical specifications: IDS wireless modules

|                                          |                                                                     |
|------------------------------------------|---------------------------------------------------------------------|
| <b>Wireless transmission</b>             | Bluetooth LE                                                        |
| <b>Range</b>                             | Approx. 10 m with intermediate walls and approx. 50 m line of sight |
| <b>Supply</b>                            | Rechargeable LiPo battery pack 230 mAh                              |
| <b>Operating times</b><br>(continuously) | IDS pH electrode 60 h                                               |
|                                          | IDS ORP electrode 60 h                                              |
|                                          | IDS conductivity cell 30 h (conductivity up to 1S/cm)               |
|                                          | IDS dissolved oxygen sensor 9 h                                     |
|                                          | Turbidity sensor 5 h                                                |
| <b>Signal</b>                            | RGB-LED                                                             |
| <b>Protection class</b>                  | IP54                                                                |
| <b>Usable sensors</b>                    | All WTW IDS sensors with plug head                                  |

## Order information: IDS wireless modules

| Model                   | Description                                                                                                                  | Order no. |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>IDS WLM Kit</b>      | Kit consisting of a wireless module for sensor and meter, USB charger and universal USB power supply                         | 108144    |
| <b>IDS WLM-S</b>        | Wireless module for plug head sensor                                                                                         | 108141    |
| <b>IDS WLM-M</b>        | Wireless module for IDS meter                                                                                                | 108142    |
| <b>WLM Charger</b>      | USB charger for wireless modules, cascadable, (up to 5 units, with WTW power supply), scope of delivery without power supply | 108143    |
| <b>NT USB Universal</b> | Universal USB power supply                                                                                                   | 902872    |

## IDS pH electrodes

pH measurement shows a wide range of applications, from routine measurement in aqueous solutions up to special applications in a variety of media such as strong acid or alkaline solutions, with suspended solids or non-aqueous phases. The sample consistency can vary from liquid to firm, and measurements can be taken in a sheltered laboratory environment or outdoors in harsh conditions. Across all these variables, the range of IDS electrodes has the solution.

### IDS pH electrodes for water, wastewater and other aqueous samples

- SenTix® 940(-P)  
Low-maintenance pH electrode with robust plastic shaft with gel electrolyte
- SenTix® 945(-P)  
Low-maintenance, fast-response pH electrode with a gel reference system and three ceramic junctions for the laboratory
- SenTix® 950(-P)  
Robust, liquid-filled electrode with plastic shaft and ceramic junctions for portable field measurement
- SenTix® 980(-P)  
Precision pH electrode with platinum wire junction and glass shaft for the laboratory
- SensoLyt® 900-P  
Pressure-resistant pH electrode with polymer electrolyte for depth measurement



from left to right: the digital IDS sensors and wireless ready IDS plug head electrodes (1) SenTix® 940, (2) SenTix® 940-P, (3) SenTix® 945, (4) SenTix® 945-P, (5) SenTix® 950, (6) SenTix® 950-P, (7) SenTix® 980, (8) SenTix® 980-P, (9) SensoLyt® 900-P

**pH electrodes for special samples (suspensions, emulsions, high and low ion concentrations)**

- SenTix® HW-T 900(-P)  
Precision pH electrode with liquid electrolyte; adjustable split ring junction

**pH measurement in semi-solid or viscous samples**

- SenTix® Sp-T 900(-P)  
pH electrode with spear-shaped membrane for penetration measurements

**pH measurement in small vessels**

- SenTix® Micro 900(-P)  
Micro pH electrode with 5 mm shaft diameter and built-in Temperature probe

- Secure measurement values by means of signal processing in the sensor
- Easy electrode exchange thanks to calibration data stored in the sensor
- Sensor quality monitoring through QSC function



from left to right: the digital IDS special electrodes and wireless ready IDS plug head electrodes (1) SenTix® HW-T 900, (2) SenTix® HW-T 900-P, (3) SenTix® Sp-T 900, (4) SenTix® Sp-T 900-P, (5) SenTix® Micro 900-P, (6) SenTix® Micro 900-P

## Technical specifications and order information:

### Low maintenance IDS pH electrodes with gel reference system

|                           | SenTix® 940   | SenTix® 940-3 | SenTix® 940-P           | SenTix® 945   | SenTix® 945-P           |
|---------------------------|---------------|---------------|-------------------------|---------------|-------------------------|
| <b>Order no.</b>          | 103740        | 103741        | 103760                  | 103743        | 103764                  |
| <b>Measuring range pH</b> | 0 ... 14 pH   | 0 ... 14 pH   | 0 ... 14 pH             | 0 ... 14 pH   | 0 ... 14 pH             |
| <b>Temperature range</b>  | 0 ... + 80 °C | 0 ... + 80 °C | 0 ... + 80 °C           | 0 ... + 80 °C | 0 ... + 80 °C           |
| <b>Reference system</b>   | Gel           | Gel           | Gel                     | Gel           | Gel                     |
| <b>Membrane shape</b>     | Cylinder      | Cylinder      | Ball                    | Ball          | Cylinder                |
| <b>Junction</b>           | Fibre         | Fibre         | Fibre                   | 3 x Ceramic   | 3 x Ceramic             |
| <b>Shaft material</b>     | Noryl         | Noryl         | Noryl                   | Glass         | Glass                   |
| <b>Shaft length</b>       | 120 mm        | 120 mm        | 120 mm                  | 120 mm        | 120 mm                  |
| <b>Shaft diameter</b>     | 12 mm         | 12 mm         | 12 mm                   | 12 mm         | 12 mm                   |
| <b>Temperature probe</b>  | NTC 30 kOhm   | NTC 30 kOhm   | NTC 30 kOhm             | NTC 30 kOhm   | NTC 30 kOhm             |
| <b>Cable length</b>       | 1.5 m         | 3 m           | 1.5 ... 100 m, wireless | 1.5 m         | 1.5 ... 100 m, wireless |

### Precision IDS pH electrodes with 3 mol/l KCl liquid reference

|                           | SenTix® 950          | SenTix® 950-P        | SenTix® 980          | SenTix® 980-P           |
|---------------------------|----------------------|----------------------|----------------------|-------------------------|
| <b>Order no.</b>          | 103750               | 103761               | 103780               | 103762                  |
| <b>Measuring range pH</b> | 0... 14 pH           | 0... 14 pH           | 0... 14 pH           | 0... 14 pH              |
| <b>Temperature range</b>  | 0 ... 80 °C          | 0 ... 80 °C          | 0 ... + 100 °C       | 0 ... + 100 °C          |
| <b>Reference system</b>   | KCl 3 mol/l Ag+ free | KCl 3 mol/l Ag+ free | KCl 3 mol/l Ag+ free | KCl 3 mol/l Ag+ free    |
| <b>Membrane shape</b>     | Cylinder             | Cylinder             | Cone                 | Cone                    |
| <b>Diaphragm</b>          | Ceramic              | Ceramic              | Platinum wire        | Platinum wire           |
| <b>Shaft material</b>     | PPE                  | PPE                  | Glass                | Glass                   |
| <b>Shaft length</b>       | 120 mm               | 120 mm               | 120 mm               | 120 mm                  |
| <b>Shaft diameter</b>     | 12 mm                | 12 mm                | 12 mm                | 12 mm                   |
| <b>Temperature probe</b>  | NTC 30 kOhm          | NTC 30 kOhm          | NTC 30 kOhm          | NTC 30 kOhm             |
| <b>Cable length</b>       | 1.5 m                | 1.5 m                | 1.5 m                | 1.5 ... 100 m, wireless |



## Special IDS-pH electrodes

|                           | SenTix® Micro 900    | SenTix® Micro 900-P     | SensoLyt® 900-P         |
|---------------------------|----------------------|-------------------------|-------------------------|
| <b>Order no.</b>          | 103751               | 103765                  | 103748                  |
| <b>Measuring range pH</b> | 0...14 pH            | 0...14 pH               | 0...12 pH               |
| <b>Temperature range</b>  | 0 ... + 100 °C       | 0 ... + 100 °C          | 0 ... 60 °C             |
| <b>Reference system</b>   | KCl 3 mol/l Ag+ free | KCl 3 mol/l Ag+ free    | Polymer                 |
| <b>Membrane shape</b>     | Cylinder             | Cylinder                | Cylinder                |
| <b>Junction</b>           | Platinum wire        | Platinum wire           | Hole                    |
| <b>Shaft material</b>     | Glass                | Glass                   | Glass                   |
| <b>Shaft length</b>       | 65/130 mm            | 65/130 mm               | 120 mm                  |
| <b>Shaft diameter</b>     | 12/5 mm              | 12/5 mm                 | 12 mm                   |
| <b>Temperature probe</b>  | NTC 30 KOhm          | NTC 30 KOhm             | NTC 30 KOhm             |
| <b>Cable length</b>       | 1.5 m                | 1.5 ... 100 m, wireless | 1.5 ... 100 m, wireless |

|                           | SenTix® HW-T 900     | SenTix® HW-T 900-P      | SenTix® SP-T 900 | SenTix® SP-T 900-P      |
|---------------------------|----------------------|-------------------------|------------------|-------------------------|
| <b>Order no.</b>          | 103753               | 103767                  | 103752           | 103766                  |
| <b>Measuring range pH</b> | 0...14 pH            | 0...14 pH               | 2...13 pH        | 2...13 pH               |
| <b>Temperature range</b>  | 0 ... + 60 °C        | 0 ... + 60 °C           | 0 ... + 80 °C    | 0 ... + 80 °C           |
| <b>Reference system</b>   | KCl 3 mol/l Ag+ free | KCl 3 mol/l Ag+ free    | Polymer          | Polymer                 |
| <b>Membrane shape</b>     | Cylinder             | Cylinder                | Spear            | Spear                   |
| <b>Junction</b>           | Split ring           | Split ring              | Hole             | Hole                    |
| <b>Shaft material</b>     | Glass                | Glass                   | Glass            | Glass                   |
| <b>Shaft length</b>       | 170 mm               | 170 mm                  | 65/25 mm         | 65/25 mm                |
| <b>Shaft diameter</b>     | 12 mm                | 12 mm                   | 15/5mm           | 15/5mm                  |
| <b>Temperature probe</b>  | NTC 30 KOhm          | NTC 30 KOhm             | NTC 30 KOhm      | NTC 30 KOhm             |
| <b>Cable length</b>       | 1.5 m                | 1.5 ... 100 m, wireless | 1.5 m            | 1.5 ... 100 m, wireless |

Accuracy IDS electronics  $\pm 0.004$  pH  
mV  $\pm 0.2$  mV

## Adapter for analogue pH electrodes

An adapter for all analogue pH electrodes with S7 plug head allows the connection of special electrodes to any IDS multi-parameter meters.



ADA S7/IDS

## IDS ORP electrodes

There are two different IDS ORP electrodes for the measurement, one for the standard applications in the laboratory and the other for field use.

- 
**Secure measurement values by means of signal processing in the sensor**
- 
**Integrated temperature probe NTC 30 kOhm for precise value documentation**
- 
**Best possible GLP support through documentation of the sensor data**

**Universal ORP electrode with platinum round blank for laboratory applications**

- SenTix® ORP-T 900(-P )



**Pressure-resistant IDS platinum ORP electrode for measurement at depth**

- SensoLyt® ORP 900-P



## Technical specifications and order information: SenTix® IDS ORP electrodes

|                              | SenTix® ORP-T 900      | SenTix® ORP-T 900-P     | SensoLyt® ORP 900-P                                      |
|------------------------------|------------------------|-------------------------|----------------------------------------------------------|
| <b>Order no.</b>             | 103791                 | 103763                  | 103749                                                   |
| <b>Measuring range</b>       | -1250.0 ... +1250.0 mV | -1250.0 ... +1250.0 mV  | -1250.0 ... +1250.0 mV                                   |
| <b>Work area °C</b>          | 0 ... 100 °C           | 0 ... 100 °C            | - 5 ... 100 °C                                           |
| <b>Reference electrolyte</b> | KCl 3 mol/l            | KCl 3 mol/l             | 0 ... 60 °C                                              |
| <b>Sensor</b>                | Platinum               | Platinum                | Platinum                                                 |
| <b>Sensor form</b>           | (4 mm)                 | (4 mm)                  | Ring                                                     |
| <b>Junction</b>              | Ceramic                | Ceramic                 | Hole                                                     |
| <b>Shaft material</b>        | Glass                  | Glass                   | Glass                                                    |
| <b>Shaft length (±2 mm)</b>  | 120 mm                 | 120 mm                  | 120 mm                                                   |
| <b>Shaft-Ø (±0,5 mm)</b>     | 12 mm                  | 12 mm                   | 12 mm                                                    |
| <b>Temperature probe</b>     | NTC 30 kOhm            | NTC 30 kOhm             | NTC 30 kOhm                                              |
| <b>Cable length</b>          | 1.5 m                  | 1.5 ... 100 m, wireless | 1.5 ... 100 m, wireless, pressure-resistant up to 10 bar |

Accuracy IDS electronics ± 0.2 mV

## IDS optical dissolved oxygen sensor



### Up-to-date standard compliant oxygen measurement

The most modern type of oxygen measurement: No chemicals, no electrolytes, instead a membrane cap with a special oxygen-selective dye. Measurement without maintenance effort, fast and precise - and recognised as per DIN ISO 17289: 2014-12 as standard method for measurement of dissolved oxygen.

- **Saves time and money - low-maintenance and fast ( $t_{99} < 60s$ )**
- **Flow-free; with chamfered membrane**
- **Factory-calibrated sensor cap with smart chip**

**Precise, flow-free optical IDS dissolved oxygen sensor for field and laboratory use.**

- FDO® 925(-P)



### Technical specifications and order information: IDS dissolved oxygen sensors

|                                  | FDO® 925                                        | FDO® 925-3                                      | FDO® 925-P                                               |
|----------------------------------|-------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|
| Order no.                        | 201300                                          | 201301                                          | 201306                                                   |
| Method                           | Optical                                         | Optical                                         | Optical                                                  |
| Response time $T_{99}$ (20 °C)   | < 60 s                                          | < 60 s                                          | < 60 s                                                   |
| Measuring range concentration    | 0.00...20.00 mg/l $\pm 0,5$ % of measured value | 0.00...20.00 mg/l $\pm 0,5$ % of measured value | 0.00...20.00 mg/l $\pm 0,5$ % of measured value          |
| Measuring range saturation       | 0.0 ... 200.0 % $\pm 0,5$ % of measured value   | 0.0 ... 200.0 % $\pm 0,5$ % of measured value   | 0.0 ... 200.0 % $\pm 0,5$ % of measured value            |
| Measuring range partial pressure | 0.0 to 400 hPa $\pm 0.5$ % of measured value    | 0.0 to 400 hPa $\pm 0.5$ % of measured value    | 0.0 to 400 hPa $\pm 0.5$ % of measured value             |
| Temperature                      | 0 ... 50.0 °C $\pm 0.2$ °C                      | 0 ... 50.0 °C $\pm 0.2$ °C                      | 0 ... 50.0 °C $\pm 0.2$ °C                               |
| Membrane shape                   | Chamfered                                       | Chamfered                                       | Chamfered                                                |
| Shaft material                   | POM, stainless steel                            | POM, stainless steel                            | POM, stainless steel                                     |
| Shaft length                     | 140 mm                                          | 140 mm                                          | 140 mm                                                   |
| Diameter                         | 15.3 mm                                         | 15.3 mm                                         | 15.3 mm                                                  |
| Cable length                     | 1.5 m                                           | 3 m                                             | 1.5 ... 100 m, wireless, pressure-resistant up to 10 bar |

## IDS conductivity cells

Two important parameters affect conductivity measurements: the cell constant and temperature compensation. Both must be specified manually when using different cells and analogue meters. With IDS conductivity cells, these data are transferred automatically - a clear advantage in measurement reliability!

- **Proven two or four electrode technology**
- **Easiest handling, robust design**
- **Broad application range from ultrapure water up to highly concentrated solutions**

### IDS graphite cells for universal use

- TetraCon® 925(-P)

Universal measuring cell for laboratory and field

### IDS Graphite measuring cells for special applications

- TetraCon® 925/C

Modified measuring cell with acid-proof PEEK head

- TetraCon® 925/LV(-P)

Measuring cell for small volumes and viscous samples

### Two electrode ultrapure water measuring cell

- LR 925/01(-P)

Two electrode measuring cell for conductivities up to 200  $\mu\text{S}/\text{cm}$



from left to right: the digital IDS sensors and wireless ready IDS plug head electrodes (1) TetraCon® 925, (2) TetraCon® 925-P, (3) TetraCon® 925 / C, (4) TetraCon® 925 / LV, (5) TetraCon® 925 / LV-P, (6) LR 925/01, (7) LR 925/01-P

## Specifications and order information: IDS conductivity cells

### Universal applications:

|                                  | <b>TetraCon® 925</b>   | <b>TetraCon® 925-3</b> | <b>TetraCon® 925-P</b>                                   |
|----------------------------------|------------------------|------------------------|----------------------------------------------------------|
| <b>Order number</b>              | 301710                 | 301711                 | 301716                                                   |
| <b>Type</b>                      | 4 electrode            | 4 electrode            | 4 electrode                                              |
| <b>Electrode material</b>        | Graphite               | Graphite               | Graphite                                                 |
| <b>Flow through vessel</b>       | -                      | -                      | -                                                        |
| <b>Shaft material</b>            | Epoxy                  | Epoxy                  | Epoxy                                                    |
| <b>Shaft length</b>              | 120 mm                 | 120 mm                 | 120 mm                                                   |
| <b>Cell constant</b>             | 0.475 cm <sup>-1</sup> | 0.475 cm <sup>-1</sup> | 0.475 cm <sup>-1</sup>                                   |
| <b>Diameter</b>                  | 15.3 mm                | 15.3 mm                | 15.3 mm                                                  |
| <b>Measurement range</b>         | 1 µS/cm to 2000 mS/cm  | 1 µS/cm to 2000 mS/cm  | 1 µS/cm to 2000 mS/cm                                    |
| <b>Temperature range</b>         | 0 to 100 °C            | 0 to 100 °C            | 0 to 100 °C                                              |
| <b>Temperature sensor</b>        | NTC 30 kOhm            | NTC 30 kOhm            | NTC 30 kOhm                                              |
| <b>min./max. immersion depth</b> | 36/120 mm              | 36/120 mm              | 36/120 mm                                                |
| <b>Cable length</b>              | 1.5 m*                 | 3 m                    | 1.5 ... 100 m, wireless, pressure resistant up to 10 bar |

### Special applications

|                                  | <b>TetraCon® 925/C</b> | <b>TetraCon® 925/LV</b> | <b>TetraCon® 925/LV-P</b>                                 |
|----------------------------------|------------------------|-------------------------|-----------------------------------------------------------|
| <b>Order number</b>              | 301721                 | 301718                  | 301719                                                    |
| <b>Type</b>                      | 4 electrode            | 4 electrode             | 4 electrode                                               |
| <b>Electrode material</b>        | Graphite               | Graphite                | Graphite                                                  |
| <b>Shaft material</b>            | Epoxy                  | Epoxy                   | Epoxy                                                     |
| <b>Shaft length</b>              | 120 mm                 | 120 mm                  | 120 mm                                                    |
| <b>Cell constant</b>             | 0.475 cm <sup>-1</sup> | 0.469 cm <sup>-1</sup>  | 0.469 cm <sup>-1</sup>                                    |
| <b>Diameter</b>                  | 15.3 mm                | 15.3 mm                 | 15.3 mm                                                   |
| <b>Measurement range</b>         | 1 µS/cm ... 2000 mS/cm | 1 µS/cm ... 2000 mS/cm  | 1 µS/cm ... 2000 mS/cm                                    |
| <b>Temperaturbereich</b>         | 0 ... 100 °C           | 0 ... 100 °C            | 0 ... 100 °C                                              |
| <b>Temperature sensor</b>        | NTC 30 kOhm            | NTC 30 kOhm             | NTC 30 kOhm                                               |
| <b>min./max. immersion depth</b> | 36/120 mm              | 16/120 mm               |                                                           |
| <b>Cable length</b>              | 1.5 m                  | 1.5 m                   | 1.5 ... 100 m, wireless, pressure resistant up to 10 bars |

### Ultra pure water applications

|                                  | <b>LR 925/01</b>       | <b>LR 925/01-P</b>      |
|----------------------------------|------------------------|-------------------------|
| <b>Order number</b>              | 301720                 | 301722                  |
| <b>Electrode material</b>        | Stainless steel V4A    | Stainless steel V4A     |
| <b>Flow through vessel</b>       | Glass                  | Glass                   |
| <b>Shaft material</b>            | Stainless steel V4A    | Stainless steel V4A     |
| <b>Shaft length</b>              | 120 mm                 | 120 mm                  |
| <b>Cell constant</b>             | 0.1 cm <sup>-1</sup>   | 0.1 cm <sup>-1</sup>    |
| <b>Diameter</b>                  | 12 mm                  | 12 mm                   |
| <b>Measurement range</b>         | 0.01 ... 200 µS/cm     | 0.01 ... 200 µS/cm      |
| <b>Temperature range</b>         | 0...100 °C             | 0...100 °C              |
| <b>Temperature sensor</b>        | NTC 30 kOhm            | NTC 30 kOhm             |
| <b>Volume</b>                    | 17 ml (without sensor) | 17 ml (without sensor)  |
| <b>min./max. immersion depth</b> | 30/120 mm              | 30/120 mm               |
| <b>Cable length</b>              | 1.5 m                  | 1.5 ... 100 m, wireless |



## IDS turbidity sensor

The new VisoTurb® 900-P is an infrared turbidity sensor for direct measurement in the medium for laboratory and mobile applications. Application areas are surface water, pumping tests, groundwater, monitoring of filters in food and beverage production, and anywhere turbidity needs to be measured quickly and easily.

The VisoTurb® 900-P conforms to DIN ISO 27027 with infrared light at a scattering angle of 90°.

-  **Handy turbidity sensor with titanium shaft**
-  **Simple 2- or 3-point calibration**
-  **Suitable for multi-parameter measurement with MPP-IDS**

### Technical specifications and order information: IDS turbidity sensor

| VisoTurb® 900-P                  |                                                                                                    |
|----------------------------------|----------------------------------------------------------------------------------------------------|
| Order no.                        | 600700                                                                                             |
| Parameter                        | FNU or NTU                                                                                         |
| Temperature                      | Operating temperature: -5 to 50 °C                                                                 |
| Measuring range                  | 0 to 4000 FNU                                                                                      |
| Accuracy                         | 0 to 999 FNU: 0.3 FNU or ±2 %, (depending which is larger)<br>1000 to 4000 FNU: ± 5 % of the value |
| Wavelength of the exciting light | 860 nm ± 15 nm                                                                                     |
| Measurement angle                | 90°                                                                                                |
| Pressure resistance (IP 68)      | 10 bar                                                                                             |
| Connection                       | 1.5 ... 100 m, wireless                                                                            |



VisoTurb® 900-P

## Accessories for IDS sensors

### Protection for IDS sensors

Measurements in the field required robust meters and sensors. There are a wide range of accessories available to further enhance the protection of your instruments.

Protection accessories are available to avoid damaging sensors during usage in harsh conditions such as in floodwater, boreholes, rivers containing debris, or in channels and tanks.

The range extends from plastic protection for pH laboratory electrodes used in mobile application in the field and in production up to a solid stainless steel version, which simultaneously acts as a sinker.

#### A pHLab/K:

- Protection for precision pH electrodes with 120 mm glass shaft
- Significantly reduces the risk of breakage when measuring in the process and in the field

#### A 925/K, A 925/K-P and A 925/S-P:

- Protection for tough field use of pressure-resistant IDS sensors
- Version for IDS sensors with and without plug head



### Flow-through measurement in the field

For groundwater measurement, there is a flow-through vessel with the possibility to measure up to three parameters simultaneously. Pump measurement in the field is made easier with a tripod for uneven ground or the pole support. The hose connections are designed for standard 19 mm (3/4") garden hoses.



D 3Sen for mast assembly



D 3Sen in a tripod ground stand

## Order information: Accessories for IDS sensors

| Model            | Description                                                                                                              | Order no. |
|------------------|--------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>A 925-P/K</b> | Protection for IDS field sensors with plug head, plastic                                                                 | 903839    |
| <b>A 925-P/S</b> | Protection for IDS field sensors with plug head, stainless steel                                                         | 903840    |
| <b>A pHLab/K</b> | Protection for pH and ORP electrode with a length of 120 mm                                                              | 903841    |
| <b>D 3Sen</b>    | Flow-through vessel in a tripod ground stand for up to three pH, ORP, oxygen or conductivity sensors (also IDS versions) | 903842    |

Accessories see price list or [www.WTW.com](http://www.WTW.com)

## Depth sonde MPP 930 IDS



- **Measures pH, conductivity, dissolved oxygen and turbidity - up to three main parameters simultaneously, plus depth and temperature**
- **Barometric pressure-compensated depth measurement for accurate results**
- **Profile measurement without tangled cables - special cable reel with sliding contacts available**

MPP 930-pH/FDO®/Cond-Kit

Multi-parameter probe for the simultaneous measurement of up to three of the following parameters. Dissolved oxygen (optical), pH or ORP, conductivity and turbidity. A built-in pressure sensor supplies the depth reading. Each sensor includes self contained temperature compensation.

Typical applications include limnological studies up to a depth of 100 meters, but also measurements in wells, dump site monitoring and much more.

The Multi 3630 IDS is required for measurement. The probe is available in a kit with sensors.



## IDS depth profile measurement

Depth profile measurement with the WTW IDS system: A temperature- and barometric pressure-compensated pressure sensor integrated in the depth sonde combines dissolved oxygen, pH or ORP and conductivity with exact depth indication.



## Novel plug head system

No Twisting. One click and the connection to the MPP is closed in a pressure-resistant, tensile-resistant and data-safe manner. With thin and tear-resistant cables in different lengths.



## Special cable reel with sliding contacts

Unwind the cable and conveniently read the data on the meter: This is enabled by the optional cable reel with sliding contacts for up to 100m of cable.



## Technical specifications: IDS depth sonde

| MPP 930 IDS                         |                   |
|-------------------------------------|-------------------|
| Length                              | 500 mm            |
| Diameter                            | 70 mm             |
| Weight                              | 3.0 kg            |
| Measuring range depth measurement   | 0.50 to 100 m     |
| Dissolution                         | 0.05 m            |
| Accuracy                            | ± 0.25 m at 100 m |
| Number of the sensor plug locations | 3                 |

## Order information: IDS depth sonde

| Model                    | Description                                                                                                                                                                              | Order no. |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| MPP 930-pH/FDO®/Cond-Kit | Digital multi-parameter depth sonde, for Multi 3630 IDS, in the kit with pressure-resistant digital pH, oxygen and conductivity sensors, in a field carrying case including accessories. | 401206    |

For accessories, see price list or [www.WTW.com](http://www.WTW.com)



# Digital multi-parameter benchtop meters

inoLab® Multi 9630, 9620 IDS: measure securely



inoLab® Multi 9630

- Three or two universal measuring channels
- Digital sensor recognition
- Prepared for IDS wireless modules

3 year  
Warranty

IP 43



The inoLab® Multi 9630 IDS and inoLab® Multi 9620 IDS are the new, wireless-ready, high-performance, three-channel and dual-channel digital benchtop meters with a glass-protected color graphic display, high-quality die-cast zinc base and antibacterial keyboard. With these multi channel instruments, several parameters can be measured and documented simultaneously.

The new MultiLab® user enables the assignment of individual user rights for life science and other regulated applications.

## Measurement safety

- The digital signal transfer eliminates interference, safely allocates calibration data, simply transmits sensor data
- The intelligent sensor evaluation (QSC) provides information about the actual state of the electrode and therefore increases the operational safety
- Secure wireless connection by clear allocation of sensor and meter

## GLP/AQA compliant documentation

- Automatic, digital capture of all sensor data for the clear traceability of the measured values
- Activatable user management with definable user rights for the safe allocation of users, measurement results and sample
- Data output on PC, USB memory stick or printer
- ISE measurement with increment methods

## Flexible and high performance

- Any combination of parameters
- Backlit graphic display with CMC, QSC and channel display
- Adapter for analogue pH/ISE/ORP electrodes
- Memory with 10,000 entries



## inoLab® Multi 9310 IDS: determine securely



inoLab® Multi 9630

- One universal measuring channel
- Digital sensor recognition
- IDS wireless module compatible

3 year  
warranty

IP 43



The Lab 9310 with a digital measuring channel is very suitable to enter the world of digital multi-parameter measurement using IDS sensors. The IDS technology allows optimized measurements and efficient documentation in the simplest manner.

The inoLab® Multi 9310 IDS is compatible with the wireless IDS modules.

### GLP/AQA compliant documentation

- Automatic, digital recording of all sensor data for the clear traceability of the measured values
- Activatable user management with definable user rights for the safe allocation of user and measurement result
- Transmission of all data in \*.csv format via USB interface to PC; if desired, formatted transfer to Excel (MultiLab® Importer, included in the delivery or as a download).
- Output directly into the meter possible; via optional built-in printer.



## Technical specifications: Digital multi-parameter benchtop meters

|                                        | inoLab® Multi 9630 IDS                                                                                                                          | inoLab® Multi 9620 IDS                               | inoLab® Multi 9310 IDS                              |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------|
| <b>Parameter</b>                       | pH, mV, O <sub>2</sub> (saturation, concentration, partial pressure), conductivity (specific resistance, salinity, TDS), temperature, turbidity |                                                      |                                                     |
| <b>Digital/IDS sensors</b>             | ●                                                                                                                                               | ●                                                    | ●                                                   |
| <b>Universal measuring channels</b>    | 3                                                                                                                                               | 2                                                    | 1                                                   |
| <b>Analogue pH/ORP and ISE sensors</b> | ADA 94 pH/IDS                                                                                                                                   | ADA 94 pH/IDS                                        | ADA S7/IDS (optional; no ISE measurement possible)  |
| <b>Temperature compensation</b>        | All except for ORP                                                                                                                              | All except for ORP                                   | All except for ORP                                  |
| <b>Calibration points:</b>             |                                                                                                                                                 |                                                      |                                                     |
| <b>pH measurement</b>                  | 1-5                                                                                                                                             | 1-5                                                  | 1-5                                                 |
| <b>ISE measurement</b>                 | 2-7 (Adapter necessary)                                                                                                                         | 2-7 (Adapter necessary)                              | -                                                   |
| <b>Dissolved oxygen measurement</b>    | 1                                                                                                                                               | 1                                                    | 1                                                   |
| <b>Conductivity measurement</b>        | 1                                                                                                                                               | 1                                                    | 1                                                   |
| <b>Turbidity measurement</b>           | 3                                                                                                                                               | 3                                                    | 3                                                   |
| <b>Calibration timer</b>               | 1 - 999 days                                                                                                                                    | 1 - 999 days                                         | 1 - 999 days                                        |
| <b>Memory capacity</b>                 | Manual: 500 data sets<br>automatic: 10,000 data sets                                                                                            | Manual: 500 data sets<br>automatic: 10,000 data sets | Manual: 500 data sets<br>automatic: 4,500 data sets |
| <b>Logger</b>                          | ●                                                                                                                                               | ●                                                    | ●                                                   |
| <b>Interface</b>                       | USB-A, Mini USB-B                                                                                                                               | USB-A, Mini USB-B                                    | Mini USB-B                                          |
| <b>GLP/AQA support</b>                 | ●                                                                                                                                               | ●                                                    | ●                                                   |
| <b>Display</b>                         | Color graphic                                                                                                                                   | Color graphic                                        | BW graphic                                          |
| <b>Printer option</b>                  | External                                                                                                                                        | External                                             | Yes                                                 |
| <b>Miscellaneous</b>                   | Antibacterial keypad, QSC, CMC                                                                                                                  | Antibacterial keypad, QSC, CMC                       | CMC, QSC                                            |
| <b>Power Supply</b>                    | Universal power supply                                                                                                                          | Universal power supply                               | Universal power supply, battery (4 x 1.5 V AA Type) |

## Order information: Digital multi-parameter benchtop meters

| Model                                                                               | Description                                                                                                                                                                                                                                                                                          | Order no. |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>inoLab® Multi 9310 SET C</b>                                                     | Digital multi-parameter laboratory meter, wireless ready, in set included IDS sensors, electrode SenTix® 940, IDS conductivity cell TetraCon® 925, accessories                                                                                                                                       | 1FD35C    |
| <b>inoLab® Multi 9620 SET C</b>                                                     | Professional digital multi-parameter benchtop meters, wireless ready. With two universal measuring channels for pH/mV/ISE, dissolved oxygen, turbidity and conductivity, digital IDS pH electrode SenTix® 980, IDS conductivity cell TetraCon® 925, accessories                                      | 1FD56C    |
| <b>inoLab® Multi 9630 SET K</b>                                                     | Professional digital multi-parameter benchtop meters, wireless ready. With three universal measuring channels for pH/mV/ISE, dissolved oxygen and conductivity, digital IDS pH electrode SenTix® 980, optical IDS dissolved oxygen sensor FDO® 925. IDS conductivity cell TetraCon® 925, accessories | 1FD57K    |
| For additional sets, see price list or <a href="http://www.WTW.com">www.WTW.com</a> |                                                                                                                                                                                                                                                                                                      |           |

## Benchtop meters for analogue sensors

### inoLab® pH/ION 7320 – reliable ion concentration measurement and documentation

The inoLab® pH / ION 7320 is perfectly suited for precision measurement and automatic GLP/AQA compliant documentation in quality laboratories of all industries. Also available with optionally installed printer



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

see page 78

# Digital multi-parameter portable meters

## MultiLine IDS

The robust and field-suitable measuring instruments are waterproof and dust-proof according to IP 67. They have a silicon keypad made of a single cast and can be cleaned easily with a soft brush under a water jet. They support the GLP documentation with meter and sensor data, and with the new MultiLab® User user management, individual user rights can also be assigned. By being prepared for optional wireless measurement, they save space and ensure full freedom of movement.

**MultiLine®** INTELLIGENT DIGITAL SENSORS

**3 year warranty**

**IP 67**

**CE**



All IDS portable meters are available in application-specific carrying case kits with sensors and accessories.



### Modern communication

Two field-suitable waterproof USB interfaces for connecting memory sticks or selected printers and for data transfer to PC or laptop with MultiLab® Importer (For Multi 3630/3620 IDS).

## Technical specifications: Digital multi-parameter portable meters

| MultiLine®                          | Multi 3630 IDS                                                                                                                                                      | Multi 3620 IDS                                                                                                                                           | Multi 3510 IDS                                                                                                                                           |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Parameter</b>                    | pH, mV,<br>O <sub>2</sub> (saturation, concentration, partial pressure),<br>Conductivity (spec. resistance, salinity, TDS),<br>Temperature,<br>Turbidity,<br>Depth* | pH, mV,<br>O <sub>2</sub> (saturation, concentration, partial pressure),<br>Conductivity (spec. resistance, salinity, TDS),<br>Temperature,<br>Turbidity | pH, mV,<br>O <sub>2</sub> (saturation, concentration, partial pressure),<br>Conductivity (spec. resistance, salinity, TDS),<br>Temperature,<br>Turbidity |
| <b>Digital/ IDS sensors</b>         | ●                                                                                                                                                                   | ●                                                                                                                                                        | ●                                                                                                                                                        |
| <b>Universal measuring channels</b> | 3                                                                                                                                                                   | 2                                                                                                                                                        | 1                                                                                                                                                        |
| <b>Memory capacity</b>              | Manual: 500 data sets<br>Automatic: 10,000 data sets                                                                                                                | Manual: 500 data sets<br>Automatic: 10,000 data sets                                                                                                     | Manual: 500 data sets<br>Automatic: 4,500 data sets                                                                                                      |
| <b>Data logger</b>                  | Manual, time-controlled                                                                                                                                             | Manual, time-controlled                                                                                                                                  | Manual, time-controlled                                                                                                                                  |
| <b>Interface</b>                    | USB-A, Mini USB-B                                                                                                                                                   | USB-A, Mini USB-B                                                                                                                                        | Mini USB-B                                                                                                                                               |
| <b>Display</b>                      | Color graphic                                                                                                                                                       | Color graphic                                                                                                                                            | Graphic, BW                                                                                                                                              |
| <b>Power Supply</b>                 | Power supply with charging function,<br>4 NiMH batteries (AA type), USB                                                                                             | Power supply with charging function,<br>4 NiMH batteries (AA type), USB                                                                                  | 4 Alkaline batteries, USB                                                                                                                                |
| <b>Protection class</b>             | IP 67                                                                                                                                                               | IP 67                                                                                                                                                    | IP 67                                                                                                                                                    |

\* with MPP 930 IDS

## Multi 3630 IDS: The all-rounder for pH/ORP, conductivity, dissolved oxygen and turbidity



MultiLine® Multi 3630 IDS

- **Fail safe measurement due to galvanic isolation of the two inputs**
- **Simultaneous proof reading of up to three parameters through brilliant color graphic display**
- **Prepared for the use with a MPP IDS depth sonde**

The Multi 3630 IDS with three universal measurement channels works with all WTW IDS pH, ORP, dissolved dissolved oxygen sensors, conductivity cells and turbidity sensors, whether tethered or wireless.

### Reliable measurements

- Any combination of equal and different parameters
- Cable lengths up to 100 m for all parameters
- Backlit color graphic display with CMC, QSC and channel display
- Secure wireless connection between sensor and meter

### GLP/AQA compliant documentation

- Automatic, digital logging of all sensor data for the clear traceability of the measured values
- Activatable user management with definable user rights for secure provisioning of users, measurement results and samples

### Flexible and high performance

- The digital signal transfer eliminates interference, safely allocates calibration data, simply transmits sensor data
- The intelligent sensor evaluation (QSC) provides information about the actual state of the electrode and therefore increases the operational safety
- Memory with 10,000 entries
- Data output on PC, USB memory stick or printer
- Pluggable adapter for analogue pH/ORP electrodes
- Connection of a MPP IDS depth sonde possible

## Multi 3620 IDS: Simultaneous measurement of two parameters



MultiLine® Multi 3620 IDS

- **Fail safe measurement due to galvanic isolation of the two inputs**
- **Clear display of one or two measurement parameters with bright color display**
- **Simple to operate with clear menu structure**

### Reliable measurements

- Any combination of available measurement parameters
- Cable lengths up to 100 m for all parameters
- Backlit color graphic display with CMC, QSC and channel display
- Secure wireless connection by clear allocation of sensor and meter

### GLP/AQA compliant documentation

- Automatic, digital logging of all sensor data for the clear traceability of the measured values
- Activatable user management with definable user rights for the safe allocation of users, measurement results and sample

### Flexible and high performance:

- The digital signal transfer eliminates interference, safely allocates calibration data, simply transmits sensor data
- The intelligent sensor evaluation (QSC) provides information about the actual state of the electrode and therefore increases the operational safety
- Memory with 10,000 entries
- Data output on PC, USB memory stick or printer
- Pluggable adapter for analogue pH/ORP electrodes



## Multi 3510 IDS: Multi-parameter measurement made simple



MultiLine® Multi 3620 IDS

- Sequential multi-parameter measurement
- Memory for 4500 automatic and 500 manual inputs for data collection in the field
- Reliable and robust for mobile use
- Easy-to-read backlit S/W graphic display

The Multi 3510 IDS is a perfect entry-level meter for IDS multi-parameter measurement. All WTW IDS pH, ORP, dissolved oxygen sensors, conductivity cells and turbidity sensors can be connected to the universal measuring channel, either with cable or with wireless module.



## Order information: Digital multi-parameter portable meters

| Model                       | Description                                                                                                                                                                                                                                                                                                        | Order no. |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Multi 3510 IDS SET 4</b> | Professional multi-parameter portable meter for IDS electrodes, wireless ready in a carrying case kit with optical dissolved oxygen sensor FDO® 925, accessories.                                                                                                                                                  | 2FD354    |
| <b>Multi 3620 IDS SET C</b> | Professional, digital multi-parameter portable meter for field measurement, with two universal measuring channels, wireless ready, set in a carrying case with IDS sensors: digital pH electrode SenTix® 940, digital conductivity cell TetraCon® 925, accessories                                                 | 2FD56C    |
| <b>Multi 3630 IDS SET F</b> | Professional, digital multi-parameter portable meter for field measurement, with three universal measuring channels, wireless ready, set in field carrying case with IDS sensors: digital pH electrode SenTix® 940, digital conductivity cell TetraCon® 925, optical dissolved oxygen sensor FDO® 925, accessories | 2FD57F    |

For additional sets, see price list or [www.WTW.com](http://www.WTW.com)

# ProfiLine multi-parameter portable meters for analogue sensors

ProfiLine is a line of robust and watertight multi-parameter portable meters for analogue sensors. They measure simultaneously from a selection of different parameters with a maximum of 2 sensors.

**3** year  
warranty

IP 67



## pH/ION 3310

A portable specialist for pH/mV/ISE measurement. You can find more information in the chapter "Ion-selective measurement".

see page 80



pH/ION 3310

pH

ORP

ISE

Dissolved Oxygen

Conductivity

BOD/Respiration

Photometry

Turbidity

Software,  
Documentation

## Technical specifications: Multi-parameter portable meters for analogue sensors

| ProfiLine                             |                                                                                       | pH/Cond 3320 and Multi 3320                                                                                                                           |                                                                                                                                                                                                                                                                          |                                                                                       |
|---------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| pH measurement                        | Measurement Range pH                                                                  | -2.0 ... 20.0 ±0.1 pH<br>-2.00 ... 20.00 ±0.01 pH<br>-2.000 ... 19.999 ±0.005 pH                                                                      |                                                                                                                                                                                                                                                                          |                                                                                       |
|                                       | Measurement range mV                                                                  | ± 1200.0 mV<br>± 0.3 mV<br>± (2500 ± 1) mV                                                                                                            |                                                                                                                                                                                                                                                                          |                                                                                       |
|                                       | Measurement range ISE                                                                 | Conc.<br>(mg/l, µmol/l,<br>mg/kg, ppm, %)                                                                                                             | 0.000 ... 9.999<br>10.00 ... 99.99<br>100.0 ... 999.9<br>1000 ... 999999                                                                                                                                                                                                 |                                                                                       |
|                                       | Measurement range temperature                                                         | -5.0 ... 105.0 °C ± 0.1 °C                                                                                                                            |                                                                                                                                                                                                                                                                          |                                                                                       |
|                                       | CMC                                                                                   | Yes                                                                                                                                                   |                                                                                                                                                                                                                                                                          |                                                                                       |
|                                       | Calibration                                                                           | 1-, 2-, 3-, 4-, 5-point calibration<br>WTW Technical, DIN-, NIST- as well as further 22 buffer sets<br>ISE 2 ... 7-point calibration, also non-linear |                                                                                                                                                                                                                                                                          |                                                                                       |
|                                       | Conductivity measurement                                                              | Measurement range conductivity                                                                                                                        | 0.00 ... 1000 mS/cm ± 0.5 % of measured value                                                                                                                                                                                                                            |                                                                                       |
| Measurement range specific resistance |                                                                                       | 1 Ohm/cm ... 199.9 MOhm/cm (dependent on cell constant)                                                                                               |                                                                                                                                                                                                                                                                          |                                                                                       |
| Cell constants                        |                                                                                       | Fixed:<br>Additionally<br>With calibration:<br>Adjustable:                                                                                            | 0.01 cm <sup>-1</sup><br>0.000 ... 1.999 µS/cm, K= 0.01 cm <sup>-1</sup><br>0.00 ... 19.99 µS/cm, K= 0.1 cm <sup>-1</sup><br>0.450 to 0.500 cm <sup>-1</sup><br>0.800 ... 0.880 cm <sup>-1</sup><br>0.090 ... 0.110 cm <sup>-1</sup><br>0.250... 25.000 cm <sup>-1</sup> |                                                                                       |
| Salinity                              |                                                                                       | 0.0 ... 70.0 (as per IOT)                                                                                                                             |                                                                                                                                                                                                                                                                          |                                                                                       |
| TDS                                   |                                                                                       | 1 ... 1999 mg/l, 0 to 199.9 g/l                                                                                                                       |                                                                                                                                                                                                                                                                          |                                                                                       |
| Measurement range temperature         |                                                                                       | -5.0 ... 105.0 °C ± 0.1 °C                                                                                                                            |                                                                                                                                                                                                                                                                          |                                                                                       |
| Sensor plug                           |                                                                                       | 8 pins                                                                                                                                                |                                                                                                                                                                                                                                                                          |                                                                                       |
| Calibration (conductivity)            |                                                                                       | 1-point                                                                                                                                               | 0.01 mol/l KCl 1413 µS/cm at 25°C                                                                                                                                                                                                                                        |                                                                                       |
| T <sub>ref</sub>                      |                                                                                       | 20 °C/25 °C                                                                                                                                           |                                                                                                                                                                                                                                                                          |                                                                                       |
| Temperature compensation              |                                                                                       | None, nIF, 0.000 ... 10.000 %/K                                                                                                                       |                                                                                                                                                                                                                                                                          |                                                                                       |
| Additionally with Multi 3320:         |                                                                                       |                                                                                                                                                       |                                                                                                                                                                                                                                                                          |                                                                                       |
| Oxygen measurement                    |                                                                                       | Measurement range dissolved oxygen                                                                                                                    | Concentration*                                                                                                                                                                                                                                                           | 0.00 ... 20.00 mg/l ± 0,5 % measured value<br>0 ... 90 mg/L ± 0,5 % of measured value |
|                                       |                                                                                       |                                                                                                                                                       | Saturation *                                                                                                                                                                                                                                                             | 0.0 ... 200.0 % ± 0,5 % of measured value<br>0 ... 600 % ± 0.5 of measured value      |
|                                       | Partial pressure*                                                                     |                                                                                                                                                       | 0 ... 200.0 hPa,<br>0 ... 1250 hPa, each ± 0,5% of measured value                                                                                                                                                                                                        |                                                                                       |
|                                       | Measurement range temperature                                                         | 0.0 ... 50.0 °C ± 0.1 °C                                                                                                                              |                                                                                                                                                                                                                                                                          |                                                                                       |
| Calibration                           | CellOx / DurOx with OxiCal calibration vessels, in addition against external standard |                                                                                                                                                       |                                                                                                                                                                                                                                                                          |                                                                                       |
| Air pressure compensation             | Through built-in sensor                                                               |                                                                                                                                                       |                                                                                                                                                                                                                                                                          |                                                                                       |
| General data                          |                                                                                       |                                                                                                                                                       |                                                                                                                                                                                                                                                                          |                                                                                       |
| Calibration memory                    |                                                                                       | Retrievable up to 10 calibrations                                                                                                                     |                                                                                                                                                                                                                                                                          |                                                                                       |
| AutoRead                              |                                                                                       | Can be switched automatically/manually                                                                                                                |                                                                                                                                                                                                                                                                          |                                                                                       |
| Display Celsius/Fahrenheit            |                                                                                       | Yes                                                                                                                                                   |                                                                                                                                                                                                                                                                          |                                                                                       |
| Display                               |                                                                                       | LCD graphics -, backlit                                                                                                                               |                                                                                                                                                                                                                                                                          |                                                                                       |
| Data memory                           |                                                                                       | 500 manual, 5000 automatic                                                                                                                            |                                                                                                                                                                                                                                                                          |                                                                                       |
| Logger                                |                                                                                       | Manual/time-controlled                                                                                                                                |                                                                                                                                                                                                                                                                          |                                                                                       |
| Waterproof                            |                                                                                       | IP 67                                                                                                                                                 |                                                                                                                                                                                                                                                                          |                                                                                       |
| Interface                             |                                                                                       | USB slave                                                                                                                                             |                                                                                                                                                                                                                                                                          |                                                                                       |
| Power Supply                          |                                                                                       | 4 x 1.5 V AA or 4 x 1,2 V NiMH battery pack                                                                                                           |                                                                                                                                                                                                                                                                          |                                                                                       |
| Permanent operation                   |                                                                                       | Up to 800 h without or 100 h with illumination                                                                                                        |                                                                                                                                                                                                                                                                          |                                                                                       |

\* depending on sensor

All values ± one position after decimal point

## Multi 3320



ProfiLine Multi 3320

- **Extensive measurement functions for pH, ORP, ISE, conductivity and dissolved oxygen**
- **Built-in memory and data logger for recording measurement series**
- **Backlit graphic display with simultaneous display of the measurement values**

The Multi 3320 measures pH, ORP, ISE conductivity and dissolved oxygen (electrochemical). It is an ideal meter for environmental applications like groundwater and surface water measurement, aquaculture, as well as in a wastewater treatment plant and much more. Also suitable for process applications where dissolved oxygen is important. All analogue WTW pH/ORP electrodes, combined ISE electrodes, conductivity cells and galvanic dissolved oxygen sensors can be connected to the meter.

### Clear measurements

- Backlit graphic display with CMC function for pH
- Measure two parameters simultaneously

### GLP/AQA compliant documentation

- GLP-supporting data acquisition with date, time, ID number

### Flexible and high performance:

- pH, ORP, ISE, conductivity and dissolved oxygen measurement
- Memory with 5,000 entries
- Data output on the PC

## pH/Cond 3320



ProfiLine pH/Cond 3320

- **Two inputs for the simultaneous measurement of pH/mV/ISE and conductivity**
- **Backlit graphic display for the simultaneous display of the measured values**
- **Perfect for monitoring process applications**

The pH/Cond 3320 measures pH, ORP, ISE and conductivity. It is used almost everywhere – from process chemistry via life science, food and beverage to the pharmaceutical industry (measurement of pH and conductivity according to pharmacopoeia). It is a handy and robust meters, even for demanding applications which require documentation.

### Reliable measurements

- Backlit graphic display with CMC function for pH
- Measure two parameters simultaneously

### GLP/AQA compliant documentation

- GLP-supporting data acquisition with date, time, ID number

### Flexible and high performance:

- pH, ORP, ISE and conductivity measurement
- Memory with 5,000 entries
- Data output on the PC

## Order information: Multi-parameter portable meters for analogue sensors

| Model                                                                       | Description                                                                                                                                                                                                            | Order no. |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>pH/Cond 3320 SET 2</b>                                                   | Professional pH/conductivity meter with 2 inputs, meter in a carrying case with pH electrode SenTix® 41, conductivity cell TetraCon® 325 and accessories                                                               | 2EA312    |
| <b>Multi 3320 SET 1</b>                                                     | Professional pH/dissolved oxygen/conductivity meter with 2 inputs, meter in a field carrying case with pH - electrode SenTix® 41, dissolved oxygen sensor CellOx® 325, conductivity cell TetraCon® 325 and accessories | 2FA311    |
| Further sets see price list or <a href="http://www.WTW.com">www.WTW.com</a> |                                                                                                                                                                                                                        |           |



# Analogue sensors

## pH electrodes

WTW pH electrodes include a wide variety of application-oriented models that cover all aspects of pH measurement.

*see page 65*



## ORP electrodes

The ORP measurement is a determination of potentials that result from reactions on the metal surface of the electrodes. Each multi-parameter meter with pH function also measures the ORP voltage.

*see page 73*



## ISE electrodes

Ion-selective measurement is a method to determine concentrations of specific ions in a quantitative manner.

*see page 81*



## Dissolved oxygen sensors

Dissolved oxygen is an important parameter in biologic and technical processes, for example in corrosion prevention applications. The Multi 3320 has the possibility of electrochemical oxygen measurement.

*see page 92*



## Conductivity cells

WTW has a large selection of analogue conductivity cells for all applications. Highest mechanical precision in manufacturing ensures unsurpassed quality.

*see page 106*



# pH measurement



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# Applications and meters overview

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

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

# Benchtop pH meters

The pH measurement benefits from the possibilities of IDS technology like no other measurement. With this, all requirements for Reliable measurements and GLP/AQA compliant documentation can be fulfilled in a simple and efficient manner.

## inoLab® IDS – digital



pH measurements with the new digital multi parameter benchtop meters inoLab® IDS:

### inoLab® Multi 9630 IDS: Measure three parameters simultaneously

The digital inoLab® multi parameter meter for IDS sensors for simultaneous measurement of the same or different parameters. Up to three sensors can be connected. Also suitable for analogue electrodes with an adapter.

*see page 40*



inoLab® Multi 9630 IDS

### inoLab® Multi 9620 IDS: Measure two parameters simultaneously

Two channel version of the inoLab® Multi 9630 IDS.

*see page 40*



inoLab® Multi 9620 IDS

### inoLab® Multi 9310 IDS: Digital single parameter solution

The new inoLab® Multi 9310 IDS is well suited for pH measurement in the laboratory. The IDS technology allows optimized measurements and efficient documentation in the simplest manner.

*see page 41*



inoLab® Multi 9310 IDS

# inoLab® - analogue

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

**inoLab**  
innovations that make sense

**3** year  
warranty

IP 43

CE



inoLab® pH 7110 SET 4

## Technical specifications: inoLab® analogue benchtop pH meters

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

## inoLab® pH/ION 7320 - Reliable ISE measurement and documentation

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



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

see page 78



## inoLab® pH 7310: Reliable pH documentation



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

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

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

### Reliable measurements

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

### GLP/AQA compliant documentation

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

### Flexible and high performance:

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



## inoLab® pH 7110: Accurate pH measurement



inoLab® pH 7110

- **Active AutoRead function**
- **Easy calibration with adjustable calibration timer**
- **Intuitive operation with well laid out keyboard**

The inoLab® pH 7110 is optimally suited for routine measurement in the laboratory, where automatic documentation has no priority. With a smooth, easy to clean surface.

### Reliable measurements

- Repeatable measurement results due to active automatic AutoRead function for the detection of stable measuring values
- Secure operation: Automated functions reduce the number of keys
- Increased measuring accuracy through adjustable calibration timer

### Easy and reliable:

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

## Order information: Benchtop pH meters inoLab® analogue

| Model                 | Description                                                                                                                                                                                                                                                            | Order no. |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| inoLab® pH 7310P      | Convenient, menu-guided pH/mV benchtop meter (DIN) for measurements/GLP/AQA compliant documentation with built-in thermal printer. Single meter with universal power supply, stand, operating manual, CD-ROM with software, USB cable.                                 | 1AA310P   |
| inoLab® pH 7310 SET 4 | Convenient, menu-guided pH/mV benchtop meter (DIN) for measurements/GLP/AQA compliant documentation. Meter with universal power supply, stand and operating instructions, pH electrode SenTix® 81, buffer 4,7 and 10.01, 3 mol/l KCl, CD-ROM with software, USB cable. | 1AA314    |
| inoLab® pH 7110 SET 2 | Simple, easy-to-use pH/mV benchtop meter (DIN) for routine measurements. Meter with universal power supply, stand and operating instructions, pH electrode SenTix® 41, buffer 4, 7 and 10.01, 3 mol/l KCl.                                                             | 1AA112    |

Further SETs and electrodes in the SET or BNC versions see price list or [www.WTW.com](http://www.WTW.com)

## Portable pH meters

pH value is a parameter, which also plays an important role with on-site measurements. The spectrum ranges from measuring pH in surface water up to the measurement in the process of a chemical plant.

### MultiLine® IDS – digital



pH measurements with the new digital MultiLine® multi-parameter measuring instruments:

#### Multi 3630 IDS: Measure three parameters simultaneously

Three galvanically isolated measurement channels, can be freely combined for the same or different parameters. Simultaneous multi measurement without compromises.



MultiLine® Multi 3630 IDS

*see page 44*

#### Multi 3620 IDS: Measure two parameters simultaneously

Two galvanically isolated measurement channels, can be used simultaneously for identical or different parameters. Economic multi-parameter meter for many applications in which two parameters must be measured and/or stored simultaneously.



MultiLine® Multi 3620 IDS

*see page 45*

#### MultiLine® Multi 3510 IDS: Digital single parameter solution

The single-channel multi-parameter instrument Multi 3510 IDS is ideal for portable pH measurement in all conditions both outdoors and in a plant. Like all MultiLine® IDS meters, it is also suitable for pH measurement with cable lengths of up to 100 m.



MultiLine® Multi 3510 IDS

*see page 46*

### pHotoFlex® Series

A successful combination of photometer and optional turbidity measurement in conjunction with a built-in pH / mV meter.



pHotoFlex® pH

*see "pHotoFlex® pH – Portable photometer with pH measurement function" on page 145*

# ProfiLine - analogue

All portable meters are available including sensors and accessories in a practical field case.



**3** year  
warranty

IP 67



ProfiLine pH 3310 SET 2

## Technical specifications: Profiline portable analogue pH meters

| ProfiLine                     |                | Multi 3320                                                                                                                                    | pH/Cond 3320                                 | pH/ION 3310                                  | pH 3310                                      | pH 3110                                     |
|-------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------|----------------------------------------------|---------------------------------------------|
| Measurement ranges/resolution | <b>pH</b>      | -2.0 ... 20.0                                                                                                                                 | -2.0 ... 20.0                                | -2.0 ... 20.0                                | -2.0 ... 20.0                                | -2.0 ... 20.0                               |
|                               |                | -2.00 ... 20.00                                                                                                                               | -2.00 ... 20.00                              | -2.00 ... 20.00                              | -2.00 ... 20.00                              | -2.00 ... 20.00                             |
|                               |                | -2.000 ... 19.999                                                                                                                             | -2.000 ... 19.999                            | -2.000 ... 19.999                            | -2.000 ... 19.999                            | -2.000 ... 19.999                           |
|                               | <b>mV</b>      | ± 1200.0                                                                                                                                      | ± 1200.0                                     | ± 1200.0                                     | ± 1200.0                                     | ± 1200.0                                    |
|                               |                | ± 2500                                                                                                                                        | ± 2500                                       | ± 2500                                       | ± 2500                                       | ± 2000                                      |
|                               | <b>Temp.</b>   | -5.0 ... +105.0 °C                                                                                                                            | -5.0 ... +105.0 °C                           | -5.0 ... +105.0 °C                           | -5.0 ... +105.0 °C                           | -5.0 ... +105.0 °C                          |
|                               | <b>Conc.</b>   | 0.000 ... 9.999                                                                                                                               | 0.000 ... 9.999                              | 0.000 ... 9.999                              | —                                            | —                                           |
|                               | (mg/l, µmol/l, | 10.00 ... 99.99                                                                                                                               | 10.00 ... 99.99                              | 10.00 ... 99.99                              |                                              |                                             |
|                               | mg/kg, ppm,    | 100.0 ... 999.9                                                                                                                               | 100.0 ... 999.9                              | 100.0 ... 999.9                              |                                              |                                             |
|                               | %)             | 1000 ... 999999                                                                                                                               | 1000 ... 999999                              | 1000 ... 999999                              |                                              |                                             |
| Accuracy (±1 digit)           | <b>pH</b>      | ± 0.1 pH                                                                                                                                      | ± 0.1 pH                                     | ± 0.1 pH                                     | ± 0.1 pH                                     | ± 0.1 pH                                    |
|                               |                | ± 0.01 pH                                                                                                                                     | ± 0.01 pH                                    | ± 0.01 pH                                    | ± 0.01 pH                                    | ± 0.01 pH                                   |
|                               |                | ± 0.005 pH                                                                                                                                    | ± 0.005 pH                                   | ± 0.005 pH                                   | ± 0.005 pH                                   | ± 0.005 pH                                  |
|                               | <b>mV</b>      | ± 0.3 mV                                                                                                                                      | ± 0.3 mV                                     | ± 0.3 mV                                     | ± 0.3 mV                                     | ± 0.3 mV                                    |
|                               |                | ± 1 mV                                                                                                                                        | ± 1 mV                                       | ± 1 mV                                       | ± 1 mV                                       | ± 1 mV                                      |
|                               | <b>Temp.</b>   | ± 0.1 °C                                                                                                                                      | ± 0.1 °C                                     | ± 0.1 °C                                     | ± 0.1 °C                                     | ± 0.1 °C                                    |
| Calibration                   |                | 1-, 2-, 3-, 4-, 5-point, WTW techn., DIN, NIST as well as additional 22 buffer sets, 1- to 5-point ConCal® calibration with arbitrary buffers |                                              |                                              |                                              | 1-, 2-, 3-point, WTW techn. and DIN buffers |
|                               | <b>ISE</b>     | 2-7 points                                                                                                                                    | 2-7 points                                   | 2-7 points                                   | —                                            | —                                           |
| CMC                           |                | Yes                                                                                                                                           | Yes                                          | Yes                                          | Yes                                          | —                                           |
| Data memory                   |                | Manual 200/5000 automatic                                                                                                                     | Manual 200/5000 automatic                    | Manual 200/5000 automatic                    | Manual 200/5000 automatic                    | —                                           |
| Logger                        |                | Manually/time-controlled                                                                                                                      | Manually/time-controlled                     | Manually/time-controlled                     | Manually/time-controlled                     | —                                           |
| Display                       |                | LCD graphics, backlit                                                                                                                         | LCD graphics, backlit                        | LCD graphics, backlit                        | LCD graphics, backlit                        | 7-Segment LCD                               |
| Permanent operation           |                | Up to 800 h without/ 100 h with illumination                                                                                                  | Up to 800 h without/ 100 h with illumination | Up to 800 h without/ 100 h with illumination | Up to 800 h without/ 100 h with illumination | Up to 2500 h                                |



## ProfiLine Multi 3320: The environment specialist

The Multi 3320 for the measurement of pH, ISE, ORP, conductivity and dissolved oxygen (electrochemical) is an ideal meter for environmental applications in the area of ground and surface water measurement, aquaculture, as well as in a wastewater treatment plant and much more.

*see page 49*



ProfiLine Multi 3320

## ProfiLine pH/Cond 3320: Perfect in process

The pH / Cond 3320 with two inputs for pH, mV, ISE and conductivity measurement is an all-rounder for almost all applications in process chemistry from life science, food and beverage to the pharmaceutical industry (measurement of pH and conductivity according to pharmacopoeia).

*see page 50*



ProfiLine pH/Cond 3320

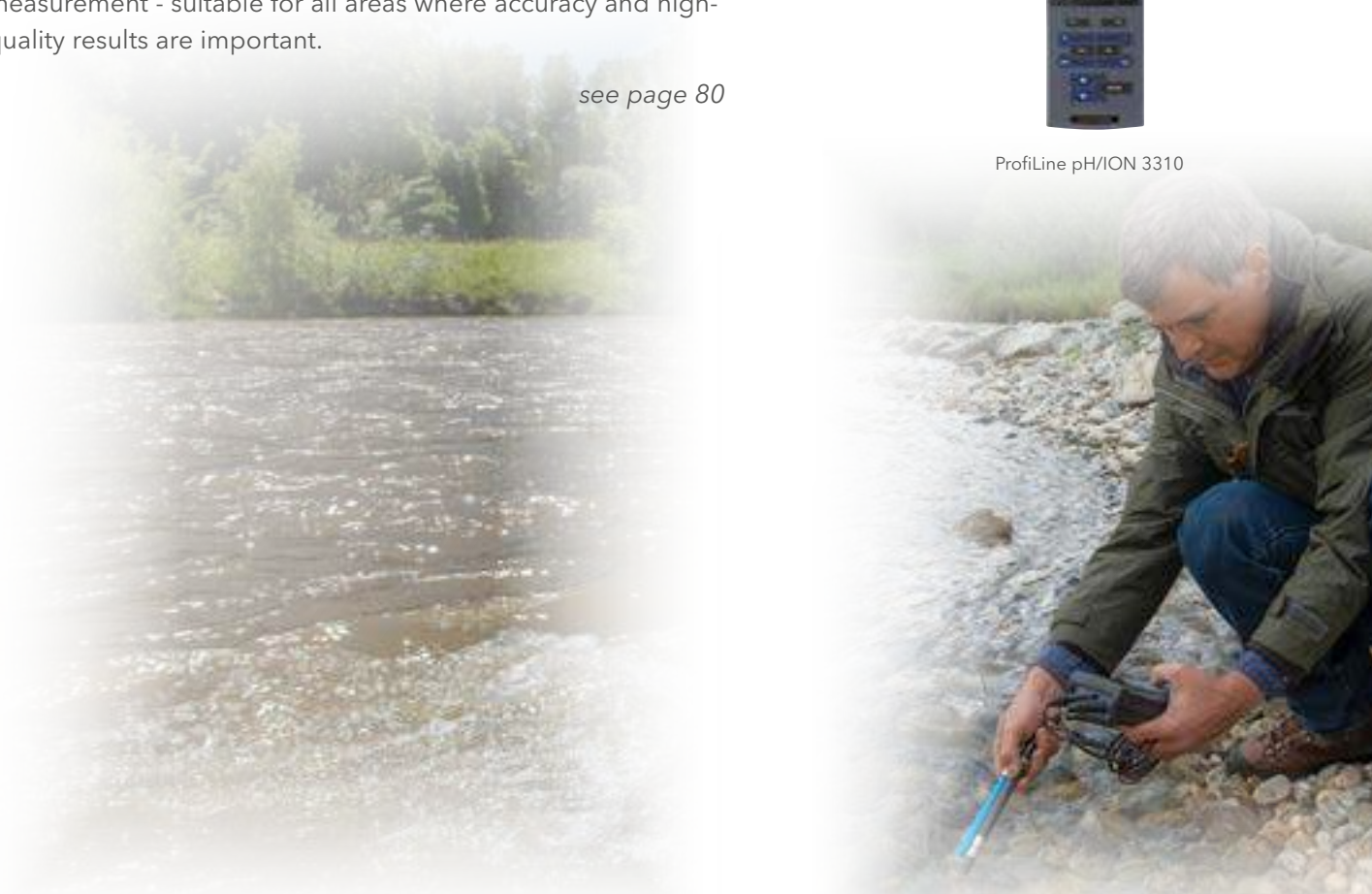
## ProfiLine pH/ION 3310: pH-, mV- and concentration measurement in one hand

pH/ISE portable meter for pH, mV and concentration measurement - suitable for all areas where accuracy and high-quality results are important.

*see page 80*



ProfiLine pH/ION 3310





## ProfiLine pH 3310: Reliable pH documentation



ProfiLine pH 3310

- ⦿ **Waterproof USB interface for fast data transfer**
- ⦿ **Data output in \*.csv-Format**
- ⦿ **Data logger for up to 5000 data sets**

The pH 3310 is an elegant combination of a robust portable meter and data logger for anyone who wants to automatically save measurement series and process them further on the PC.

### Reliable measurements

- Repeatable measurement results due to active automatic AutoRead function
- The CMC function visualises the optimal measuring range and supports correct measuring
- Graphic display with plain text menus for convenient and safe operation

### GLP/AQA compliant documentation

- Transmission of all data in \*.csv format via USB interface at the PC
- Formatted takeover into Excel (MultiLab® Importer included in the delivery or as a download)

### Flexible and high performance:

- 1- to 5-point calibration with calibration timer for all measuring tasks
- 24 pre-programmed buffer sets for easy calibration
- Backlit graphic display with CMC display



## ProfiLine pH 3110: Easy pH measurement



ProfiLine pH 3110

- **pH or ORP measurement**
- **Simple 1 to 3 point calibration with adjustable calibration timer**
- **Robust and waterproof (IP 67)**

The pH 3110 is ideal for anyone looking for a simple, robust and waterproof meter for portable pH measurement.

### Reliable measurements

- Repeatable measurement results due to active automatic AutoRead function for the detection of stable measured values
- For the safe operation automated functions and simplified keyboard
- A waterproof DIN socket enables for measurement also in a humid environment

### Easy and reliable:

- Easily readable display for measured value and temperature
- Silicon keyboard with tactile key click, operable with gloves
- For field use in a carrying case set with proven electrodes

## Order information: ProfiLine portable measuring pH meters

| Model                          | Description                                                                                                                                      | Order no. |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>ProfiLine pH 3310 SET 2</b> | Robust and waterproof portable pH meter with data logger and USB Mini-B interface, for battery operation, in a carrying case kit with SenTix® 41 | 2AA312    |
| <b>ProfiLine pH 3110 SET 2</b> | Robust and waterproof portable pH meter for battery operation, in a carrying case kit with SenTix® 41                                            | 2AA112    |

Further electrodes in SET see price list or [www.WTW.com](http://www.WTW.com)

# pH electrodes

## IDS electrodes - digital

Digital measurement of pH with integrated electrode quality monitoring - can be used in all areas of laboratory and field measurement also for special applications.

Also as fixed cable variants and wireless ready.

*see "IDS pH electrodes" on page 28*



from left to right: the digital IDS sensors (1) SenTix® 940, (2) SenTix® 945, (3) SenTix® 950, (4) SenTix® 980; the IDS special electrodes (5) SenTix® HW-T 900, (6) SenTix® Sp-T 900, (7) SenTix® Micro 900; the wireless ready IDS plug head electrodes (8) SenTix® 940-P, (9) SenTix® 945-P, (10) SenTix® 950-P, (11) SenTix® Sp-T 900-P, (12) SenTix® 980-P, (13) SenTix® HW-T 900-P, (14) SenTix® Micro 900-P and (15) SensoLyt® 900-P

## Applications for SenTix® electrodes

Our pH electrodes are optimised for measurement in aqueous systems. In addition, there is the possibility to also measure samples of a different consistence. The following table provides information about other application fields and electrodes suitable therefor.

|                                                | SenTix® ...      |                                     |                       |              |                                      |    |   |                                     |                                           |     |                                                    |                                                         |
|------------------------------------------------|------------------|-------------------------------------|-----------------------|--------------|--------------------------------------|----|---|-------------------------------------|-------------------------------------------|-----|----------------------------------------------------|---------------------------------------------------------|
|                                                | 20<br>21-..., 22 | 41, 41-3,<br>42, RJD,<br>940, 940-P | 51, 52,<br>950, 950-P | 60, 61<br>62 | 81, 82,<br>980, 980-P,<br>945, 945-P | 91 | H | HW, HWD,<br>HW-T 900,<br>HW-T 900-P | Sp,<br>Sp-DIN,<br>Sp-T 900,<br>Sp-T 900-P | Sur | Mic, MIC-D,<br>MIC-B,<br>Micro 900,<br>Micro 900-P | ORP**,<br>ORP-T 900**,<br>ORP-T 900-P**,<br>PtR, Ag, Au |
| ● recommended by WTW                           |                  |                                     |                       |              |                                      |    |   |                                     |                                           |     |                                                    |                                                         |
| ○ can be used for this application             |                  |                                     |                       |              |                                      |    |   |                                     |                                           |     |                                                    |                                                         |
| * only recommended for the mentioned model     |                  |                                     |                       |              |                                      |    |   |                                     |                                           |     |                                                    |                                                         |
| <b>Aquarium water</b>                          | ●                | ●                                   | ●                     | ○            | ○                                    | ○  |   |                                     |                                           |     |                                                    | ORP...*, PtR*                                           |
| <b>Beer</b>                                    |                  |                                     | ●                     | ●            | ●                                    |    |   | ●                                   |                                           |     |                                                    | ORP...*                                                 |
| <b>Beverages</b>                               |                  |                                     |                       | ●            | ●                                    | ●  |   | ○                                   |                                           |     |                                                    |                                                         |
| <b>Bleaching lye</b>                           |                  |                                     | ○                     | ○            | ○                                    | ○  | ● | ○                                   |                                           |     |                                                    |                                                         |
| <b>Boiler feed water</b>                       |                  |                                     |                       | ○            | ○                                    | ○  |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>Bread</b>                                   |                  |                                     |                       |              |                                      |    |   |                                     | ●                                         |     |                                                    |                                                         |
| <b>Cheese</b>                                  |                  |                                     |                       |              |                                      |    |   |                                     | ●                                         |     |                                                    |                                                         |
| <b>(punch possibly necessary)</b>              |                  |                                     |                       |              |                                      |    |   |                                     |                                           |     |                                                    |                                                         |
| <b>Coffee extract</b>                          |                  |                                     | ○                     | ●            | ●                                    | ●  |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>Condensate</b>                              |                  |                                     |                       |              |                                      |    |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>Cosmetics</b>                               |                  |                                     |                       |              |                                      |    |   | ●                                   | ●                                         | ●   |                                                    |                                                         |
| <b>Diluted acids</b>                           |                  |                                     |                       | ●            | ●                                    | ●  |   | ○                                   |                                           |     |                                                    | Au, ORP...*                                             |
| <b>Diluted alkalis</b>                         |                  |                                     |                       |              |                                      |    | ● |                                     |                                           |     |                                                    |                                                         |
| <b>Dispersion colors</b>                       |                  | RJD*                                |                       |              |                                      |    |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>Distilled water</b>                         |                  |                                     |                       |              |                                      |    |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>Drinking water</b>                          | ○                | ○                                   | ●                     | ●            | ●                                    | ●  |   | ○                                   |                                           |     |                                                    |                                                         |
| <b>Electroplating waster water</b>             | ●                | ●                                   | ○                     | ○            | ○                                    | ○  |   | ○                                   |                                           |     |                                                    | ○                                                       |
| <b>Fruit</b>                                   |                  |                                     |                       |              |                                      |    |   |                                     | ●                                         |     |                                                    |                                                         |
| <b>Fruit juice</b>                             |                  |                                     | ●                     | ●            | ●                                    | ●  |   | ○                                   |                                           |     |                                                    |                                                         |
| <b>Fruit juice</b>                             |                  |                                     | ●                     | ●            | ●                                    | ●  |   | ○                                   |                                           |     |                                                    |                                                         |
| <b>Fully demineralised water</b>               |                  |                                     |                       |              |                                      |    |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>Galvanic baths</b>                          |                  | RJD*                                | ●                     | ●            | ●                                    | ●  |   | ○                                   |                                           |     |                                                    | ●                                                       |
| <b>Groundwater</b>                             | ●                | ●                                   | ○                     | ○            | ○                                    |    |   |                                     |                                           |     |                                                    | PtR*                                                    |
| <b>H<sub>2</sub>S-containing liquids</b>       |                  | RJD*                                |                       |              |                                      |    |   | ●                                   |                                           |     |                                                    | PtR*                                                    |
| <b>Household cleaners</b>                      | ○                | ○                                   | ○                     | ●            | ●                                    | ●  | ● | ○                                   |                                           |     |                                                    |                                                         |
| <b>Leather</b>                                 |                  |                                     |                       |              |                                      |    |   |                                     |                                           | ●   |                                                    |                                                         |
| <b>Lemonade</b>                                |                  |                                     | ●                     | ●            | ●                                    | ●  |   | ○                                   |                                           |     |                                                    |                                                         |
| <b>Measurement in Eppendorf or NMR vessels</b> |                  |                                     |                       |              |                                      |    |   |                                     |                                           |     | ●                                                  |                                                         |
| <b>Meat</b>                                    |                  |                                     |                       |              |                                      |    |   |                                     | ●                                         |     |                                                    |                                                         |
| <b>(punch possibly necessary)</b>              |                  |                                     |                       |              |                                      |    |   |                                     |                                           |     |                                                    |                                                         |
| <b>Milk</b>                                    |                  |                                     |                       | ●            | ●                                    | ●  |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>Mineral water</b>                           | ○                | ○                                   | ●                     | ●            | ●                                    | ●  |   | ○                                   |                                           |     |                                                    |                                                         |
| <b>Oil/water emulsions</b>                     |                  | RJD*                                |                       |              |                                      |    |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>Paints and coatings, water soluble</b>      |                  | RJD*                                |                       |              |                                      |    |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>Paper</b>                                   |                  |                                     |                       |              |                                      |    |   |                                     |                                           | ●   |                                                    |                                                         |
| <b>Paper extract</b>                           |                  |                                     |                       | ●            | ●                                    | ●  |   |                                     |                                           |     |                                                    |                                                         |
| <b>Protein-containing liquids</b>              |                  |                                     |                       | ●            | ●                                    | ●  |   | ●                                   |                                           |     | MIC-D/-B*,<br>Micro 900*                           |                                                         |
| <b>Rain water</b>                              |                  |                                     |                       | ○            | ○                                    | ○  |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>saline solutions</b>                        | ○                | ○                                   | ○                     | ●            | ●                                    | ●  | ○ | ●                                   |                                           |     |                                                    | ORP...*                                                 |
| <b>saliva</b>                                  |                  |                                     |                       |              |                                      |    |   |                                     |                                           | ●   | ○                                                  |                                                         |
| <b>Sausage</b>                                 |                  |                                     |                       |              |                                      |    |   |                                     | ●                                         |     |                                                    |                                                         |
| <b>(punch possibly necessary)</b>              |                  |                                     |                       |              |                                      |    |   |                                     |                                           |     |                                                    |                                                         |
| <b>Seawater</b>                                |                  |                                     |                       | ○            | ○                                    | ○  | ○ | ●                                   |                                           |     |                                                    |                                                         |
| <b>Shampoo</b>                                 |                  |                                     |                       |              |                                      |    |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>Skin</b>                                    |                  |                                     |                       |              |                                      |    |   |                                     |                                           | ●   |                                                    |                                                         |
| <b>Soil extract</b>                            |                  |                                     |                       | ●            | ●                                    | ●  |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>Solids (insertion)</b>                      |                  |                                     |                       |              |                                      |    |   |                                     | ●                                         |     |                                                    |                                                         |
| <b>Solids (surface)</b>                        |                  |                                     |                       |              |                                      |    |   |                                     |                                           | ●   |                                                    |                                                         |
| <b>Surface water</b>                           | ●                | ●                                   | ●                     | ●            | ●                                    | ●  |   | ○                                   |                                           |     |                                                    |                                                         |
| <b>Suspensions</b>                             |                  | RJD*                                |                       |              |                                      |    |   | ●                                   |                                           |     |                                                    | ORP...*                                                 |
| <b>Swimming pool water</b>                     | ●                | ●                                   | ●                     | ○            | ○                                    | ○  |   |                                     |                                           |     |                                                    |                                                         |
| <b>Tris buffer solutions</b>                   |                  |                                     |                       | ●            | ●                                    | ●  |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>Vegetable juice</b>                         |                  |                                     | ○                     | ●            | ●                                    | ●  |   | ○                                   |                                           |     |                                                    |                                                         |
| <b>Vegetables</b>                              |                  |                                     |                       |              |                                      |    |   |                                     | ●                                         |     |                                                    |                                                         |
| <b>Waste water</b>                             | ●                | ●                                   | ○                     | ○            | ○                                    | ○  |   |                                     |                                           |     |                                                    | PtR*                                                    |
| <b>Wine</b>                                    |                  |                                     | ○                     | ●            | ●                                    | ●  |   | ●                                   |                                           |     |                                                    |                                                         |
| <b>Yoghurt</b>                                 |                  |                                     |                       | ●            | ●                                    | ●  |   | ●                                   | ●                                         |     |                                                    |                                                         |

1 year warranty for material damages for all pH sensors as per § 10 Terms and Conditions  
\*\* for ORP measurement



# SenTix® pH electrodes analogue

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

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

## Technical specifications: SenTix® pH electrodes analogue

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

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

\* not contained in the scope of delivery

①: Plug head, ②: Fixed cable,

\*\* from grinding upper edge

③: AS/DIN, AS/DIN-3 or AS/BNC, ④: Cable length 1 m, ⑤: Cable length 3 m,

⑥: DIN plug, ⑦: BNC plug, ⑧: Banana plug



## Low maintenance analogue pH electrodes with gel electrolyte

Ideal for portable measurement but also for routine measurement in the laboratory. With or without built-in temperature sensor All electrodes have robust plastic shafts and a low-maintenance gel reference system.



SenTix® 20



SenTix® 21



SenTix® 41



## Quick and precise analogue pH electrodes with liquid electrolyte

For demanding measurements in the laboratory: SenTix® Electrodes with liquid electrolyte, easy to clean glass shaft and platinum diaphragm. Can also be used in difficult samples. And who needs an electrode with liquid electrolyte for portable measurement: The SenTix® 51/52 with plastic shaft, integrated temperature sensor and ceramic diaphragm masters nearly every measuring task.



SenTix® 52



SenTix® 60



SenTix® 61



SenTix® 81



SenTix® 91

## Analogue pH electrodes for special applications: Specialists for all cases

The consistencies of samples in which pH is measured are very different. Liquid or solid, low in ions or highly concentrated, aqueous and non-aqueous phases, with and without suspended solids. Sometimes the smallest volumes have to be determined. All this can be handled easily together with our specialists.

For measurements in or on solids, spear-type and surface electrodes are recommended. pH value measurements in ion-poor or concentrated solutions can be mastered with ground electrodes, as well as in emulsions. Samples with suspended solids can most easily be measured with polymer electrodes. Micro-electrodes help when there is little volume available.



SenTix® HW



SenTix® HWD



SenTix® SP



SenTix® Sur



SenTix® Mic



SenTix® Mic-D



SenTix® RJD

## Order information: Analogue SenTix® pH electrodes

| Model                                         | Description                                                                      | Order no. |
|-----------------------------------------------|----------------------------------------------------------------------------------|-----------|
| <b>pH electrodes with gel electrolyte</b>     |                                                                                  |           |
| <b>SenTix® 20</b>                             | Gel electrode, S7 plug head                                                      | 103630    |
| <b>SenTix® 21</b>                             | Gel electrode, DIN cable                                                         | 103631    |
| <b>SenTix® 21-3</b>                           | Gel electrode, DIN cable, 3 m                                                    | 103632    |
| <b>SenTix® 22</b>                             | Gel electrode, BNC cable                                                         | 103633    |
| <b>SenTix® 41</b>                             | Gel electrode with temperature sensor, DIN cable                                 | 103635    |
| <b>SenTix® 41-3</b>                           | Gel electrode with temperature sensor, DIN cable, 3 m                            | 103636    |
| <b>SenTix® 42</b>                             | Gel electrode with temperature sensor, BNC cable                                 | 103637    |
| <b>pH electrodes with liquid electrolyte</b>  |                                                                                  |           |
| <b>SenTix® 60</b>                             | Precision electrode, S7 plug head                                                | 103639    |
| <b>SenTix® 61</b>                             | Precision electrode, DIN cable                                                   | 103640    |
| <b>SenTix® 62</b>                             | Precision electrode, BNC cable                                                   | 103641    |
| <b>SenTix® 81</b>                             | Precision electrode with temperature sensor, DIN cable                           | 103642    |
| <b>SenTix® 82</b>                             | Precision electrode with temperature sensor, BNC cable                           | 103643    |
| <b>SenTix® 51</b>                             | Plastic shaft, temperature sensor, DIN cable                                     | 103651    |
| <b>SenTix® 52</b>                             | Plastic shaft, temperature sensor, BNC cable                                     | 103652    |
| <b>SenTix® 91</b>                             | Precision electrode 170 mm, with temperature sensor, DIN cable                   | 103695    |
| <b>pH electrodes for special applications</b> |                                                                                  |           |
| <b>SenTix® H</b>                              | pH electrode for highly alkaline solutions, S7 plug head                         | 103644    |
| <b>SenTix® Sp</b>                             | pH spear-type electrode, S7 plug head                                            | 103645    |
| <b>SenTix® Sur</b>                            | pH surface electrode, S7 plug head                                               | 103646    |
| <b>SenTix® Mic</b>                            | pH-micro electrode, 5 mm membrane                                                | 103647    |
| <b>SenTix® HW</b>                             | pH electrode for low-conducting samples, S7 plug head                            | 103650    |
| <b>SenTix® Mic-D</b>                          | pH micro electrode, 3 mm membrane, DIN cable                                     | 103660    |
| <b>SenTix® Mic-B</b>                          | pH micro electrode, 3 mm membrane, BNC cable                                     | 103661    |
| <b>SenTix® Sp-DIN</b>                         | pH spear-type electrode, DIN cable                                               | 103730    |
| <b>SenTix® HWD</b>                            | pH electrode for emulsions etc. with temperature sensor, DIN cable               | 103731    |
| <b>SenTix® RJD</b>                            | pH electrode low maintenance, polymer electrolyte, temperature sensor, DIN cable | 103732    |

Accessories & cables see price list or [www.WTW.com](http://www.WTW.com)

## Calibration and maintenance accessories

In practice, work reference buffer solutions are used, which are obtained by comparison with primary or secondary material. Common WTW-pH buffers correspond to these requirements. Certificates document the respective pH value uncertainty of the solution.

### Buffer bottles by WTW

- **Standard (DIN/NIST) buffer solutions PL 2/4/7/9/12**  
(250 ml container)
- Technical buffer solutions **TEP** (1 litre), **TPL** (250 ml):  
pH buffer by WTW - precise and traceable to PTB/NIST in two container sizes with built-in dosing vessel standard buffer



- **Easy to dose**
- **Easy to use**
- **Safe calibration**

## Usable Buffers

|                                    |                                                                                                       | PL 4/7/9<br>DIN/NIST | STAPL<br>4/7/9<br>DIN/NIST | TEP 4/7<br>Trace | TEP 10<br>Trace | TPL 4/7<br>Trace | TPL 10<br>Trace |
|------------------------------------|-------------------------------------------------------------------------------------------------------|----------------------|----------------------------|------------------|-----------------|------------------|-----------------|
| <b>Benchtop meters</b>             |                                                                                                       |                      |                            |                  |                 |                  |                 |
| <b>inoLab®</b>                     |                                                                                                       | ●                    | ●                          | ●                | ●               | ●                | ●               |
| <b>Portable meters</b>             |                                                                                                       |                      |                            |                  |                 |                  |                 |
| <b>ProfiLine</b>                   | <b>pH 3110, pH 3210, pH 3310</b>                                                                      | ●                    | ●                          | ●                | ●               | ●                | ●               |
|                                    | <b>pH/Cond 3320, Multi 3320, pH/ION 3310</b>                                                          | ●*                   | ●*                         | ●                | ●               | ●                | ●               |
|                                    | <b>pH 315i, pH 330i, pH 340i, pH/ION 340i</b>                                                         | ●                    | ●                          | ●                | ●               | ●                | ●               |
|                                    | <b>pH/Cond 340i, pH/Oxi 340i, Multi 340i, Multi 350i,</b>                                             | ●*                   | ●*                         | ●                | ●               | ●                | ●               |
| <b>MultiLine®</b>                  | <b>Multi 3410 IDS, Multi 3420 IDS, Multi 3430 IDS, Multi 3510 IDS, Multi 3620 IDS, Multi 3630 IDS</b> | ●*                   | ●*                         | ●                | ●               | ●                | ●               |
| <b>VARIO® pH</b>                   |                                                                                                       |                      |                            |                  |                 |                  |                 |
|                                    |                                                                                                       | ●                    | ●                          | ●                | ●               | ●                | ●               |
| <b>Field meters ProfiLine</b>      |                                                                                                       |                      |                            |                  |                 |                  |                 |
|                                    | <b>pH 197i/1970i</b>                                                                                  | ●                    | ●                          | ●                | ●               | ●                | ●               |
|                                    | <b>Multi 197i/1970i</b>                                                                               | ●*                   | ●*                         | ●                | ●               | ●                | ●               |
| * not Multi 340i, Multi 197i/1970i |                                                                                                       |                      |                            |                  |                 |                  |                 |

## Buffer solutions in glass ampoules

- **STAPL-4/7/9 precision DIN / NIST buffer in ampoules with +/- 0.01 pH accuracy**
- QSC (Quality Sensor Control): With the **QSC Kit** consisting of three precision DIN buffers (pH 4.01, pH 6.87 and pH 9.18 with an accuracy of respectively  $\pm 0.01$  pH at 25°C) in glass ampoules, an initial calibration can be carried out with IDS pH electrodes. Ideal for quality control: All following calibrations are compared with this calibration and thereby exactly deliver the current state of the sensor.



- **Single use portions**
- **Steam sterilised and 5 year shelf life**
- **Precision buffer with an accuracy of  $\pm 0.01$  pH**

| Model                                                                              | Description                                                                                                                                                           | Order no. |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>TEP 4</b>                                                                       | Technical buffer solution, 1 bottle with 1 l: pH 4.01                                                                                                                 | 108700    |
| <b>TEP 7</b>                                                                       | Technical buffer solution, 1 bottle with 1 l: pH 7.00                                                                                                                 | 108702    |
| <b>TEP 10 Trace</b>                                                                | Technical buffer solution, 1 bottle with 1 l: pH 10.01                                                                                                                | 108703    |
| <b>TPL 4</b>                                                                       | Technical buffer solution, 1 bottle with 250 ml: pH 4.01                                                                                                              | 108800    |
| <b>TPL 7</b>                                                                       | Technical buffer solution, 1 bottle with 250 ml: pH 7.00                                                                                                              | 108802    |
| <b>TPL 10 Trace</b>                                                                | Technical buffer solution, 1 bottle with 250 ml: pH 10.01                                                                                                             | 108805    |
| <b>STAPL-4/7/9</b>                                                                 | Assortment of working reference buffer solutions pH 4.01, pH 6.87, pH 9.18. Traceable to NIST / PTB standards. Steam sterilized, 10 x 6 glass ampoules of 20 ml each. | 109020    |
| <b>PL 4</b>                                                                        | Standard (DIN/NIST) buffer solution, 1 bottle with 250 ml: pH 4.006 /4.01                                                                                             | 109110    |
| <b>PL 7</b>                                                                        | Standard (DIN/NIST) buffer solution, 1 bottle with 250 ml: pH 6.865 /6.87                                                                                             | 109120    |
| <b>PL 9</b>                                                                        | Standard (DIN/NIST) buffer solution, 1 bottle with 250 ml: pH 9.180 /9.18                                                                                             | 109130    |
| <b>KCI-250</b>                                                                     | Reference electrolyte, 1 bottle with 250 ml KCl solution 3 mol/l                                                                                                      | 109705    |
| Further accessories see price list or <a href="http://www.WTW.com">www.WTW.com</a> |                                                                                                                                                                       |           |



# ORP measurement



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# Applications and meters overview

The ORP measurement maps the intensity of oxidation and reduction reactions proceeding in aqueous solution. The resulting voltage signal is for example used as a measure of the cleaning power of disinfectants such as chlorine or ozone in the swimming pool.

| ✓ yes<br>● yes<br>✓ recommended<br>✓ recommended for some applications<br>– not recommended | Digital               |                        |            | Analogue    |             |         | Digital             |            |            | Analogue   |              |              |             |         |               |               |
|---------------------------------------------------------------------------------------------|-----------------------|------------------------|------------|-------------|-------------|---------|---------------------|------------|------------|------------|--------------|--------------|-------------|---------|---------------|---------------|
|                                                                                             | Laboratory ORP meters |                        |            |             |             |         | Portable ORP meters |            |            |            |              |              |             |         |               |               |
|                                                                                             | inoLab® IDS           |                        |            | inoLab®     |             |         | MultiLine® IDS      |            |            | ProfiLine  |              |              |             |         | pHotoFlex® pH |               |
|                                                                                             | Multi 9630            | Multi 9620             | Multi 9310 | pH/ION 7320 | pH 7310     | pH 7110 | Multi 3630          | Multi 3620 | Multi 3510 | Multi 3320 | pH/Cond 3320 | pH/ION 3310  | pH 3310     | pH 3110 |               |               |
| 2 parameters simultaneously*                                                                | ✓                     | ✓                      |            | ✓           |             |         | ✓                   | ✓          |            | ✓          | ✓            |              |             |         |               |               |
| 3 parameters simultaneously                                                                 | ✓                     |                        |            |             |             |         | ✓                   |            |            |            |              |              |             |         |               |               |
| ORP                                                                                         | ●                     | ●                      | ●          | ●           | ●           | ●       | ●                   | ●          | ●          | ●          | ●            | ●            | ●           | ●       | ●             |               |
| Additional parameters                                                                       | ●                     | ●                      | ●          | ●           |             |         | ●                   | ●          | ●          | ●          | ●            | ●            |             |         | ●*            |               |
| Routine measurements                                                                        | ✓                     | ✓                      | ✓          | ✓           | ✓           | ✓       | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           | ✓       | ✓             |               |
| Routine measurements with documentation                                                     | ✓                     | ✓                      | ✓          | ✓           | ✓           | –       | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           | –       | ✓             |               |
| AQA with documentation                                                                      | ✓                     | ✓                      | ✓          | ✓           | ✓           | –       | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           | –       | ✓             |               |
| R&D High resolution and precision                                                           | ✓                     | ✓                      | ✓          | ✓           | ✓           | –       | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           | –       | ✓             |               |
| Control measurements                                                                        | ✓                     | ✓                      | ✓          | ✓           | ✓           | –       | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           | –       | ✓             |               |
| LIMS connection                                                                             | ✓                     | ✓                      | ✓          | ✓           | ✓           | –       | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           | –       | ✓             |               |
| Quality assurance                                                                           | ✓                     | ✓                      | ✓          | ✓           | ✓           | –       | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           | –       | ✓             |               |
| Education                                                                                   | ✓                     | ✓                      | ✓          | ✓           | ✓           | ✓       | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           | ✓       | ✓             |               |
| Service                                                                                     | –                     | –                      | –          | –           | –           | –       | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           | ✓       | ✓             |               |
| Laboratory measurements                                                                     | ✓                     | ✓                      | ✓          | ✓           | ✓           | ✓       | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           | ✓       | ✓             |               |
| Field measurements                                                                          | –                     | –                      | –          | –           | –           | –       | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           | ✓       | ✓             |               |
| Depth measurements                                                                          | –                     | –                      | –          | –           | –           | –       | ✓                   | ✓          | ✓          | –          | –            | –            | –           | –       | –             |               |
| PC connection                                                                               | ✓                     | ✓                      | ✓          | ✓           | ✓           |         | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           |         | ✓             |               |
| Memory                                                                                      | ✓                     | ✓                      | ✓          | ✓           | ✓           |         | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           |         |               |               |
| USB interface                                                                               | ✓                     | ✓                      | ✓          | ✓           | ✓           |         | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           |         |               |               |
| Graphic display                                                                             |                       |                        | ✓          | ✓           | ✓           |         |                     | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           |         | ✓             |               |
| Color graphic display                                                                       | ✓                     | ✓                      |            |             |             |         | ✓                   | ✓          |            |            |              |              |             |         |               |               |
|                                                                                             |                       | Compatible sensors     |            |             |             |         |                     |            |            |            |              |              |             |         |               |               |
|                                                                                             |                       | Digital IDS electrodes |            |             |             |         |                     |            |            |            |              |              |             |         |               |               |
| IDS ORP electrodes                                                                          | 72                    | ✓                      | ✓          | ✓           |             |         | ✓                   | ✓          | ✓          |            |              |              |             |         |               |               |
|                                                                                             |                       | Analogue electrodes    |            |             |             |         |                     |            |            |            |              |              |             |         |               |               |
| ORP electrodes                                                                              | 73                    | ✓                      | ✓          | ✓           | ✓           | ✓       | ✓                   | ✓          | ✓          | ✓          | ✓            | ✓            | ✓           | ✓       | ✓             |               |
|                                                                                             |                       | Multi 9630             | Multi 9620 | Multi 9310  | pH/ION 7320 | pH 7310 | pH 7110             | Multi 3630 | Multi 3620 | Multi 3510 | Multi 3320   | pH/Cond 3320 | pH/ION 3310 | pH 3310 | pH 3110       | pHotoFlex® pH |
| see page                                                                                    |                       | 40                     | 40         | 41          | 56          | 56      | 57                  | 44         | 45         | 46         | 49           | 50           | 47          | 61      | 62            | 145           |

see page 40 40 41 56 56 57 44 45 46 49 50 47 61 62 145

\* see chapter "Photometric determination" on page 130

ORP measurements can be carried out with all WTW pH/mV meters.

# ORP electrodes

All ORP electrodes consist of a metal electrode made of a precious metal and a reference electrode. As with all SenTix® and SensoLyt® electrodes, the reference system is silver/silver chloride, typically with a platinum electrode.

WTW meters with pH function also measure the ORP voltage

## IDS ORP electrodes - digital



- Short response time due to ideal contact to the sample
- Precise measurement results due to liquid electrolyte
- Refillable for a long life
- Platinum electrode for universal application

### SenTix® ORP-T900 (-P)

ORP electrodes with liquid electrolyte and ceramic diaphragm



- No maintenance due to life-long KCl supply
- Insensitive to soiling due to open connection
- Wide application range due to universal platinum metal electrode

### SensoLyt® ORP 900-P

ORP electrodes with polymer electrolyte and split ring or hole junction

Technical data and order information:

see page 32

# SenTix® ORP electrodes – analogue

Technical data and order information: SenTix® ORP electrodes – analogue

|                               | SenTix® ORP              | SenTix® Ag*              | SenTix® Au               | SenTix® PtR              |
|-------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <b>Order no.</b>              | 103648                   | 103664                   | 103665                   | 103666                   |
| <b>working temperature °C</b> | 0 ... 100 °C             | -5 ... 100 °C            | -5 ... 100 °C            | -5 ... 100 °C            |
| <b>Reference electrolyte</b>  | KCl 3 mol/l              | ELY/ORP/Ag               | KCl 3 mol/l              | Gel                      |
| <b>Sensor</b>                 | Platinum                 | Silver                   | Gold                     | Platinum                 |
| <b>Sensor form</b>            | (4 mm)                   | Cylinder cap             | Cylinder cap             | (6 mm)                   |
| <b>Diaphragm</b>              | Ceramics                 | Ceramics                 | Ceramics                 | Split ring               |
| <b>Shaft material</b>         | Glass                    | Glass                    | Glass                    | Glass                    |
| <b>Shaft length (±2 mm)</b>   | 120 mm                   | 120 mm                   | 120 mm                   | 120 mm                   |
| <b>Shaft-Ø (±0,5 mm)</b>      | 12 mm                    | 12 mm                    | 12 mm                    | 12 mm                    |
| <b>Temperature sensor</b>     | -                        | -                        | -                        | -                        |
| <b>Connection</b>             | AS/DIN, AS/DIN-3, AS/BNC | AS/DIN, AS/DIN-3, AS/BNC | AS/DIN, AS/DIN-3, AS/BNC | AS/DIN, AS/DIN-3, AS/BNC |

\* for argentometry



## SenTix® ORP

Universal ORP electrode with platinum round, glass shaft



## SenTix® Ag

Combined Ag electrode (argentometry)



## SenTix® Au

Au ORP electrode with AU cap, liquid electrolyte



## SenTix® PtR

Maintenance-free Pt ORP electrode with polymer electrolyte

Order information: Test and maintenance agents for the ORP measurement

| Model                                                                               | Description                                                                                         | Order no. |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------|
| <b>RH 28</b>                                                                        | ORP buffer solution, 1 bottle with 250 ml: pH 7, $U_H = 427$ mV                                     | 109740    |
| <b>ELY/ORP/AG</b>                                                                   | Electrolyte with 2 mol/l $KNO_3$ + 0.001 mol/l KCl for combined ORP electrode with silver electrode | 109735    |
| Accessories & cables see price list or <a href="http://www.WTW.com">www.WTW.com</a> |                                                                                                     |           |

# Ion-selective measurement



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# Applications and meters overview

Ion-selective measurement is an electrochemical process in which the concentration of a multitude of dissolved ions in liquids can be quantitatively determined with suitable electrodes.

|                                         | Digital             |            | Analogue            | Analogue   |              |             |
|-----------------------------------------|---------------------|------------|---------------------|------------|--------------|-------------|
|                                         | Benchtop ISE meters |            | Portable ISE meters |            |              |             |
|                                         | inoLab® IDS         |            | inoLab®             | ProfiLine  |              |             |
|                                         | Multi 9630          | Multi 9620 | pH/ION 7320         | Multi 3320 | pH/Cond 3320 | pH/ION 3310 |
| ✓ yes                                   |                     |            |                     |            |              |             |
| ● yes                                   |                     |            |                     |            |              |             |
| ✓ recommended                           |                     |            |                     |            |              |             |
| ✓ recommended for some applications     |                     |            |                     |            |              |             |
| – not recommended                       |                     |            |                     |            |              |             |
| 2 parameters simultaneously*            | ✓                   | ✓          | ✓                   | ✓          | ✓            |             |
| 3 parameters simultaneously             | ✓                   |            |                     |            |              |             |
| ISE direct measurement                  | ●                   | ●          | ●                   | ●          | ●            | ●           |
| Incremental methods                     | ●                   | ●          | ●                   |            |              |             |
| Additional parameters                   | ●                   | ●          | ●                   | ●          | ●            | ●           |
| Routine measurements                    | ✓                   | ✓          | ✓                   | ✓          | ✓            | ✓           |
| Routine measurements with documentation | ✓                   | ✓          | ✓                   | ✓          | ✓            | ✓           |
| AQA with documentation                  | ✓                   | ✓          | ✓                   | ✓          | ✓            | ✓           |
| R&D High resolution and precision       | ✓                   | ✓          | ✓                   | ✓          | ✓            | ✓           |
| Control measurements                    | ✓                   | ✓          | ✓                   | ✓          | ✓            | ✓           |
| LIMS connection                         | ✓                   | ✓          | ✓                   | ✓          | ✓            | ✓           |
| Quality assurance                       | ✓                   | ✓          | ✓                   | ✓          | ✓            | ✓           |
| Education                               | ✓                   | ✓          | ✓                   | ✓          | ✓            | ✓           |
| Service                                 | –                   | –          | –                   | ✓          | ✓            | ✓           |
| Laboratory measurements                 | ✓                   | ✓          | ✓                   | ✓          | ✓            | ✓           |
| Field measurements                      | –                   | –          | –                   | ✓          | ✓            | ✓           |
| PC connection                           | ✓                   | ✓          | ✓                   | ✓          | ✓            | ✓           |
| Memory                                  | ✓                   | ✓          | ✓                   | ✓          | ✓            | ✓           |
| USB interface                           | ✓                   | ✓          | ✓                   | ✓          | ✓            | ✓           |
| Analogue/Digital adapter necessary      | ✓                   | ✓          |                     |            |              |             |
| Graphic display                         |                     |            | ✓                   | ✓          | ✓            | ✓           |
| Color graphic display                   | ✓                   | ✓          |                     |            |              |             |
|                                         | Compatible sensors  |            |                     |            |              |             |
|                                         | Analogue electrodes |            |                     |            |              |             |
| Combined ISE 82                         | ✓                   | ✓          | ✓                   | ✓          | ✓            | ✓           |
| Half cells 83                           | ✓                   | ✓          | ✓                   |            |              | ✓           |
|                                         | Multi 9630          | Multi 9620 | pH/ION 7320         | Multi 3320 | pH/Cond 3320 | pH/ION 3310 |
| see page                                | 40                  | 40         | 56                  | 49         | 50           | 80          |



# Benchtop meters for ion-selective measurement

Ion-selective measurement can be performed in two general ways:

Simple, direct potentiometric determination via a linear or non-linear calibration curve, or determination via the so-called increment methods.

All state-of-the-art WTW laboratory meters with ISE function have both functionalities.

## inoLab® IDS – digital



### inoLab® Multi 9630 IDS: Measure three parameters simultaneously

The digital inoLab® multi parameter meter for IDS sensors for parallel measurement of the same or different parameters. Requires the ADA 94pH/IDS DIN or ADA 94pH/IDS BNC for the ISE measurement.

*see page 40*



inoLab® Multi 9630 IDS

### inoLab® Multi 9620 IDS: Measure two parameters simultaneously

Similar to inoLab® Multi 9630 IDS, but up to two sensors can be connected. Requires the ADA 94pH/IDS DIN or ADA 94pH/IDS BNC for the ISE measurement.

*see page 40*



inoLab® Multi 9620 IDS

# inoLab® – analogue



inoLab® pH/ION 7320P

**inoLab**  
innovations that make sense

**3** year  
warranty

IP 43

CE

## Technical specifications: inoLab® analogue benchtop ion selective meters

| inoLab® pH/ION 7320                                     |                                                                                                                             |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Measurement ranges/resolution</b>                    | <b>pH</b> -2.000 ... +20.000 pH units                                                                                       |
|                                                         | <b>mV</b> -1200 ... +1200 mV<br>-2500 ... +2500 mV                                                                          |
|                                                         | <b>Temperature</b> -5 ... +105 °C/0,1 °C                                                                                    |
|                                                         | <b>Concentration</b> 0.000 ... 9.999<br>(mg/l, µmol/l, 10.00 ... 99.99<br>mg/kg, ppm, %) 100.0 ... 999.9<br>1000 ... 999999 |
| <b>Special functions</b>                                | Known addition (single), known subtraction, sample addition, sample subtraction, blank value correction                     |
| <b>Accuracy<br/>(±1 digit)</b>                          | <b>pH</b> ±0.005 pH units<br>±0.01 pH units                                                                                 |
|                                                         | <b>mV</b> ±0.3 mV, ±1 mV                                                                                                    |
|                                                         | <b>Temperature</b> ±0.1 K                                                                                                   |
| <b>Calibration<br/>MultiCal® calibration automatic:</b> | <b>AutoCal</b> 2-/3-/4-/5 point                                                                                             |
|                                                         | <b>AutoCal-Tec</b> 2-/3-/4-/5 point                                                                                         |
|                                                         | <b>ConCal®</b> 2-/3-/4-/5 point                                                                                             |
|                                                         | <b>ISECal</b> 2 bis 7 points                                                                                                |

## inoLab® pH/ION 7320: Concentration determination with two measurement channels



inoLab® pH/ION 7320P

- **Two channel meter for simultaneous measurements of pH, ion concentration or ORP**
- **Data output via USB interface for rapid data transfer in \*.csv format or via an optionally built-in printer**
- **CMC function for measuring range monitoring with pH**

The inoLab® pH / ION 7320 is a specialized pH and ionic concentration meter that can measure pH or concentration on each of its two channels simultaneously.

### Reliable measurements

- Repeatable measurement results due to active automatic AutoRead function with detection of stable measuring values
- The CMC function for pH visualises the optimal measuring range for correct measurement
- Graphic display with plain text menus for convenient and safe operation
- Input of the electrode serial number for the GLP/AQA compliant documentation
- Transmission of all data in \*.csv format via USB interface to PC, formatted transfer to Excel (MultiLab® Importer, included in the delivery or as a download)
- Output directly in the meter via optional built-in printer

### Flexible and high performance:

- 1 to 5 point calibration with pH
- 2 to 7 point calibration with ion measurement, also non-linear
- Blank value correction, incremental methods: Known addition, known subtraction, sample addition, sample subtraction
- Concentration specification in different units
- Selectable AutoRead criterion
- DIN or BNC version
- Backlit graphic display with CMC display

## Order information: inoLab® analogue benchtop Ion-selective meters

| Model                          | Description                                                                     | Order no. |
|--------------------------------|---------------------------------------------------------------------------------|-----------|
| <b>inoLab® pH/ION 7320</b>     | Precise and convenient pH/mV/ISE 2 channel benchtop meter                       | 1GA330    |
| <b>inoLab® pH/ION 7320P</b>    | Precise and convenient pH/mV/ISE 2 channel benchtop meter with built-in printer | 1GA330P   |
| <b>inoLab® pH/ION 7320 BNC</b> | Precise and convenient pH/mV/ISE 2 channel benchtop meter with BNC connectors   | 1GA340    |

# Portable meters for ion-selective measurement

3 year  
Warranty

IP 67



## ProfiLine Multi 3320: The environment specialist

In addition to pH, ORP potential, conductivity and dissolved oxygen (electrochemical), the Multi 3320 also measures ion concentration with combined electrodes.

see page 49

ProfiLine Multi 3320

## ProfiLine pH/Cond 3320: Perfect in process

The most important parameters pH/mV and conductivity are complemented by the possibility for ISE measurement with combined ISE electrodes.

see page 50

ProfiLine pH/Cond 3320

## Specifications

| ProfiLine          |                               | pH/ION 3310                                                                                |
|--------------------|-------------------------------|--------------------------------------------------------------------------------------------|
| pH measurement     |                               | -2.0 ... +20.0 ± 0.1 pH                                                                    |
|                    |                               | <b>pH</b> -2.00 ... +20.00 ± 0.01 pH                                                       |
|                    |                               | -2.000 ... +19,999 ± 0,005 pH                                                              |
| ISE measurement    |                               | <b>mV</b> ± 1200.0 mV ± 0.3 mV                                                             |
|                    |                               | ± (2500 ± 1) mV                                                                            |
|                    | <b>Concentration</b>          | 0.000 ... 9.999                                                                            |
|                    | (mg/l, µmol/l, mg/kg, ppm, %) | 10.00 ... 99.99                                                                            |
|                    |                               | 100.0 ... 999.9                                                                            |
|                    |                               | 1000 ... 999999                                                                            |
| <b>Temperature</b> |                               | -5.0 ... 105.0 °C ± 0.1 °C                                                                 |
| <b>CMC</b>         |                               | Yes                                                                                        |
| <b>Calibration</b> |                               | 1-, 2-, 3-, 4-, 5-point WTW technical buffers, DIN, NIST as well as further 22 buffer sets |
|                    |                               | <b>ISECal</b> 2 to 7 point                                                                 |

## ProfiLine pH/ION 3310: pH-, mV- and concentration measurement from a single source



ProfiLine pH/ION 3310

- **pH and ISE measurement**
- **2 to 7 point calibration, also non-linear**
- **Convenient menu control**

The pH/ION 3310 is a portable meter for outdoor use for combined pH and ISE measurements. All applications are covered with 1 to 5 point calibration for pH as well as a 2 to 7 point calibration for the direct potentiometric determination with ISE's, including the non-linear range.

### Reliable measurements

- Repeatable measurement results with the automatic AutoRead function for detecting stable measurement values
- The CMC function for pH visualises the optimal measuring range and supports correct measuring
- Graphic display with plain text menus for convenient and safe operation GLP/AQA compliant documentation
- Transmission of all data in \*.csv format via USB interface to PC; if desired, formatted transfer to Excel (MultiLab® Importer, included in the delivery or as download)

### Flexible and high performance:

- 1 to 5 point calibration for pH
- 2 to 7 point calibration for ion measurements, including the non-linear range
- Concentration readings in different units
- Backlit graphics display

## Order information: Portable analogue ISE meters

| Model       | Description                                    | Order no. |
|-------------|------------------------------------------------|-----------|
| pH/ION 3310 | Professional pH/mV/ISE meter, IP 67 waterproof | 2GA310    |



## Application table

| Ion type                                             | Application                               |
|------------------------------------------------------|-------------------------------------------|
| Ammonium (NH <sub>4</sub> <sup>+</sup> )             | Wastewater                                |
| Bromide (Br <sup>-</sup> )                           | Wine, plants                              |
| Calcium (Ca <sup>2+</sup> )                          | Milk products                             |
| Chloride (Cl <sup>-</sup> )                          | Drinking water, diet foods, mineral water |
| Copper (Cu <sup>2+</sup> )                           | Galvanic baths                            |
| Fluoride (F <sup>-</sup> )                           | Toothpaste, drinking water, cement        |
| Nitrate (NO <sub>3</sub> <sup>-</sup> ) <sup>®</sup> | Baby food, fertiliser, wastewater         |
| Potassium (K <sup>+</sup> ) <sup>®</sup>             | Wine, fertiliser                          |
| Silver (Ag <sup>+</sup> ) <sup>®</sup>               | Galvanic baths                            |
| Sodium (Na <sup>+</sup> ) <sup>®</sup>               | Boiler feed water, diet foods, wine       |
| Sulphide (S <sup>2-</sup> ) <sup>®</sup>             | Proteins, sediments                       |

## Ion-selective electrodes

Ion-selective and gas-sensitive electrodes are used for measuring the dissolved concentration of specific ions or gases in water. Similar to the pH electrode, the membrane interacts with the dissolved ions and delivers a concentration-dependent voltage signal that is converted to the corresponding measurement result.

### Combined ISE and GSE electrodes

- **Space-saving through integrated reference electrode**
- **11 different types available - broad selection of applications including ammonium measurement**
- **Slim and space-saving design with 12 mm shaft diameter**
- **Series 800 with 1 m fixed cable and DIN or BNC plug**

## Technical specifications and order information: inoLab® analogue Ion-selective electrodes

### Combined ISE and GSE electrodes



|                                          | NH 500/2                                                                        | Ca 800                                                | Ag/S 800                                                                                       | Cl 800                                             | CN 800                                                     |
|------------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------|
| <b>Determinable ions</b>                 | Ammonium                                                                        | Calcium, Magnesium                                    | Silver, Sulphide                                                                               | Chloride                                           | Cyanide                                                    |
| <b>Membrane</b>                          | –                                                                               | L                                                     | S                                                                                              | S                                                  | S                                                          |
| <b>Contains reference electrode</b>      | Yes                                                                             | Yes                                                   | Yes                                                                                            | Yes                                                | Yes                                                        |
| <b>Measuring range</b>                   | 0.02 to 900 mg/l,<br>With 3 exchange heads<br>and 50 ml electrolyte<br>solution | 0.02 ... 40000 mg/l<br>$5 \times 10^{-7}$ ... 1 mol/l | 0.01 ... 108000 mg/l<br>$10^{-7}$ ... 1 mol/l<br>0.003 ... 32000 mg/l<br>$10^{-7}$ ... 1 mol/l | 2 ... 35000 mg/l<br>$5 \times 10^{-5}$ ... 1 mol/l | 0.2 ... 260 mg/l<br>$8 \times 10^{-6}$ ... $10^{-2}$ mol/l |
| <b>Bridge electrolyte</b>                |                                                                                 | ELY/BR/503                                            | ELY/BR/503                                                                                     | ELY/BR/503                                         | ELY/BR/503                                                 |
| <b>Ionic strength-adjusting solution</b> | MZ/NH3/CN                                                                       | ISA/Ca                                                | ISA/FK (Ag) or according to the operating instructions for sulphide measurement                | ISA/FK                                             |                                                            |
| <b>Standard solutions (conc. 10 g/l)</b> | ES/NH <sub>4</sub>                                                              | ES/Ca                                                 | Standard solutions must be prepared freshly <sup>③</sup>                                       | ES/Cl                                              | MZ/NH3/CN<br>Standard solutions must be prepared freshly   |
| <b>pH range</b>                          | 4-12                                                                            | 2.5-11                                                | 2-12                                                                                           | 2-12                                               | 0-14                                                       |
| <b>Order No. DIN variant</b>             | 106395 (S7 plug head)                                                           | 106655                                                | 106651                                                                                         | 106661                                             | 106663                                                     |
| <b>Order No. BNC variant</b>             |                                                                                 | 106654                                                | 106650                                                                                         | 106660                                             | 106662                                                     |
| <b>Order no. Exchange head</b>           |                                                                                 | 106656                                                |                                                                                                |                                                    |                                                            |

① S = Solid electrode, L = Matrix electrode, G = Glass electrodes

② Titration

③ Preparation according to operating manual

④ Recipes for additionally required solutions are specified in the application report and operating manuals.

Combined ISE and GSE electrodes

ISE half cell



| Cu 800                                                              | K 800                                               | Br 800                                                 | F 800                                                 | NO 800                |                                      |
|---------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------|-----------------------|--------------------------------------|
| Copper, Nickel®                                                     | Potassium®                                          | Bromide                                                | Fluoride, Aluminium, Phosphate®, Lithium®             | Nitrate               | Sodium                               |
| S                                                                   | L                                                   | S                                                      | S                                                     | L                     | G                                    |
| Yes                                                                 | Yes                                                 | Yes                                                    | Yes                                                   | Yes                   | requires reference electrode R 503/D |
| 0.0006 ... 6400 mg/l<br>10 <sup>-8</sup> ... 10 <sup>-1</sup> mol/l | 0.04 ... 39000 mg/l<br>10 <sup>-6</sup> ... 1 mol/l | 0.4 ... 79000 mg/l<br>5 x 10 <sup>-6</sup> ... 1 mol/l | 0.02 ... sat. mg/l<br>10 <sup>-6</sup> ... sat. mol/l | 0.4 ... 62000 mg/l,   | 0.05 ... 23000 mg/l                  |
| ELY/BR/503                                                          | ELY/BR/503/K                                        | ELY/BR/503                                             | ELY/BR/503                                            | ELY/BR/503/N          | ELY/BR/503                           |
| ISA/FK                                                              | ISA/K                                               | ISA/FK                                                 | TISAB                                                 | TISAB/NO <sub>3</sub> | ISA/Na                               |
| ES/Cu                                                               | ES/K                                                | ES/Br                                                  | ES/F                                                  | ES/NO <sub>3</sub>    | ES/Na                                |
| 2-6                                                                 | 2-12                                                | 1-12                                                   | 5-7                                                   | 2.5-11                | >10                                  |
| 106665                                                              | 106671                                              | 106653                                                 | 106667                                                | 106675                | 106375 (S7 plug head)                |
| 106664                                                              | 106670                                              | 106652                                                 | 106666                                                | 106674                |                                      |
|                                                                     | 106672                                              |                                                        |                                                       | 106676                |                                      |

# Dissolved Oxygen measurement



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# Applications and meters overview

The oxygen dissolved in water does not only play a crucial role for the organisms living in it, but is also an important factor in many technical processes. The dissolved oxygen measurement is actually a partial pressure measurement; the solubility depends on the partial pressure of the oxygen in the atmosphere above the liquid surface. It is measured either electrochemically with an amperometric sensor or optically via a fluorescence method with an optical dissolved oxygen sensor.

| <div><div>✓ yes</div><div>● yes</div><div>✓ recommended</div><div>✓ recommended for some applications</div><div>– not recommended</div></div> | Digital                          |            |            | Analogue | Digital                          |            |            | Analogue   |          |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------|------------|----------|----------------------------------|------------|------------|------------|----------|----------|
|                                                                                                                                               | Benchtop dissolved oxygen meters |            |            |          | Portable dissolved oxygen meters |            |            |            |          |          |
|                                                                                                                                               | inoLab® IDS                      |            |            | inoLab®  | MultiLine® IDS                   |            |            | ProfiLine  |          |          |
|                                                                                                                                               | Multi 9630                       | Multi 9620 | Multi 9310 | Oxi 7310 | Multi 3630                       | Multi 3620 | Multi 3510 | Multi 3320 | Oxi 3310 | Oxi 3205 |
| 2 parameters simultaneously                                                                                                                   | ✓                                | ✓          |            |          | ✓                                | ✓          |            | ✓          |          |          |
| 3 parameters simultaneously                                                                                                                   | ✓                                |            |            |          | ✓                                |            |            |            |          |          |
| Dissolved oxygen optical                                                                                                                      | ●                                | ●          | ●          |          | ●                                | ●          | ●          |            |          |          |
| Gelöster Sauerstoff galvanisch                                                                                                                |                                  |            |            | ●        |                                  |            |            | ●          | ●        | ●        |
| Additional parameters                                                                                                                         | ●                                | ●          | ●          |          | ●                                | ●          | ●          | ●          |          |          |
| Routine measurement                                                                                                                           | ✓                                | ✓          | ✓          | ✓        | ✓                                | ✓          | ✓          | ✓          | ✓        | ✓        |
| Routine measurement with documentation                                                                                                        | ✓                                | ✓          | ✓          | ✓        | ✓                                | ✓          | ✓          | ✓          | ✓        | –        |
| AQA with documentation                                                                                                                        | ✓                                | ✓          | ✓          | ✓        | ✓                                | ✓          | ✓          | ✓          | ✓        | –        |
| R&D High resolution and precision                                                                                                             | ✓                                | ✓          | ✓          | ✓        | ✓                                | ✓          | ✓          | ✓          | ✓        | –        |
| Control measurements                                                                                                                          | ✓                                | ✓          | ✓          | ✓        | ✓                                | ✓          | ✓          | ✓          | ✓        | –        |
| LIMS connection                                                                                                                               | ✓                                | ✓          | ✓          | ✓        | ✓                                | ✓          | ✓          | ✓          | ✓        | –        |
| Quality assurance                                                                                                                             | ✓                                | ✓          | ✓          | ✓        | ✓                                | ✓          | ✓          | ✓          | ✓        | –        |
| Education                                                                                                                                     | ✓                                | ✓          | ✓          | ✓        | ✓                                | ✓          | ✓          | ✓          | ✓        | ✓        |
| Service                                                                                                                                       | –                                | –          | –          | –        | ✓                                | ✓          | ✓          | ✓          | ✓        | ✓        |
| Laboratory measurements                                                                                                                       | ✓                                | ✓          | ✓          | ✓        | ✓                                | ✓          | ✓          | ✓          | ✓        | ✓        |
| Field measurements                                                                                                                            | –                                | –          | –          | –        | ✓                                | ✓          | ✓          | ✓          | ✓        | ✓        |
| Depth measurements                                                                                                                            | –                                | –          | –          | –        | ✓                                | ✓          | ✓          | –          | –        | –        |
| PC connection                                                                                                                                 | ✓                                | ✓          | ✓          | ✓        | ✓                                | ✓          | ✓          | ✓          | ✓        | –        |
| Memory                                                                                                                                        | ✓                                | ✓          | ✓          | ✓        | ✓                                | ✓          | ✓          | ✓          | ✓        | –        |
| USB interface                                                                                                                                 | ✓                                | ✓          | ✓          | ✓        | ✓                                | ✓          | ✓          | ✓          | ✓        | –        |
| Graphic display                                                                                                                               |                                  |            | ✓          | ✓        |                                  |            |            | ✓          | ✓        | ✓        |
| Color graphic display                                                                                                                         | ✓                                | ✓          |            |          | ✓                                | ✓          |            |            |          |          |
|                                                                                                                                               | Compatible sensors               |            |            |          |                                  |            |            |            |          |          |
|                                                                                                                                               | Digital IDS electrodes           |            |            |          |                                  |            |            |            |          |          |
| IDS Optical dissolved oxygen sensor 33                                                                                                        | ✓                                | ✓          | ✓          |          | ✓                                | ✓          | ✓          |            |          |          |
|                                                                                                                                               | Analogue electrodes              |            |            |          |                                  |            |            |            |          |          |
| Dissolved oxygen sensors 92                                                                                                                   |                                  |            |            | ✓        |                                  |            |            | ✓          | ✓        | ✓        |
| Self-stirring dissolved oxygen sensor 93                                                                                                      |                                  |            |            | ✓        |                                  |            |            |            |          |          |
|                                                                                                                                               | Multi 9630                       | Multi 9620 | Multi 9310 | Oxi 7310 | Multi 3630                       | Multi 3620 | Multi 3510 | Multi 3320 | Oxi 3310 | Oxi 3205 |
| see page                                                                                                                                      | 40                               | 40         | 41         | 88       | 44                               | 45         | 46         | 49         | 91       | 91       |



# Benchtop dissolved oxygen meters

Dissolved oxygen is mainly used to determine the biochemical oxygen demand (BOD), but also as a parameter for other biological and chemical processes such as corrosion.

## inoLab® IDS – digital



Dissolved oxygen measurement with the new digital multi-parameter meters inoLab® IDS:

### inoLab® Multi 9630 IDS: Measure three parameters simultaneously

High-tech for demanding laboratory applications. The digital inoLab® multi-parameter meter for IDS sensors for parallel measurement of the same or different parameters. Up to three sensors can be connected. The optical sensor FDO® 925 is also suitable and approved for BOD measurement.

*see page 40*



inoLab® Multi 9630 IDS

### inoLab® Multi 9620 IDS: Measure two parameters simultaneously

As inoLab® Multi 9630 IDS, but up to two sensors can be connected.

*see page 40*



inoLab® Multi 9620 IDS

### inoLab® Multi 9310 IDS: Digital individual parameter solution

The new inoLab® Multi 9310 IDS is well suited for dissolved oxygen measurement in the laboratory. The IDS technology allows optimized measurements and efficient documentation in the simplest manner.

*see page 41*



inoLab® Multi 9310 IDS

# inoLab® - analogue

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



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IP 43

CE

inoLab® Oxi 7310

## Technical specifications: Benchtop oxygen meter inoLab® Oxi 7310

|                                 | <b>inoLab® Oxi 7310</b><br>(all values $\pm 1$ digit)                                      |
|---------------------------------|--------------------------------------------------------------------------------------------|
| <b>Concentration</b>            | 0.000 ... 20.00 mg/l $\pm 0.5$ %<br>0 ... 90 mg/l $\pm 0.5$ %                              |
| <b>Saturation</b>               | 0.0 ... 200.0 % $\pm 0.5$ % of measured value<br>0 ... 600 % $\pm 0.5$ % of measured value |
| <b>Partial pressure</b>         | 0 ... 200,0 hPa, 0 ... 1250 hPa                                                            |
| <b>Temperature</b>              | -5.0 ... 105.0 °C $\pm 0.1$ °C                                                             |
| <b>Celsius/Fahrenheit</b>       | Yes                                                                                        |
| <b>AutoRead</b>                 | Can be switched automatically/manually                                                     |
| <b>Calibration</b>              | Calibration against external standard                                                      |
| <b>Calibration memory</b>       | retrieve up to 10 calibrations                                                             |
| <b>Built-in pressure sensor</b> | Yes                                                                                        |
| <b>Display</b>                  | LCD graphics, backlit                                                                      |
| <b>Data memory</b>              | Manual 500/5000 automatic                                                                  |
| <b>Logger</b>                   | Manually/time-controlled                                                                   |
| <b>Interface</b>                | Mini USB                                                                                   |
| <b>Printer (optional)</b>       | Thermal printer, width 58 mm                                                               |
| <b>Power Supply</b>             | Universal power supply 100 to 240 V, 50/60 Hz, 4 x 1.5 V AA or 4 x 1.2 V NiMH battery pack |

## inoLab® Oxi 7310: reliable documentation of dissolved oxygen



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

- **USB interface for rapid data transfer**
- **Data output in \*.csv-Format or via optionally built-in printer**
- **Calibration against external standard possible**

The inoLab® Oxi 7310 is perfectly suited for precision measurement and automatic GLP/AQA compliant documentation in quality laboratories of all industries. The meter has a special connector for the connection of the self-stirring dissolved oxygen sensor StirrOx® G. Also available with optionally built-in printer.

### Reliable measurement

- Repeatable measurement results due to active automatic AutoRead function with detection of stable measuring values
- Easy calibration in water vapour saturated air
- Graphic display with clear text menus for convenient and safe operation

### GLP/AQA compliant documentation

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

### Flexible and high performance:

- Measures partial pressure, concentration and saturation
- Salinity correction
- Storage for large measurement series
- Connection for self-stirring dissolved oxygen sensor StirrOx® G



## Order information: Benchtop dissolved oxygen meters

| Model                         | Description                                                                                                                                                                        | Bestell-Nr. |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| <b>inoLab® Oxi 7310 SET 1</b> | Professional, menu-controlled benchtop D.O. meter for GLP/AQA-compliant measurements/documentation. Set with galvanic oxygen sensor Cellox® 325 and accessories.                   | 1BA301      |
| <b>inoLab® Oxi 7310 SET 4</b> | Professional, menu-controlled benchtop D.O. meter for GLP/AQA-compliant measurements/documentation. Set with self-stirring galvanic oxygen electrode StirrOx® 325 and accessories. | 1BA304      |
| <b>inoLab® Oxi 7310P</b>      | Professional, menu-controlled benchtop D.O. meter for GLP/AQA-compliant measurements/documentation with built-in thermo printer.                                                   | 1BA300P     |

Further articles see price list or [www.WTW.com](http://www.WTW.com).

# Portable dissolved oxygen meters

The oxygen measurement plays a large role in mobile environment analytics. Portable systems are used in the water wastewater treatment plant for monitoring stationary measurement, fish farming, in limnology and many other fields.

## MultiLine® IDS – digital



Portable optical dissolved oxygen measurement with the new digital MultiLine® multi-parameter meters:



MultiLine® Multi 3630 IDS

### Multi 3630 IDS: Measure three parameters simultaneously

Three galvanically isolated measurement channels, can be freely combined for the same or different parameters. It also allows oxygen measurement in conjunction with a depth sonde of the MPP IDS type.

*see page 44*



MultiLine® Multi 3620 IDS

### Multi 3620 IDS: Measure two parameters simultaneously

Two galvanically isolated measurement channels, can be freely combined for the same or different parameters. Measures dissolved oxygen also in connection with other parameters.

*see page 45*



MultiLine® Multi 3510 IDS

### Multi 3510 IDS: Digital single parameter solution

The single channel multi-parameter meter Multi 3510 IDS is ideally suited for portable dissolved oxygen measurement in wastewater treatment plants, surface waters and industrial applications.

*see page 46*

## ProfiLine – analogue



ProfiLine Multi 3320

### ProfiLine Multi 3320: The environment specialist

Dissolved oxygen, pH/ORP, ISE and conductivity: the Multi 3320 is a perfect meter for environmental monitoring with electrochemical sensors. Especially in combination with the dissolved oxygen, applications can be covered in surface water, in fish farming and in wastewater treatment plants.

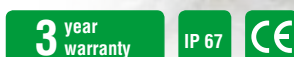
*see page 49*

# ProfiLine – analogue

All analogue ProfiLine oxygen meters are also available in application-oriented carrying case kits.



ProfiLine Oxi 3310 Set 1



## Technical specifications: ProfiLine portable oxygen meters

| Models                                                | Oxi 3205                                                                                                                                                                                                                                                                                                                                                                                                              | Oxi 3310                  |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Measuring ranges/<br/>Dissolving/<br/>accuracy</b> | O <sub>2</sub> conc. 0.00 ... 20.00 mg/l (20.0 mg/l*) ±0.5 % of measured value<br>O <sub>2</sub> saturation 0 ... 90 mg/l ±0.5 % of measured value<br>O <sub>2</sub> partial pressure 0.0 ... 200.0 % (200 %) ±0.5 % of measured value<br>temperature 0 ... 600 % ±0.5 % of measured value<br>0,0 ... 200.0 mbar (200 mbar*) ±0.5 % of measured value;<br>0 ... 1250 mbar ±0.5 % v. Mw.<br>-5.0 ... +105.0 °C ±0.1 °C |                           |
| <b>Temperature compensation</b>                       | Better than 2 % at 0 ... +40 °C                                                                                                                                                                                                                                                                                                                                                                                       |                           |
| <b>Air pressure compensation</b>                      | Automatic with integrated pressure sensor<br>(500 ... 1100 mbar)                                                                                                                                                                                                                                                                                                                                                      |                           |
| <b>Salinity correction</b>                            | 0 or 35 fixed                                                                                                                                                                                                                                                                                                                                                                                                         |                           |
| <b>Calibration</b>                                    | OxiCal® fast calibration in OxiCal®-SL or<br>OxiCal®-D                                                                                                                                                                                                                                                                                                                                                                |                           |
| <b>Data memory/logger</b>                             | -                                                                                                                                                                                                                                                                                                                                                                                                                     | manual 500/5000 automatic |
| <b>Display</b>                                        | LCD graphics, backlit                                                                                                                                                                                                                                                                                                                                                                                                 |                           |
| <b>Continuous operation</b>                           | Up to 800 h without/100 h with illumination                                                                                                                                                                                                                                                                                                                                                                           |                           |

## Order information: ProfiLine portable oxygen meters

| Model                 | Description                                                                                                                                                     | Order no. |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Oxi 3205 Set 1</b> | Robust and waterproof oxygen meter in a carrying case kit with galvanic dissolved oxygen sensor CellOx® 325 and accessories                                     | 2BA101    |
| <b>Oxi 3310 Set 1</b> | Professional, waterproof oxygen meter with data logger and USB interface in the carrying case with galvanic dissolved oxygen sensor CellOx® 325 and accessories | 2BA301    |

For additional products, see price list or [www.WTW.com](http://www.WTW.com)



## ProfiLine Oxi 3310: Measure and document dissolved oxygen



ProfiLine Oxi 3310

The Oxi 3310 is a robust portable meter with built-in data logger for recording series of measurements.

### Reliable measurements

- Repeatable measuring results due to automatic AutoRead function
- Automatic barometric pressure compensation
- Silicon keyboard with tactile key click and acoustic feedback

### GLP/AQA compliant documentation

- Data transfer in \*.csv format via USB interface at the PC
- Formatted takeover into Excel (MultiLab® Importer, included in the delivery or as a download)

### Flexible and high performance:

- Measures partial pressure, concentration and saturation
- Built-in salinity correction
- Memory for large measurement series

- ⦿ **Waterproof USB interface for rapid data transfer**
- ⦿ **Data output in \*.csv-Format**
- ⦿ **Calibration against external standard possible (Winkler titration)**

## ProfiLine Oxi 3205: Measure dissolved oxygen in a simple manner



ProfiLine Oxi 3205

The Oxi 3205 is a easy, reliable meter for routine measurement

- Repeatable measurement results due to active automatic AutoRead function with detection of stable measuring values
- Simple operation: Automated functions reduce the number of keys (6)
- OxiCal® Air calibration
- Waterproof 8 pin socket for measurements under outdoor conditions

- ⦿ **Compatible with CelloX® and DurOx® probes**
- ⦿ **Backlit graphics display**
- ⦿ **Automatic barometric pressure compensation**

# Dissolved oxygen sensors

## IDS optical dissolved oxygen sensor–digital

Optical measurement is the most advanced method of determining dissolved oxygen. Using fluorescence quenching as described in DIN ISO 17289, the fluorescence signal of special dyes changes as a function of the oxygen concentration. This is measured, and converted to dissolved oxygen concentration. The method is described in DIN ISO 17289.

The optical dissolved oxygen sensor is only available in the IDS system, and is described in the multi-parameter measurement chapter.



FDO® 925/FDO® 925-P

see page 33

## Galvanic dissolved oxygen sensors – analogue

The electrochemical method is the second currently used method for measuring the dissolved oxygen. It measures oxygen proportional to the current signal of a polarographic or galvanic dissolved oxygen sensor according to DIN ISO 5814.

- **Universal application due to wide measuring range between 0 and 50 mg/l**
- **Easy handling through proven technology**
- **Sensors available for special applications (fish farming, BOD measurement)**
- **Simple calibration in water vapour saturated air (calibration vessel included)**

### Technical specifications: Galvanic dissolved oxygen sensors - analogue

|                                  | <b>CellOx® 325</b>                           | <b>DurOx® 325-3</b>      | <b>StirrOx® G</b>        |
|----------------------------------|----------------------------------------------|--------------------------|--------------------------|
| <b>Order no.</b>                 | 201533                                       | 201570                   | 2013425                  |
| <b>Method</b>                    | Electrochemical/galvanic                     | Electrochemical/galvanic | Electrochemical/galvanic |
| <b>Response time T99 (20 °C)</b> | < 60 s                                       | < 125 s                  | < 45 s                   |
| <b>Measuring range</b>           | <b>Concentration</b>                         | 0 ... 50 mg/l            | 0 ... 50 mg/l            |
|                                  | <b>Saturation</b>                            | 0 ... 600 %              | 0 ... 600 %              |
|                                  | <b>Partial pressure</b>                      | 0 ... 1250 hPa           | 0 ... 1250 hPa           |
| <b>Temperature</b>               | 0 ... 50 °C                                  | 0 ... 50 °C              | 0 ... 50 °C              |
| <b>Shaft material</b>            | POM, stainless steel                         | POM, stainless steel     | POM, stainless steel     |
| <b>Shaft length</b>              | 145 mm                                       | 110 mm                   | 49 (83) mm               |
| <b>Diameter</b>                  | 15.3 mm                                      | 17.5 mm                  | 12 mm                    |
| <b>Cable length</b>              | 1.5 m (further cable lengths see price list) | 3 m                      | 2 m                      |



CellOx® 325



DurOx® 325



StirrOx® G

### CellOx® 325

This universal galvanic dissolved oxygen sensor with IMT temperature compensation can be used both in the laboratory and in the field. It is available in versions with cable lengths up to 20 m.

### DurOx® 325

Thanks to a special membrane technology, this well-priced galvanic dissolved oxygen sensor is particularly insensitive to strongly fluctuating measured values, for example when testing stationary oxygen meters in the wastewater process. Also suitable for training purposes.

### StirrOx® G

Special dissolved oxygen sensor for the BOD (biochemical oxygen demand) measurement. With a motor-operated stirring paddle for mixing the samples and flow to the sensor. This probe features extremely low intrinsic oxygen consumption and built-in membrane monitoring.

## Order information: Accessories for analogue galvanic dissolved oxygen sensors

| Model              | Description                                                                                                                   | Order no. |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>ZBK-D</b>       | Accessories box with replacement and maintenance kit for DurOx® sensors.                                                      | 201578    |
| <b>ZBK 325</b>     | Replacement and maintenance kit for dissolved oxygen sensors CellOx® 325                                                      | 202706    |
| <b>ZBK ST</b>      | Accessories box with replacement and maintenance kit for dissolved oxygen sensors StirrOx® G.                                 | 202710    |
| <b>WP 90/3</b>     | 3 changeable membrane heads suitable for all dissolved oxygen sensors, except StirrOx® G, DurOx® 325                          | 202725    |
| <b>WP3-ST</b>      | 3 changeable membrane heads for StirrOx® G                                                                                    | 202738    |
| <b>WP3-D</b>       | 3 changeable membrane heads for DurOx® sensors.                                                                               | 202740    |
| <b>RL-G</b>        | Cleaning solution for galvanic dissolved oxygen sensors StirrOx® G, CellOx® 325, DurOx® 325 and TA 197 Oxi, 1 bottle of 30 ml | 205204    |
| <b>ELY/G</b>       | Electrolyte for galvanic dissolved oxygen sensors StirrOx® G, CellOx® 325, DurOx® 325                                         | 205217    |
| <b>SC-FDO® 925</b> | Replacement membrane cap for optical dissolved oxygen sensor                                                                  | 201310    |

For additional products, see price list or [www.WTW.com](http://www.WTW.com)

# Conductivity measurement



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# Applications and meters overview

The conductivity is a sum parameter, as all ions dissolved in the water contribute to the conductivity. It is detected with so-called measuring cells, which are immersed in the sample. Determining the ratio of applied voltage and flowing current in conjunction with a geometric factor resulting from the cell provides the desired measured value.

|                                         | Digital                      |            |            |           |           | Analogue                     |            | Digital    |            |              | Analogue  |           |  |  |
|-----------------------------------------|------------------------------|------------|------------|-----------|-----------|------------------------------|------------|------------|------------|--------------|-----------|-----------|--|--|
|                                         | Benchtop conductivity meters |            |            |           |           | Portable conductivity meters |            |            |            |              |           |           |  |  |
|                                         | inoLab® IDS                  |            |            | inoLab®   |           | MultiLine® IDS               |            |            | ProfiLine  |              |           |           |  |  |
|                                         | Multi 9630                   | Multi 9620 | Multi 9310 | Cond 7310 | Cond 7110 | Multi 3630                   | Multi 3620 | Multi 3510 | Multi 3320 | pH/Cond 3320 | Cond 3310 | Cond 3110 |  |  |
| 2 parameters simultaneously             | ✓                            | ✓          |            |           |           | ✓                            | ✓          |            | ✓          | ✓            |           |           |  |  |
| 3 parameters simultaneously             | ✓                            |            |            |           |           | ✓                            |            |            |            |              |           |           |  |  |
| Additional parameters                   | ●                            | ●          | ●          |           |           | ●                            | ●          | ●          | ●          | ●            |           |           |  |  |
| Routine measurements                    | ✓                            | ✓          | ✓          | ✓         | ✓         | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         | ✓         |  |  |
| Routine measurements with documentation | ✓                            | ✓          | ✓          | ✓         | –         | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         | –         |  |  |
| AQA with documentation                  | ✓                            | ✓          | ✓          | ✓         | –         | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         | –         |  |  |
| R&D High resolution and precision       | ✓                            | ✓          | ✓          | ✓         | –         | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         | –         |  |  |
| Control measurements                    | ✓                            | ✓          | ✓          | ✓         | –         | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         | –         |  |  |
| LIMS connection                         | ✓                            | ✓          | ✓          | ✓         | –         | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         | –         |  |  |
| Quality assurance                       | ✓                            | ✓          | ✓          | ✓         | –         | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         | –         |  |  |
| Education                               | ✓                            | ✓          | ✓          | ✓         | ✓         | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         | ✓         |  |  |
| Service                                 | –                            | –          | –          | –         | –         | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         | ✓         |  |  |
| Laboratory measurements                 | ✓                            | ✓          | ✓          | ✓         | ✓         | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         | –         |  |  |
| Field measurements                      | –                            | –          | –          | –         | –         | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         | ✓         |  |  |
| Depth measurements                      | –                            | –          | –          | –         | –         | ✓                            | ✓          | ✓          | –          | –            | ✓         | ✓         |  |  |
| PC connection                           | ✓                            | ✓          | ✓          | ✓         |           | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         |           |  |  |
| Memory                                  | ✓                            | ✓          | ✓          | ✓         |           | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         |           |  |  |
| USB interface                           | ✓                            | ✓          | ✓          | ✓         |           | ✓                            | ✓          | ✓          | ✓          | ✓            | ✓         |           |  |  |
| Graphic display                         |                              |            | ✓          | ✓         |           |                              |            |            | ✓          | ✓            | ✓         |           |  |  |
| Color graphic display                   | ✓                            | ✓          |            |           |           | ✓                            | ✓          | ✓          |            |              |           |           |  |  |
|                                         | Compatible sensos            |            |            |           |           |                              |            |            |            |              |           |           |  |  |
|                                         | Digital IDS electrodes       |            |            |           |           |                              |            |            |            |              |           |           |  |  |
| IDS conductivity cells                  | 34                           | ✓          | ✓          | ✓         |           | ✓                            | ✓          | ✓          |            |              |           |           |  |  |
|                                         | Analogue electrodes          |            |            |           |           |                              |            |            |            |              |           |           |  |  |
| Conductivity cells                      | 106                          |            |            |           | ✓         | ✓                            |            |            | ✓          | ✓            | ✓         | ✓         |  |  |
|                                         | Multi 9630                   | Multi 9620 | Multi 9310 | Cond 7310 | Cond 7110 | Multi 3630                   | Multi 3620 | Multi 3510 | Multi 3320 | pH/Cond 3320 | Cond 3310 | Cond 3110 |  |  |
| see page                                | 40                           | 40         | 41         | 98        | 99        | 44                           | 45         | 46         | 49         | 50           | 103       | 104       |  |  |



# Benchtop conductivity meters

The use of different conductivity cells is common in the laboratory. The IDS technology is showing clear advantages here: The error-free automatic transmission of cell constants and preset temperature compensation for reliable measurement results.

## inoLab® IDS – digital



Conductivity measurement in the quality laboratory with the new digital multi-parameter measuring instruments inoLab® IDS

### inoLab® Multi 9630 IDS: Measure three parameters simultaneously

The digital inoLab® multi parameter meters for IDS sensors for parallel measurement of the same or different parameters. Up to three sensors can be connected. The IDS conductivity cells cover a wide range of applications. Due to the galvanic isolation of the measuring channels, there is no interference between the connected sensors, e.g. IDS pH electrodes.

*see page 40*



inoLab® Multi 9630 IDS

### inoLab® Multi 9620 IDS: Measure two parameters simultaneously

As inoLab® Multi 9630 IDS, but up to two sensors can be connected.

*see page 40*



inoLab® Multi 9620 IDS

### inoLab® Multi 9310 IDS: Digital individual parameter solution

The inoLab® Multi 9310 IDS works with any IDS conductivity cell and can cover all laboratory related tasks.

*see page 41*



inoLab® Multi 9310 IDS

# inoLab® - analogue

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

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warranty

IP 43



inoLab® Cond 7310 SET 1

## Technical specifications: inoLab® analogue benchtop conductivity meters

|                                 | <b>inoLab® Cond 7310</b><br>all values $\pm 1$ digit                                                                                                                                                    | <b>inoLab® Cond 7110</b><br>all values $\pm 1$ digit                                                                                                                    |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Conductivity</b>             | 0 $\mu\text{S}/\text{cm}$ ... 1000 $\text{mS}/\text{cm}$ $\pm 0.5$ % of measured value                                                                                                                  | 0 $\mu\text{S}/\text{cm}$ ... 1000 $\text{mS}/\text{cm}$ $\pm 0.5$ % of measured value                                                                                  |
| <b>Salinity</b>                 | 0.0 ... 70.0 (according to IOT)<br>0.00 ... 20 $\text{MOhm cm}$                                                                                                                                         | 0.0 ... 70.0 (according to IOT)<br>0.00 ... 20 $\text{MOhm cm}$                                                                                                         |
| <b>TDS</b>                      | 1 ... 1999 $\text{mg}/\text{l}$ , 0 to 199.9 $\text{g}/\text{l}$                                                                                                                                        | 0 ... 1999 $\text{mg}/\text{l}$                                                                                                                                         |
| <b>Temperature</b>              | -5.0 ... 105.0 $^{\circ}\text{C}$ $\pm 0.1$ $^{\circ}\text{C}$                                                                                                                                          | -5.0 ... 105.0 $^{\circ}\text{C}$ $\pm 0.1$ $^{\circ}\text{C}$                                                                                                          |
| <b>Cell constants</b>           | Fix 0.01 $\text{cm}^{-1}$ ,<br>can be calibrated 0.450...0.500 $\text{cm}^{-1}$ ,<br>0.800 to 0.880 $\text{cm}^{-1}$ ,<br>adjustable 0.09 ... 0.110 $\text{cm}^{-1}$<br>0.250 ... 25.0 $\text{cm}^{-1}$ | 0.450 ... 0.500 $\text{cm}^{-1}$<br>0.09 ... 0.110 $\text{cm}^{-1}$<br>0.800 to 0.880 $\text{cm}^{-1}$ ,<br>0.25 ... 2.5 $\text{cm}^{-1}$ , fixed 0.01 $\text{cm}^{-1}$ |
| <b>Calibration</b>              | 1-point                                                                                                                                                                                                 | 1-point                                                                                                                                                                 |
| <b>Tref</b>                     | 20 $^{\circ}\text{C}$ /25 $^{\circ}\text{C}$                                                                                                                                                            | 20 $^{\circ}\text{C}$ /25 $^{\circ}\text{C}$                                                                                                                            |
| <b>Temperature compensation</b> | nLF, linear 0.000 to 10.000 %, disengageable                                                                                                                                                            | nLF, linear 0.000 to 3000 %, disengageable                                                                                                                              |

## inoLab® Cond 7310: Reliable conductivity documentation



inoLab® Cond 7310

- **USB interface for rapid data transfer**
- **Data output in \*.csv-Format or via optionally built-in printer**
- **Mains and battery operation inoLab® Cond 7310**

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

### Reliable measurements

- Repeatable measurement results due to active automatic AutoRead function for the detection of stable measured values
- The sensor symbol informs about the condition of the electrode
- Graphic display with plain text menus for convenient and safe operation

### GLP/AQA compliant documentation

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

### Flexible and high performance:

- For all modern WTW conductivity cells
- Measures TDS, salinity and specific resistance
- Backlit graphics display for brilliant representation
- Suitable for measurements according to pharmacopoeia

## inoLab® Cond 7110: Exact conductivity measurement



inoLab® Cond 7110

- **Simple, intuitive operation**
- **Measurement range up to 1000 mS/cm**
- **Including stand and sensor holder**

The inoLab® Cond 7110 is a laboratory routine conductivity meter with a large display and all functions that make accurate measurements easy.

### Measuring certainty

- Repeatable measurement results due to active automatic AutoRead function with independent detection of stable measuring values
- Calibration timer for regularly checking the conductivity cells
- Precise measured value recording through high-quality electronics

### Flexible and high performance:

- Measures conductivity, TDS and salinity
- Connection of special measuring cells possible
- Linear, non-linear (nlf) and selectable temperature compensation
- Simple, intuitive operation
- Measurement range up to 1000 mS/cm
- Including stand and sensor holder



## Order information: inoLab® analogue benchtop conductivity meters

| Model                                                                                            | Description                                                                                                                                               | Order no. |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>inoLab® Cond 7110 SET 1</b>                                                                   | Simple, easy-to-use conductivity benchtop meter for routine measurements. In a set with conductivity cell TetraCon® 325                                   | 1CA101    |
| <b>inoLab® Cond 7310P</b>                                                                        | Comfortable, menu-controlled conductivity benchtop meter for measurements/GLP/AQA compliant documentation With built-in thermal printer Single instrument | 1CA300P   |
| <b>inoLab® Cond 7310 SET 1</b>                                                                   | Convenient, menu-controlled conductivity benchtop meter for measurements/GLP/AQA compliant documentation In a set with conductivity cell TetraCon® 325    | 1CA301    |
| For Accessories and cables, see price list or <a href="http://www.WTW.com/de">www.WTW.com/de</a> |                                                                                                                                                           |           |

# Portable conductivity meters

## MultiLine® IDS – digital

Portable conductivity measurement in the process and in the field with the new digital MultiLine® multi-parameter instruments:



### Multi 3630 IDS: Measure three parameters simultaneously

Three galvanically isolated measurement channels can be used for any combination of parameters. It enables conductivity measurement also in conjunction with a MPP IDS depth sonde. Galvanic isolation eliminates the possibility of interference with other sensors.

*see page 44*



MultiLine® Multi 3630 IDS

### Multi 3620 IDS: Measure two parameters simultaneously

Two galvanically isolated measurement channels can be used for any combination of parameters. Perfect for conductivity measurement in combination with pH measurement.

*see page 45*



MultiLine® Multi 3620 IDS

### MultiLine® Multi 3510 IDS: Digital single parameter solution

The single channel multi-parameter meter Multi 3510 IDS is perfect for conductivity measurement of ultra-pure water up to concentrated solutions.

*see page 46*



MultiLine® Multi 3510 IDS



# ProfiLine – analogue

All portable meters are available in application specific kits including sensors and accessories in a carrying case.

3 year  
warranty

IP 67

CE

ProfiLine Cond 3310 SET 1

## Technical specifications: ProfiLine analogue portable conductivity meters

| ProfiLine ...                                | Cond 3110                                                                                    | Cond 3310                                                                                                                                                                     |
|----------------------------------------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measuring ranges/<br>resolution/<br>accuracy | <b>Conductivity</b> 0,0 ... 1000 mS/cm $\pm 0,5\%$ of the measured value                     | 0,0 ... 1000 mS/cm $\pm 0,5\%$ of the measured value 1.999 $\mu\text{S/cm}$ (with $K=0.01\text{ cm}^{-1}$ )<br>0.00 ... 19.99 $\mu\text{S/cm}$ (with $K=0.1\text{ cm}^{-1}$ ) |
|                                              | <b>Temperature</b> 5.0 °C ... +105.0 °C $\pm 0.1\text{ °C}$                                  | -5.0 °C ... +105.0 °C $\pm 0.1\text{ °C}$                                                                                                                                     |
|                                              | <b>Salinity</b> 0.0 ... 70.0 (as per IOT)                                                    | 0.0 ... 70.0 (as per IOT)                                                                                                                                                     |
|                                              | <b>TDS</b>                                                                                   | 0 ... 1999 mg/l, 0 ... 199.9 g/l,                                                                                                                                             |
|                                              | <b>Spec. resistance</b>                                                                      | 0.00 ... 999 M $\Omega\text{cm}$                                                                                                                                              |
| <b>Reference temperature</b>                 | selectable 20 °C or 25 °C                                                                    | selectable 20 °C or 25 °C                                                                                                                                                     |
| <b>Cell constant</b>                         | <b>fixed:</b> 0.475 $\text{cm}^{-1}$                                                         | 0.475 $\text{cm}^{-1}$ , 0.010 $\text{cm}^{-1}$                                                                                                                               |
|                                              | <b>with calibration:</b> 0.450 ... 0.500 $\text{cm}^{-1}$ , 0.800 ... 0.880 $\text{cm}^{-1}$ | 0.450 ... 0.500 $\text{cm}^{-1}$ , 0.800 ... 0.880 $\text{cm}^{-1}$                                                                                                           |
|                                              | <b>adjustable:</b> -                                                                         | 0.090 ... 0.110 $\text{cm}^{-1}$ , 0.250 ... 25.000 $\text{cm}^{-1}$                                                                                                          |
| <b>Temperature compensation</b>              | automatic                                                                                    | can be switched automatically/manually                                                                                                                                        |
| <b>Temperature coefficient</b>               | • Non-linear function of natural waters (nLF) as per EN 27 888                               | • Non-linear function of natural waters (nLF) as per EN 27 888 and ultra-pure water function                                                                                  |
|                                              |                                                                                              | • Linear compensation of 0.000 ... 10.000 %/K<br>• No compensation                                                                                                            |
| <b>Data memory/logger</b>                    | -                                                                                            | manual 200/5000 automatic                                                                                                                                                     |
| <b>Display</b>                               | 7-Segment LCD, customized                                                                    | LCD graphics, backlight                                                                                                                                                       |
| <b>Permanent operation</b>                   | up to 1000 hours                                                                             | up to 800 h without/100 h with illumination                                                                                                                                   |

## ProfiLine Multi 3320: The environment specialist

The Multi 3320 for the measurement of conductivity, pH, ISE, ORP, and dissolved oxygen is a perfect analogue meter for environmental monitoring with electrochemical sensors. With conductivity measurement, all applications can be covered with standard, special and ultra-pure water measuring cells.

*see page 49*



ProfiLine Multi 3320

## ProfiLine pH/Cond 3320: Perfect in process

Conductivity, pH / ORP, ISE: the pH/Cond 3320 is a perfect meter also in portable process monitoring with electrochemical sensors. With conductivity measurement, all types of measurement can be covered with standard, special and ultra-pure water measuring cells, alone or in combination pH, ORP or ISE.

*see page 50*



ProfiLine pH/Cond 3320



## ProfiLine Cond 3310: Reliable conductivity measurement with documentation



ProfiLine Cond 3310

- **Waterproof USB interface for rapid data transfer**
- **Data output in \*.csv-Format**
- **Measuring range 0.001 µS/cm to 1000 mS/cm**

The Cond 3310 is a combination of a robust portable meter and a data logger for anyone who wants to record measured data automatically and evaluate them based on EDP.

### Reliable measurements

- Repeatable measurement results due to active automatic AutoRead function with detection of stable measuring values
- Automatic temperature compensation, also disengageable, linear compensation up to 10%/K
- Silicon keyboard with tactile key click and optional protection for field use

### GLP/AQA compliant documentation

- Large memory for 500 manual and 5000 automatically generated entries
- Transfer of all data in \*.csv format via USB interface at the PC; formatted takeover into Excel (MultiLab® Importer)

### Flexible and high performance:

- Measures conductivity, salinity, TDS and specific resistance
- Data transfer directly in Excel
- Suitable for measurements according to pharmacopoeia

## ProfiLine Cond 3110: Easy conductivity measurement



ProfiLine Cond 3110

- **Compatible with TetraCon® 325 or KLE 325**
- **Automatic temperature compensation**
- **Salinity**

The Cond 3110 is a simple, reliable conductivity meter with automatic nIF temperature compensation according to DIN EN 27888 for routine measurement in natural waters and wastewater.

### Reliable measurement

- Repeatable measurement results due to active automatic AutoRead function for the detection of stable measured values
- Secure operation: Automated functions reduce the number of keys (6)
- A waterproof 8-pin socket enables reliable measurement also in a humid environment.

### Easy and reliable:

- Easily readable display for measured value and temperature
- Silicon keyboard with tactile key click, also operable with gloves
- Sets for field use with proven electrodes and carrying case
- Suitable for TetraCon® 325 or KLE 325
- Automatic temperature compensation
- Salinity

## Order information: Conductivity meters

| Model                                                                                                       | Description                                                                                                                                                    | Order no. |
|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Cond 3110 SET 1</b>                                                                                      | Easy-to-use, robust conductivity meter with large LCD display, for mobile routine measurement of 2- and 4 electrode cells, set with TetraCon® 325.             | 2CA101    |
| <b>Cond 3310 SET 1</b>                                                                                      | Professional, field-proven conductivity meter with backlit LCD graphic display for mobile measurement, with data logger, USB interface. Set with TetraCon® 325 | 2CA301    |
| For additional accessories and cables, see price list or <a href="http://www.WTW.com/de">www.WTW.com/de</a> |                                                                                                                                                                |           |

# Conductivity cells

Depending on the application, we provide electrodes made of graphite or stainless steel to ensure that they do not chemically react with the measured sample.

## Four electrode conductivity cells

- Universal application area due to wide measuring range between 1  $\mu\text{S}/\text{cm}$  and 2000  $\text{mS}/\text{cm}$
- Only one calibration point required due to linearity over the entire measuring range
- Measuring cells in different designs for almost all applications
- Highest accuracy through high-precision manufacturing
- Large application range in aqueous solutions through unique electrode technology

## Two electrode measuring cells made of stainless steel

- Optimised measuring cells, especially for use in ultra-pure water measurement
- No disturbances due to  $\text{CO}_2$  introduction with stainless steel measuring cells with flow-through vessels
- Precise measurement in the lower measuring range due to optimised geometry
- Suitable for ultra-pure water measurement according to pharmacopoeia

## Two electrode measuring cell made of graphite

- Robust measuring cell for simple measurements and in teaching and training
- Robust design with durable epoxy shaft
- For all aqueous samples
- For all current conductivity meters

# IDS Conductivity cells – digital



A selection of two electrode and four electrode conductivity cells for covering a wide range of applications, from ultra-pure water to viscous samples can be found in the chapter “Multi-parameter measurement”.

see page 34



from left to right: the digital IDS sensors (1) TetraCon® 925, (2) LR 925/01, (3) TetraCon® 925 / C, (4) TetraCon® 925 / LV; the wireless ready IDS plug head electrodes (5) TetraCon® 925-P, (6) TetraCon® 925 / LV-P, (7) LR 925/01-P



# Conductivity cells - analogue

## For every application



Technical specifications: Conductivity cells - analogue

### Universal applications

|                                  | <b>TetraCon® 325</b>   | <b>TetraCon® 325-3</b> | <b>TetraCon® 325-6</b> | <b>TetraCon® 325-10</b> | <b>TetraCon® 325-15</b> | <b>TetraCon® 325-20</b> |
|----------------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
| <b>Order no.</b>                 | 301960                 | 301970                 | 301971                 | 301972                  | 301973                  | 301974                  |
| <b>Type</b>                      | 4 electrode            | 4 electrode            | 4 electrode            | 4 electrode             | 4 electrode             | 4 electrode             |
| <b>Electrode material</b>        | Graphite               | Graphite               | Graphite               | Graphite                | Graphite                | Graphite                |
| <b>Flow-through vessel</b>       | -                      | -                      | -                      | -                       | -                       | -                       |
| <b>Shaft material</b>            | Epoxy                  | Epoxy                  | Epoxy                  | Epoxy                   | Epoxy                   | Epoxy                   |
| <b>Shaft length</b>              | 120 mm                 | 120 mm                 | 120 mm                 | 120 mm                  | 120 mm                  | 120 mm                  |
| <b>Cell constant</b>             | 0.475 cm <sup>-1</sup> | 0.475 cm <sup>-1</sup> | 0.475 cm <sup>-1</sup> | 0.475 cm <sup>-1</sup>  | 0.475 cm <sup>-1</sup>  | 0.475 cm <sup>-1</sup>  |
| <b>Diameter</b>                  | 15.3 mm                | 15.3 mm                | 15.3 mm                | 15.3 mm                 | 15.3 mm                 | 15.3 mm                 |
| <b>Cable length</b>              | 1.5 m                  | 3 m                    | 6 m                    | 10 m                    | 15 m                    | 20 m                    |
| <b>Measuring range</b>           | 1 µS/cm to 2000 mS/cm  | 1 µS/cm to 2000 mS/cm  | 1 µS/cm to 2000 mS/cm  | 1 µS/cm to 2000 mS/cm   | 1 µS/cm to 2000 mS/cm   | 1 µS/cm to 2000 mS/cm   |
| <b>Temperature sensor</b>        | 0 to 100 °C            | 0 to 100 °C            | 0 to 100 °C            | 0 to 100 °C             | 0 to 100 °C             | 0 to 100 °C             |
| <b>min./max. immersion depth</b> | 36/120 mm              | 36/120 mm              | 36/120 mm              | 36/120 mm               | 36/120 mm               | 36/120 mm               |

## Special applications

|                                  | <b>TetraCon® 325/C</b> | <b>TetraCon® 325/S</b> |
|----------------------------------|------------------------|------------------------|
| <b>Order no.</b>                 | 301900                 | 301602                 |
| <b>Type</b>                      | 4 electrode            | 4 electrode            |
| <b>Electrode material</b>        | Graphite               | Graphite               |
| <b>Shaft material</b>            | Epoxy                  | Epoxy                  |
| <b>Shaft length</b>              | 120 mm                 | 120 mm                 |
| <b>Cell constant</b>             | 0.475 cm <sup>-1</sup> | 0.491 cm <sup>-1</sup> |
| <b>Diameter</b>                  | 15.3 mm                | 15.3 mm                |
| <b>Cable length</b>              | 1.5 m                  | 1.5 m                  |
| <b>Measuring range</b>           | 1 µS/cm ... 2000 mS/cm | 1 µS/cm ... 2000 mS/cm |
| <b>Temperature range</b>         | 0 ... 100 °C           | 0 ... 100 °C           |
| <b>Temperature probe</b>         | NTC 30 kOhm            | NTC 30 kOhm            |
| <b>min./max. immersion depth</b> | 36/120 mm              | 40/120 mm              |

## Low conductivities

|                                  | <b>LR 325/01</b>       | <b>LR 325/001</b>              |
|----------------------------------|------------------------|--------------------------------|
| <b>Order no.</b>                 | 301961                 | 301963                         |
| <b>Electrode material</b>        | Stainless steel        | Stainless steel                |
| <b>Flow-through vessel</b>       | Glass                  | Stainless steel                |
| <b>Shaft material</b>            | Stainless steel        | Stainless steel                |
| <b>Shaft length</b>              | 120 mm                 | 120 mm                         |
| <b>Cell constant</b>             | 0.1 cm <sup>-1</sup>   | 0.01 cm <sup>-1</sup>          |
| <b>Diameter</b>                  | 12 mm                  | 20 mm                          |
| <b>Cable length</b>              | 1.5 m                  | 1.5 m                          |
| <b>Measuring range</b>           | 0.001 ... 200 µS/cm    | 0.0001 µS ... 30 µS/cm         |
| <b>Temperature range</b>         | 0 ... + 100 °C         | 0 ... + 100 °C                 |
| <b>Temperature probe</b>         | NTC 30 kOhm            | NTC 30 kOhm                    |
| <b>Filling volume</b>            | 17 ml (without sensor) | Approx. 10 ml (without sensor) |
| <b>min./max. immersion depth</b> | 30/120 mm              | 40/120 mm                      |

## Simple applications and flow-through measurement in the laboratory

|                                  | <b>KLE 325</b>        | <b>TetraCon® DU/T or DU/TH</b> |
|----------------------------------|-----------------------|--------------------------------|
| <b>Order no.</b>                 | 301995                | 301252 or 301254               |
| <b>Type</b>                      | 2 electrode           | 4 electrode                    |
| <b>Electrode material</b>        | Graphite              | Graphite                       |
| <b>Flow-through vessel</b>       | -                     | Epoxy                          |
| <b>Shaft material</b>            | Epoxy                 | -                              |
| <b>Shaft length</b>              | 120 mm                | -                              |
| <b>Cell constant</b>             | 0.84 cm <sup>-1</sup> | 0.778 cm <sup>-1</sup>         |
| <b>Diameter</b>                  | 15.3 mm               | -                              |
| <b>Cable length</b>              | 1.5 m                 | -                              |
| <b>Measuring range</b>           | 1 µS/cm to 20 mS/cm   | 10 µS/cm to 1000 mS/cm         |
| <b>Temperature range</b>         | 0 to 80 °C            | 0 to 60 °C                     |
| <b>Temperature probe</b>         | NTC 30 kOhm           | NTC 30 kOhm                    |
| <b>min./max. immersion depth</b> | 36/120 mm             | -                              |

## Four-electrode conductivity cells



TetraCon® 325

### Graphite measuring cells for universal use

- TetraCon® 325

Suitable for almost all conductivity measurements in aqueous samples; for outdoor use available with cable lengths up to 20 m.



TetraCon® S

### Graphite measuring cells for special applications

- TetraCon® 325 S

With shovel-shaped electrode holder, especially suitable for measuring in pasty samples.



TetraCon® 325/C

### Graphite measuring cells for special applications

- TetraCon® 325/C

This measuring cell is designed for measurement in acidic samples.

### Flow-through measuring cells in the laboratory

- TetraCon® 325 DU

Four-electrode flow-through conductivity cell, (also with Hansen connector, DU / TH), for standard applications. Requires separate connection cable KKDU 325.



TetraCon® DU, DU/TH

## Two-electrode conductivity cells with stainless steel and graphite electrodes



LR 325/01



LR 325/001



KLE 325

**Two electrodes ultra-pure water measuring cells**

- LR 325/01

Two electrode measuring cell with concentric stainless steel electrodes and glass flow-through vessel for measuring low conductivities up to 200  $\mu\text{S}/\text{cm}$ .

**Two electrodes pure-water measuring cells**

- LR 325/001

Two electrode measuring cell with concentric stainless steel electrodes and glass flow-through vessel for measuring trace conductivities up to 30  $\mu\text{S}/\text{cm}$ .

**Simple two electrode graphite LF measuring cell**

- KLE 325

Graphite-based two-electrode measuring cell for medium measuring ranges up to 20  $\text{mS}/\text{cm}$  for simple applications, also in training and education.

## Calibration and test means



6R/SET/Lab 1 Test resistance set

### Kit for pure water measurement according to pharmacopoeia

This kit includes LR 325/01 ultra-pure water cell, flow-through vessel D 01 / T made of glass (USP-KIT 1) or stainless steel (USP-KIT 2) NIST traceable 5  $\mu\text{S}$  standard with accuracy  $\pm 2\%$  and 6R/SET/Lab 1 test resistance set.

Calibration standard 5  $\mu\text{S}/\text{cm}$ 

### Calibration standard 100 $\mu\text{S}/\text{cm}$

Shelf life 2 years, NIST traceable with accuracy  $\pm 3\%$

### Calibration standard 5 $\mu\text{S}/\text{cm}$

Shelf life 1 year, NIST traceable with accuracy  $\pm 2\%$

## Order information: Calibration and test means

| Model                                                                                          | Description                                                                                                                                                                                                                                            | Order no. |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>USP Kit 1</b>                                                                               | Kit for conductivity measurement according to pharmacopoeia, consisting of: LR 325/01 Purest water cell, D 01/T flow-through vessel, NIST traceable 5 $\mu\text{S}/\text{cm}$ standard with accuracy $\pm 2\%$ and 6R/SET/Lab 1 testing resistance set | 300569    |
| <b>USP Kit 2</b>                                                                               | as USP Kit 1, but stainless steel flow-through vessel instead of D 01/T                                                                                                                                                                                | 300568    |
| <b>Calibration means</b>                                                                       |                                                                                                                                                                                                                                                        |           |
| <b>KS 100<math>\mu\text{S}</math></b>                                                          | Calibration standard 100 $\mu\text{S}/\text{cm}$ , shelf life 2 years, NIST traceable with accuracy $\pm 3\%$ (300 ml)                                                                                                                                 | 300578    |
| <b>KS 5<math>\mu\text{S}</math></b>                                                            | Calibration standard 5 $\mu\text{S}/\text{cm}$ , shelf life 1 year, NIST traceable with accuracy $\pm 2\%$ (300 ml)                                                                                                                                    | 300580    |
| <b>E-SET Trace</b>                                                                             | Calibration set (6 bottles at 50 ml calibration and control standard, KCl 0.01 mol/l), NIST traceable with accuracy $\pm 0.5\%$                                                                                                                        | 300572    |
| For accessories & cables, see price list or <a href="http://www.WTW.com/de">www.WTW.com/de</a> |                                                                                                                                                                                                                                                        |           |



# Flow-through vessels

With WTW conductivity cells, there are different possibilities to measure in the flow.

Ultra-pure water measuring cells are offered with a compatible measuring vessel, as impurities by introducing carbon dioxide must also be absolutely excluded.

For conductivity cells with a diameter of 12 mm, a flow-through measuring vessel is also available. For standard measuring cells with a diameter of 15.3 mm, there is the D 201, which ensures a trouble-free conductivity measurement.



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



Flow-through measuring cell for four pole  
conductivity cell

## Order information: Flow-through vessels

| Model         | Description                                                                                                     | Order no. |
|---------------|-----------------------------------------------------------------------------------------------------------------|-----------|
| <b>D 201</b>  | Flow-through vessel of PMMA, internal diameter 18 mm, V*=13 ml<br>(To TetraCon® 325)                            | 203730    |
| <b>D 01/T</b> | Flow-through vessel of glass, internal diameter 18 mm, V*=17 ml<br>(Replacement measuring vessel for LR 325/01) | 302750    |

For accessories & cables, see price list or [www.WTW.com](http://www.WTW.com)

V\* = Filling quantity without sensor

# BOD/Respiration



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# Applications and measuring systems

BOD and degradability measurements are methods for determining the cleaning performance of microorganisms in aqueous solutions, and in semi-solid systems such as soil samples. The basis is the respiration of organically bound carbon to carbon dioxide. The pressure drop is recorded in closed vessels with the addition of a CO<sub>2</sub> absorber and the oxygen consumption is determined from the known volumes. In anaerobic methods, biogas is developed in the absence of oxygen. The yield of methane is determined via the resulting overpressure.

|                                           | Digital                |            |            | Analogue |                       |                 |                  |                |             |  |
|-------------------------------------------|------------------------|------------|------------|----------|-----------------------|-----------------|------------------|----------------|-------------|--|
|                                           | Oxygen benchtop meters |            |            |          | Respirometric systems |                 |                  |                |             |  |
|                                           | inoLab® IDS            |            |            | inoLab®  | OxiTop®               | OxiTop® Control |                  |                |             |  |
|                                           | Multi 9630             | Multi 9620 | Multi 9310 | Oxi 7310 | IS                    | 6/12            | B6, B6M, B6M 2.5 | S6/S12, A6/A12 | AN 6, AN 12 |  |
| ✓ yes                                     |                        |            |            |          |                       |                 |                  |                |             |  |
| ● yes                                     |                        |            |            |          |                       |                 |                  |                |             |  |
| ✓ recommended                             |                        |            |            |          |                       |                 |                  |                |             |  |
| ✓ recommended for some applications       |                        |            |            |          |                       |                 |                  |                |             |  |
| – not recommended                         |                        |            |            |          |                       |                 |                  |                |             |  |
| 2 parameters simultaneously*              | ✓                      | ✓          |            |          |                       |                 |                  |                |             |  |
| 3 parameters simultaneously               | ✓                      |            |            |          |                       |                 |                  |                |             |  |
| Dissolved oxygen optical                  | ●                      | ●          | ●          |          |                       |                 |                  |                |             |  |
| Dissolved oxygen galvanic                 |                        |            |            | ●        |                       |                 |                  |                |             |  |
| Pressure measurement                      |                        |            |            |          | ●                     | ●               | ●                | ●              | ●           |  |
| Additional parameters                     | ●                      | ●          | ●          |          |                       |                 |                  |                |             |  |
| LIMS connection                           | ✓                      | ✓          | ✓          | ✓        |                       |                 | ✓                | ✓              | ✓           |  |
| PC connection                             | ✓                      | ✓          | ✓          | ✓        |                       |                 | ✓                | ✓              | ✓           |  |
| Memory                                    | ✓                      | ✓          | ✓          | ✓        |                       |                 | ✓                | ✓              | ✓           |  |
| USB interface                             | ✓                      | ✓          | ✓          | ✓        |                       |                 |                  |                |             |  |
| Graphic display                           |                        |            | ✓          | ✓        |                       |                 | ✓                | ✓              | ✓           |  |
| Color graphic display                     | ✓                      | ✓          |            |          |                       |                 |                  |                |             |  |
| Optical dissolved oxygen sensor           | ✓                      | ✓          | ✓          |          |                       |                 |                  |                |             |  |
| Conventional dissolved oxygen sensors     |                        |            |            | ✓        |                       |                 |                  |                |             |  |
| Self-stirring dissolved oxygen sensor     |                        |            |            | ✓        |                       |                 |                  |                |             |  |
| Manual read out                           |                        |            |            |          | ✓                     | ✓               |                  |                |             |  |
| Read out via IR controller                |                        |            |            |          |                       | ✓               | ✓                | ✓              | ✓           |  |
| BOD Routine                               |                        |            |            |          | ✓                     | ✓               |                  |                |             |  |
| BOD Standard                              |                        |            |            |          |                       | ✓               |                  |                |             |  |
| BOD Special                               |                        |            |            |          |                       |                 | ✓                | ✓              | ✓           |  |
| Output pressure                           |                        |            |            |          |                       |                 | ✓                | ✓              | ✓           |  |
| BOD measurement                           |                        |            |            |          | ✓                     | ✓               |                  | ✓              | ✓           |  |
| Soil respiration                          |                        |            |            |          |                       |                 | ✓                |                |             |  |
| Aerobic degradation                       |                        |            |            |          |                       | ✓               |                  | ✓              |             |  |
| Anaerobic degradation                     |                        |            |            |          |                       |                 |                  |                | ✓           |  |
| Compatible sensors                        |                        |            |            |          |                       |                 |                  |                |             |  |
| Digital IDS dissolved oxygen sensor       |                        |            |            |          |                       |                 |                  |                |             |  |
| IDS Optical dissolved oxygen sensor 33    | ✓                      | ✓          | ✓          |          |                       |                 |                  |                |             |  |
| Analogue dissolved oxygen sensors         |                        |            |            |          |                       |                 |                  |                |             |  |
| Galvanic dissolved oxygen sensors 92      |                        |            |            | ✓        |                       |                 |                  |                |             |  |
| Self-stirring dissolved oxygen sensors 93 |                        |            |            | ✓        |                       |                 |                  |                |             |  |
|                                           | Multi 9630             | Multi 9620 | Multi 9310 | Oxi 7310 | IS                    | 6/12            | B6, B6M, B6M 2.5 | S6/S12, A6/A12 | AN 6, AN 12 |  |
| see page                                  | 40                     | 40         | 41         | 88       | 117                   | 118             | 121              | 123            | 124         |  |

# Dilution BOD according to DIN EN 1899-1

## inoLab® IDS – digital

**inoLab** 

BOD measurement with the new digital multi-parameter meters inoLab® IDS:

### inoLab® Multi 9630 IDS: Measure three parameters simultaneously

The digital inoLab® multi-parameter instrument for IDS sensors for parallel measurement of up to three parameters. The FDO® 925 optical dissolved oxygen sensor is compatible with the inoLab® Multi 9630 and approved for BOD measurement

*see page 40*



inoLab® Multi 9630 IDS

### inoLab® Multi 9620 IDS: Measure two parameters simultaneously

Similar to the inoLab® Multi 9630 IDS, but up to two sensors can be connected.

*see page 40*



inoLab® Multi 9620 IDS

### inoLab® Multi 9310 IDS: Digital single parameter solution

The new inoLab® Multi 9310 IDS is well suited for dissolved oxygen measurement in the laboratory. The IDS technology allows optimized measurements and efficient documentation in the simplest manner.

*see page 41*



inoLab® Multi 9310 IDS

## Order information: Dilution BOD

| Model                           | Description                                                                                                                                                                                                   | Order no. |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>inoLab® Multi 9310 SET 4</b> | Digital multi-parameter benchtop meter with a universal measuring channel for pH/mV, dissolved oxygen and conductivity. Meter in a set of optical IDS dissolved dissolved oxygen sensor FDO® 925, accessories | 1FD354    |
| <b>inoLab® Oxi 7310 SET 4</b>   | Professional, menu-controlled dissolved oxygen benchtop meters in a set with self-stirring dissolved oxygen sensor StirrOx® G, accessories                                                                    | 1BA304    |

For additional products, see price list or [www.WTW.com](http://www.WTW.com)

# inoLab® - analogue

**inoLab**  
innovations that make sense

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

## inoLab® Oxi 7310: Reliable measurement of dissolved oxygen with documentation

The inoLab® pH 7310 is perfectly suited for precision measurement and automatic GLP/AQA compliant documentation in quality laboratories of all industries. The meter is equipped a special connector for the connection of the StirrOx® G self-stirring dissolved oxygen sensor. Also available with optional built-in printer.

see page 88



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

## Sensors

### FDO® 925(-P): Optical dissolved oxygen sensor

Flexible and powerful optical dissolved oxygen sensor also for IDS meters for BOD measurement

- Calibration free through factory calibration
- Wireless module makes it well suited for BOD measurement
- Attachment stirrer for BOD measurement

see page 33



FDO® 925

### StirrOx® G: Galvanic dissolved oxygen sensor

Self-stirring galvanic dissolved oxygen sensor for measurement in Karlsruher and Winkler bottles

- One-hand operation for quick series measurement
- Constant flow for high reproducibility
- Extremely low intrinsic oxygen consumption - only  $0.008 \mu\text{g h}^{-1} (\text{mg/l})^{-1}$
- Membrane leakage monitoring
- Long lifetime up to 6 months

see page 93

Technical data see dissolved oxygen sensors



StirrOx® G



# BOD measurement and respirometric degradation methods with OxiTop®

## BOD self-check measurement with OxiTop® IS and OxiTop® Control according to DIN EN 1899-2

OxiTop® provides an easy and safe way to measure biochemical oxygen requirement in water and wastewater analysis. Both systems work mercury-free and without dilution series. Complete sets including measuring heads, bottles and necessary accessories are ready to use. In all aerobic degradation measurements, the measuring principle is based on the absorption of the carbon dioxide resulting by microbial metabolism through suitable absorbers and thus the pressure drop resulting in a closed vessel. This is recorded and used for the calculation.



The OxiTop® BOD measurement system is particularly suited for wastewater analysis.

|                                 | OxiTop® IS 6/IS 12   | OxiTop® Control 100         | OxiTop® Control 110                                                                  |
|---------------------------------|----------------------|-----------------------------|--------------------------------------------------------------------------------------|
| <b>Application</b>              | BOD Routine          | BOD Routine<br>BOD Standard | BOD Routine<br>BOD Standard<br>BOD Special<br>Aerobic and anaerobic respiration test |
| <b>Measuring range BOD</b>      | 0 – 4000 mg/l        | 0 – 4000 mg/l               | 0 – 400,000 mg/l                                                                     |
| <b>Measurement value memory</b> | 5 days               | 0.5 h – 99 days             | 0.5 h – 99 days                                                                      |
| <b>Pressure mode</b>            | -                    | -                           | 500 – 1350 hPa                                                                       |
| <b>Sample volume</b>            | Fixed specifications | Fixed specifications        | Freely selectable                                                                    |

## OxiTop® IS 6/IS 12

- Simple operation without dilution series
- Data security through Measured parameter memory
- Coordinated set for immediate measurement



OxiTop® IS 12

Easy to operate respirometric measuring system for BOD<sub>5</sub>. The sets include 6 or 12 measuring units. The heads in green or yellow mark inlet or outlet measurement. The AutoTemp function ensures a correct sample start at sample temperatures between 15 and 21 °C. Inductive, wear-free operating stirring platforms with pre-programmed stirring characteristics ensure optimum mixing of the sample. The data can be entered in a prepared diagram and give an immediate overview of the course of the measurement.

### Technical specifications: OxiTop® Measuring head

|                       | Technical specifications                                                                                   |
|-----------------------|------------------------------------------------------------------------------------------------------------|
| Measurement principle | Manometric with pressure sensor                                                                            |
| Measured parameter    | BOD <sub>n</sub>                                                                                           |
| Measuring range       | 0 ... 40 digit (display units)<br>corresponds to<br>0 ... 40 / 80 / 200 / 400 / 800 / 2000 / 4000 mg/l BOD |
| Display accuracy      | ±1 (± 3.55 hPa)                                                                                            |
| Pressure range        | 500 - 1100 hPa                                                                                             |
| Memory                | For BOD <sub>5</sub> : 1 per day                                                                           |
| Ambient temperature   | Storage: -25 °C ... +65 °C<br>Operation: +5 °C ... +50 °C                                                  |
| Dimensions            | H: 69 mm,<br>Ø 70 mm                                                                                       |

### Order information: OxiTop® IS6/IS12

| Model         | Description                                                                                                                                    | Order no. |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| OxiTop® IS 6  | BOD measuring system for self-check measurement with 6 measuring units including accessories, universal power supply, 100 - 240 VAC, 50/60 Hz  | 208210    |
| OxiTop® IS 12 | BOD measuring system for self-check measurement with 12 measuring units including accessories, universal power supply, 100 - 240 VAC, 50/60 Hz | 208211    |

For further products, see price list or [www.WTW.com](http://www.WTW.com)

## OxiTop® Control 6/Control 12 System

- **Convenient and easy operation by the controller**
- **Suitable for large sample volumes - Up to 100 parallel samples**
- **Time-saving and error-avoiding with automatic statistical evaluation**
- **Easy assignment through automatic sample ID**

The OxiTop® Control System is perfect for processing large BOD samples. With the infrared interfaces, the OC 100 controller communicates with up to 100 measuring heads. OxiTop®-C measuring heads record up to 360 data points over the measurement period, and thus provide a complete representation of the measurement. The curve representation is also possible on the controller display. The controller provides both routine and standard measurements with statistical calculations. The sets contain all necessary parts for immediate measurement. The controller OC 110 is available for further examinations. Available with 6 or 12 measuring units.



OxiTop® Box with OxiTop® Control 12

## Application areas and technical specifications: OxiTop® Controller

|                                   | OxiTop® Control OC 100                                       | OxiTop® Control OC 110                                            |
|-----------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------|
| <b>BOD Routine</b>                | Individual samples up to 4000 mg/l                           | Individual samples up to 4000 mg/l                                |
| <b>BOD Standard</b>               | Parallel samples with statistical evaluation up to 4000 mg/l | Parallel samples with statistical evaluation up to 4000 mg/l      |
| <b>BOD Special</b>                | –                                                            | Freely definable volumes, 0.5 h - 99 days, up to 400,000 mg/l BOD |
| <b>Soil respiration</b>           | –                                                            | free volume determination                                         |
| <b>OECD/Aerobic application</b>   | –                                                            | free volume determination                                         |
| <b>Biogas determination</b>       | –                                                            | Pressure mode p 500 - 1350 hPa; 10 intermediate values            |
| <b>Data sets per measurement</b>  | 180 ... 360 (depending on runtime)                           | 180 ... 360 (depending on runtime)                                |
| <b>Runtime of the measurement</b> | 0.5 hours ... 99 days                                        | 0.5 hours ... 99 days                                             |
| <b>Power supply</b>               | 3 Mignon (type AA); alkaline 1.5 V                           | 3 Mignon (type AA); alkaline 1.5 V                                |
| <b>Interface</b>                  | IR (Infrared); RS 232 for PC communication                   | IR (Infrared); RS 232 for PC communication                        |
| <b>Ambient temperature</b>        | Storage: -25 °C ... +65 °C, operation: +5 °C ... +40 °C      | Storage: -25 °C ... +65 °C, operation: +5 °C ... +40 °C           |
| <b>Dimensions</b>                 | 45 x 100 x 200 mm (H x W x D)                                | 45 x 100 x 200 mm (H x W x D)                                     |
| <b>Weight</b>                     | approx. 390 g                                                | approx. 390 g                                                     |

## Technical specifications: OxiTop®-C and OxiTop -C/B measuring heads

|                              |                                                                      |
|------------------------------|----------------------------------------------------------------------|
| <b>Measurement principle</b> | manometric with pressure sensor                                      |
| <b>Measured parameter</b>    | BOD <sub>n</sub> (theoretically for up to 99 days)                   |
| <b>Pressure range</b>        | 500 - 1350 hPa                                                       |
| <b>Accuracy</b>              | ±1 % of measured parameter ±1 hPa                                    |
| <b>Resolution</b>            | 1 hPa (corresponds to 0,7 % of the BOD <sub>n</sub> measuring range) |
| <b>Power supply</b>          | 2 x CR2430 Lithium battery (280 mAh)                                 |
| <b>Ambient temperature</b>   | Storage: -25 °C ... +65 °C<br>Operation: +5 °C ... +50 °C            |
| <b>Dimensions</b>            | H: 70 mm,<br>Ø 70 mm                                                 |

## OxiTop® Controller OC 100/OC110

- Convenient sample management and grouping of up to 100 OxiTop®-C measuring heads
- On request sample statistics or individual measurement
- Automatic BOD calculation and curve representation for optimal measuring control
- Readout possibility via PC program Achat OC for processing in spreadsheet programs
- BOD special mode with free temperature and volume selection and pressure mode (OC 110 only)
- Measuring intervals between 0.5 h and 99 days



OxiTop® OC 100

## OxiTop®-C and -C/B: Measuring heads for standard and biogas applications

- Infrared communication between OxiTop®-C and controller OC 100 or OC 110 for programming and data acquisition
- Automatic assignment of a sample ID for unambiguous identification and statistical evaluation
- AutoTemp function for correct measuring start at sample temperatures between 15 and 21 °C
- Up to 360 measuring units per measuring cycle for precise determination of the measuring process
- OxiTop® C/B: through H<sub>2</sub>S-resistant pressure sensor particularly suitable for biogas applications



OxiTop®-C/B

OxiTop®-C



OxiTop® Control 12

## Order information: OxiTop controller and measuring heads

| Model                 | Description                                                                                                                                                                       | Order no. |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>OxiTop® OC 110</b> | OxiTop® controller OC 110 for controlling BOD and special applications of OxiTop®-Control measuring systems                                                                       | 208207    |
| <b>OxiTop®-C</b>      | OxiTop®-C replacement measuring head (can only be used in conjunction with OxiTop® controller OC 100 / OC 110)                                                                    | 208830    |
| <b>OxiTop®-C/B</b>    | OxiTop®-C / B replacement measuring head (can only be used in conjunction with OxiTop® controller OC 100/OC 110. Corrosion-resistant version for anaerobic / biogas applications) | 208831    |

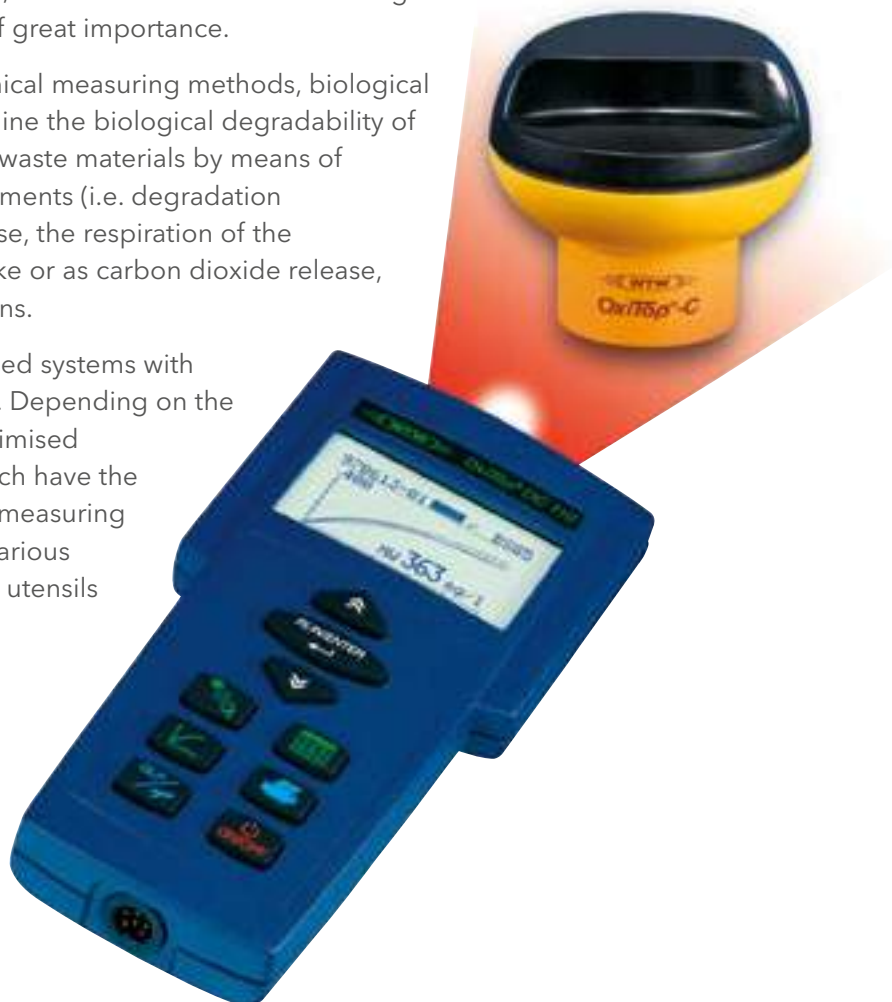
For additional products, see price list or [www.WTW.com](http://www.WTW.com)

# Degradation/respiration measurement with OxiTop® Control OC 110

For environmental tasks, such as wastewater treatment, soil decontamination and waste treatment, the examination and monitoring of biological treatment processes is of great importance.

In addition to the usual physical-chemical measuring methods, biological tests are in the foreground. To determine the biological degradability of nutrients, contaminants, pollutants or waste materials by means of microbial activity, respiration measurements (i.e. degradation measurements) are carried out. In these, the respiration of the organisms, measured as oxygen uptake or as carbon dioxide release, is determined under defined conditions.

The measurements take place via closed systems with OxiTop®-C and the controller OC 110. Depending on the application area, correspondingly optimised measuring vessels are used, all of which have the necessary connection threads for the measuring head and are partially autoclavable. Various complete packages with all necessary utensils are available for this.



OxiTop® Controller

|                                                            | Application and method                                                   | Measurement principle                                                                     |
|------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>Measurement of soil respiration</b><br>Page 121         | Soil analysis, remedial action of contaminated sites, DIN ISO 16072, AT4 | Aerobic under CO <sub>2</sub> absorption, also quantitative CO <sub>2</sub> determination |
| <b>Measurement of biological degradability</b><br>Page 122 | Determination per OECD 301F, ISO 9408                                    | Aerobic under CO <sub>2</sub> absorption                                                  |
| <b>Biogas measurement</b><br>Page 124                      | Anaerobic degradability tests (e.g., VDI 4630, GB 21)                    | Anaerobic, determination CO <sub>2</sub> , methane; warning pressure possible             |
| <b>Microbiological measurement</b><br>Page 124             | Growth and stress tests, determination of the respiration rate           | Aerobic; warning pressure possible                                                        |



# Measurement of microbial soil respiration per DIN ISO 16072

- **Various vessels for optimal adaptation to the application**
- **Measurements up to 99 days for special applications**
- **Also suitable for AT4 measurement**

Soil respiration measurement serves for the prognosis, survey and control of remedial action, for biochemical degradation measurements of pesticides, fungicides, insecticides, fertilizers, etc., as well as for performing toxicity tests.

For soils with greater CO<sub>2</sub> development, the measuring vessel MG 1.0 is available, through whose large opening (diameter approx. 100 mm) large-volume CO<sub>2</sub>absorber vessels fit.

To measure the respiration of the AT4 guideline of residues of biomechanical waste treatment, a special kit is available containing 2.5 liter measuring vessels and a special CO<sub>2</sub>-absorber with indicator.

## OxiTop® Control B6

Set for general application with soils with low and medium respiratory activity, consisting of 6 bottles with GL 45 thread and 500 ml volume. Including 6 OxiTop®-C measuring heads and controller OC 110.



OxiTop® Control B6M

## OxiTop® Control B6M

Set for respiratory active soils with six 1 litre vessels. The vessels feature large openings for convenient sample preparation.

## OxiTop® Control B6M-2.5

Special set for the determination of respiration according to the AT4 guideline. The set features 2.5 l vessels and special soda lime absorber to ensure the moisture content of the sample. Including 6 OxiTop®-C measuring heads, controller OC 110 and accessories.



OxiTop® Control B6M 2.5

## Order information soil respiration

| Model                           | Description                                                                                                                                  | Order no. |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>OxiTop® Control B 6M-2.5</b> | Measuring systems for determining AT4 soil respiration (aerobic), with controller OC 110 and 6 measuring units with 2.5 l measuring vessels. | 208231    |
| <b>OxiTop® Control B 6M</b>     | Measuring system for determining the soil respiration (aerobic) with controller OC 110 and 6 measuring units;                                | 208232    |

For additional products, see price list or [www.WTW.com](http://www.WTW.com)

# Measurement of biological degradability per ISO 9408 / OECD 301 F

- **Easy handling for safe results**
- **Flexible use for different volumes and temperatures**
- **Graphical evaluation in the controller for process monitoring**

OxiTop® Control measuring system for determining biodegradability per DIN EN ISO 9408 / OECD 301 F.

The determination of the biological degradability must be ensured before the first use of “new” chemicals; not only for environmental reasons, but also to minimise disposal costs.

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

The resulting CO<sub>2</sub> is removed from the gas chamber by means of an absorber, so that the resulting underpressure represents a measure for the biological degradability.

Due to the continuous recording of the measured parameters in the OxiTop®-C, the required documentation is fully guaranteed. The measuring bottles and the adapter are autoclavable at 121 °C.

There are a total of four sets available for this application, which are adapted to different tasks.



OxiTop® Box  
OxiTop® Control A6

## OxiTop® Control A6

Set with six 1 liter wide-neck bottles and autoclavable adapter AD/SK, including controller OC 110 and stirring platform IS-6-Var. For example for samples that require high dilution.

## OxiTop® Control A12

Set with twelve 250 ml wide-neck bottles and autoclavable adapter AD/SK, including controller OC 110 and stirring platform IS 12.



OxiTop® Control A6

## OxiTop® Control S6

Set of six 510 ml sample bottles PF 600 including controller OC 110 and stirring platform IS 6. Well suited for samples where there is a risk of algae growth

## OxiTop® Control S12

Set with twelve 510 ml sample bottles PF 600 including controller OC 110 and stirring platform IS 12. Well suited for samples where there is a risk of algae growth



OxiTop® Control IS6

## Order information: Systems for determining the aerobic degradability

| Model                      | Description                                                                                                                   | Order no. |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>OxiTop® Control S 6</b> | BOD measuring system for aerobic measuring operation, with controller OC 110 and 6 measuring units, (also for BOD self-check) | 208196    |
| <b>OxiTop® Control A 6</b> | BOD measuring system for aerobic measuring operation, with controller OC 110 and 6 measuring units.                           | 208220    |

For additional products, see price list or [www.WTW.com](http://www.WTW.com)

# Biogas and microbiological determinations (aerobic/anaerobic measuring operation)

- **Convenient and accurate measurement of the biogas rate**
- **Targeted manipulation possible with special measuring bottles**
- **Safety through warning pressure function**

A major application is the verification of fermentable substrates for biogas plants for the estimation of gas yield. Anaerobic degradation processes take place under exclusion of oxygen. So that the gas space above the sample can be filled with inert gas, the measuring bottle has lateral connection pieces. These are closed with septa, so that carbon dioxide can be withdrawn at the end of the trial by adding a CO<sub>2</sub>-absorber. The resulting pressure difference is proportional to the CO<sub>2</sub>-concentration, the remaining overpressure is proportional to the methane concentration.

The degradation process can be conveniently tracked with the "pressure" operating mode. Since the production of methane gas under anaerobic processes leads to an increase in pressure, it can happen that the measuring range can be exceeded. For these cases, it is possible to specify a "warning pressure" or pressure limit value, so that the user can manipulate the system.

## OxiTop® Control AN6

Set of six 1 l bottles with nozzles and autoclavable adapter AD/SK, including six corrosion-resistant special measuring heads OxiTop® C/B, controller OC 110 and stirring platform IS-6-Var as well as additional accessories. For anaerobic and aerobic measurements.



OxiTop® Control AN 6

## OxiTop® Control AN12

Set of six 250 ml bottles with nozzles and autoclavable adapter AD/SK, including twelve corrosion-resistant special measuring heads OxiTop® C/B, controller OC 110 and stirring platform IS 12 as well as accessories. For anaerobic and aerobic measurements.

## Order information: OxiTop® Control systems

| Model                                                                                   | Description                                                                                           | Order no. |
|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-----------|
| <b>OxiTop® Control AN 6</b>                                                             | BOD measuring system for anaerobic measuring operation, with 6 measuring units and controller OC 110, | 208225    |
| <b>OxiTop® Control AN 12</b>                                                            | BOD measuring system for aerobic measuring operation, with 12 measuring units and controller OC 110,  | 208227    |
| For additional products, see price list or <a href="http://www.WTW.com">www.WTW.com</a> |                                                                                                       |           |



# System extensions and accessories for OxiTop® measuring systems

System extensions and accessories are available to meet additional needs, including:

- Individual measuring heads OxiTop®, OxiTop®-C and OxiTop®-C/B
- Sets of OxiTop®- and OxiTop®-C measuring heads
- Complete measuring units expansion sets including heads, stirring platforms and accessories
- Stirring platforms
- Sample bottles and vessels

## Stirring platforms for all liquid samples

The inductive maintenance and wear-free stirring platforms IS 6 and IS 12 are specially optimised for BOD measurement and have 6 or 12 stirring locations respectively. A program-controlled stirring process ensures optimum mixing between the liquid and the gas phase and prevents that the stirring bar is getting caught. With the IS 6-Var platform, stirring in large vessels is also possible, and there are two speed levels.



Stirring platforms IS 6 and IS 12

**1** year  
warranty





## OxiTop® system function testers

The test for functionality of OxiTop® measuring heads and systems can be carried out with two test equipment, when using controllers even in defined intervals.

### OxiTop® PT

With the OxiTop® PT, single heads are tested for tightness and correct function in a simple test. For this, an under pressured is simulated, which is tabulated accordingly. The default values are automatically stored in the controller of the OxiTop®-C.

### OxiTop® PM

These special calibration tablets simulate a BOD of approx. 300 mg/l (batch-dependent). Thus, complete measuring systems can be tested for the function of the measuring heads or the tightness.



Test means PT and PM

## Further accessories



Storage rack and marking rings



Overflow flasks

### Storage rack

Safe storage of up to 6 OxiTop® or OxiTop®-C measuring heads

### Marking rings

Labelling and identification of the BOD bottles

### Overflow flasks

In addition to the standard measuring bottles, 164 ml and 432 ml available in the set. Further volumes are available including: 22.7 ml, 43.5 ml, 97 ml, 250 ml and 365 ml.

## Incubator OxiTop® Box

- **Space saving and compact**
- **Air circulation cooling for uniform temperature distribution**
- **Automatically preset to 20 °C**

Thermo boxes for incubating BOD samples (dilution samples or respirometric samples) at constant temperature for easy requirements

Thermostat box with air circulation cooling for BOD OxiTop® measuring systems with a maximum of 12 measuring units or 20 Karlsruher bottles for easy requirements. Comes factory set to 20 °C. Low maintenance with automatic condensate evaporation.



OxiTop® Box

**18 months warranty**



The OxiTop® Control allows to read out the measured values without opening the incubator box.



## Technical specifications: OxiTop® Box

| Model                  | OxiTop® Box                                                |
|------------------------|------------------------------------------------------------|
| Temperature control    | 20 °C ±0,5 °C                                              |
| Ambient temperature    | Storage: -25 °C ... +50 °C<br>Operation: +10 °C ... +32 °C |
| Power input            | 200 W                                                      |
| Dimensions (H x W x D) | 375 x 425 x 600 mm                                         |
| Weight                 | Approx. 30 kg                                              |

## Order information: OxiTop® Box

| Model                                                                                      | Description                                                                                             | Order no. |
|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-----------|
| OxiTop® Box                                                                                | BOD OxiTop® thermostat box with temperature-controlled air circulation, for mains operation 230 V/50 Hz | 208432    |
| For the 115v/60 Hz version, see price list or <a href="http://www.WTW.com">www.WTW.com</a> |                                                                                                         |           |

## Thermostat cabinets TS

- **Cost-effective solution for respirometric test procedures**
- **Models with glass doors for OxiTop® Control applications**
- **Energy-efficient thermal insulation**

Thermostat cabinets for the incubation of respirometric samples at constant temperatures between 10 and 40 °C - cost-effective and energy-efficient.

WTW Thermostat cabinets are adapted to respirometric measurements with OxiTop® systems. The temperature can be set in increments of 1 °C, which is maintained within  $\pm 0.5$  °C. The thermal insert with the radial fan for the constant temperature control has sockets for the agitating platforms. The thermo cabinets are available in three sizes.

### Technical specifications: Thermostat cabinets

| Model                     | TS 606/2-i                                                                  | TS 606/4-i          | TS 1006-i                                    |
|---------------------------|-----------------------------------------------------------------------------|---------------------|----------------------------------------------|
| Shelves                   | 2                                                                           | 4                   | 4 with further distance                      |
| Number of samples         | 2 x 12 BOD Standard                                                         | 4 x 12 BOD Standard | 4 x 12 BOD standard<br>4 x 6 Special vessels |
| Glass door                | Optional                                                                    | Optional            | –                                            |
| Temperature control range | +10 °C ... +40 °C $\pm 1$ °C; setting interval: 1 °C                        |                     |                                              |
| Ambient temperature       | Operation: +10 °C ... +32 °C (climate class SN); storage: -25 °C ... +65 °C |                     |                                              |
| Gross content             | 180 l                                                                       | 360 l               | 500 l                                        |
| Dimensions                | Outside: 850 x 600 x 600                                                    | 1640 x 600 x 610    | 1640 x 750 x 730                             |
| (H x B x T in mm)         | Inside: 702 x 513 x 441                                                     | 1452 x 470 x 440    | 1452 x 600 x 560                             |
| Weight                    | 34 kg                                                                       | 53 kg               | 69 kg                                        |

### TS 606/2-i and TS 606-G/2i

Thermostat cabinet for two OxiTop® measurement systems with maximally twelve measuring stations each. For 230 VAC, 50 Hz.

The model TS 606-G/2i has a door with insulated glass for OxiTop®-C operation.



TS 606-G/2-i





TS 606/4-i

## TS 606/4-i and TS 606-G/4i

Thermostat cabinet for four OxiTop® measurement systems with a maximum of twelve measuring units each. For 230 VAC, 50 Hz.

The model TS 606-G/4i has a door with insulated glass for OxiTop®-C operation.

## TS 1006-i

Thermostat cabinet for four OxiTop® measurement systems with maximally twelve measuring units each. Also suitable for special applications due to the high compartment height. For 230 VAC, 50 Hz.

1 year warranty



## Order information: Thermostat cabinets

| Model               | Description                                                              | Order no. |
|---------------------|--------------------------------------------------------------------------|-----------|
| <b>TS 606/2-i</b>   | Thermostat cabinet for 2 BOD-OxiTop® measurement systems                 | 208380    |
| <b>TS 606/4-i</b>   | Thermostat cabinet for 4 BOD-OxiTop® measurement systems                 | 208383    |
| <b>TS 1006-i</b>    | Thermostat cabinet for 4 BOD-OxiTop® measurement systems                 | 208385    |
| <b>TS 606-G/2-i</b> | Thermostat cabinet for 2 BOD Oxitop® measurement systems with glass door | 208381    |
| <b>TS 606-G/4-i</b> | Thermostat cabinet for 4 BOD Oxitop® measurement systems with glass door | 208384    |

Additional accessories see price list or [www.WTW.com](http://www.WTW.com)



# Photometric determination



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# Applications and meter overview

Photometric determination is an important measurement procedure for routine analysis in water , production industry, and in environmental monitoring. But also, for special measurement tasks and quality control in industry, development, research and education.

● yes

✓ recommended

✓ recommended for some applications

– not recommended/not present

|                                                                                                   | Laboratory photometer |                       |              |               | Portable photometer |               |                 |
|---------------------------------------------------------------------------------------------------|-----------------------|-----------------------|--------------|---------------|---------------------|---------------|-----------------|
|                                                                                                   | photoLab® 7100 VIS    | photoLab® 7600 UV-VIS | photoLab® S6 | photoLab® S12 | pHotoFlex® STD      | pHotoFlex® pH | pHotoFlex® Turb |
| Photometric determinations                                                                        | ●                     | ●                     | ●            | ●             | ●                   | ●             | ●               |
| Electrochemical pH/ORP measurement                                                                |                       |                       |              |               |                     | ●             | ●               |
| Turbidity measurement as per DIN JSO                                                              |                       |                       |              |               |                     |               | ●               |
| Reagent-freeReagent-free COD, nitrate, nitrite                                                    |                       | ●                     |              |               |                     |               |                 |
| Spectrophotometer (_adjustable wave lengths)                                                      | ✓                     | ✓                     |              |               |                     |               |                 |
| Filter photometer                                                                                 |                       |                       | ✓            | ✓             |                     |               |                 |
| LED + optical filter                                                                              |                       |                       |              |               | ✓                   | ✓             | ✓               |
| 6 wavelengths                                                                                     |                       |                       | ✓            |               | ✓                   | ✓             | ✓               |
| 12 wavelengths                                                                                    |                       |                       |              | ✓             |                     |               |                 |
| IR-LED                                                                                            |                       |                       |              |               |                     |               | ✓               |
| Programs for test kits                                                                            | ✓                     | ✓                     | ✓            | ✓             | ✓                   | ✓             | ✓               |
| Round cells 16/28                                                                                 | ✓/-                   | ✓/-                   | ✓/-          | ✓/-           | ✓/✓                 | ✓/✓           | ✓/✓             |
| Rectangular cuvettes 10, 20, 50 mm                                                                | ✓                     | ✓                     |              | ✓             |                     |               |                 |
| AQA support                                                                                       | ✓                     | ✓                     | ✓            | ✓             | ✓                   | ✓             | ✓               |
| Barcode support                                                                                   | ✓                     | ✓                     | ✓            | ✓             | optional            | optional      | optional        |
| Sample ident. Number                                                                              | ✓                     | ✓                     | ✓            | ✓             | ✓                   | ✓             | ✓               |
| Special methods NH <sub>3</sub> , CO <sub>2</sub>                                                 | ✓                     | ✓                     |              |               |                     | ✓             | ✓               |
| Reagent-free data base correction: Reagent-free (reagent-free reagent-free COD, nitrate, nitrite) |                       | ✓                     |              |               |                     |               |                 |
| User-defined programs                                                                             | ✓                     | ✓                     |              | ✓             | ✓                   | ✓             | ✓               |
| Comprehensive programming                                                                         | ✓                     | ✓                     |              |               |                     |               |                 |
| Multi-wavelength measurement/scans                                                                | ✓                     | ✓                     |              |               |                     |               |                 |
| Color measurement, PC-based                                                                       | ✓                     | ✓                     |              |               |                     |               |                 |
| Coloration                                                                                        | ✓                     | ✓                     | ✓            | ✓             | ✓                   | ✓             | ✓               |
| Kinetics                                                                                          | ✓                     | ✓                     |              | ✓             |                     |               |                 |
| pH/ORP/Turb                                                                                       |                       |                       |              |               | -/-/-               | ✓/✓/✓         | ✓/✓/✓           |
| PC software data management + LIMS connection                                                     | ✓                     | ✓                     |              |               | ✓                   | ✓             | ✓               |
| PC interface USB / Ethernet / RS232                                                               | ✓/✓/-                 | ✓/✓/-                 | -/-/✓        | -/-/✓         | -/-/✓               | -/-/✓         | -/-/✓           |
| Battery/rechargeable battery                                                                      | -/-                   | -/-                   | -/✓          | -/✓           | ✓/-                 | ✓/optional    | ✓/optional      |
| Car battery adapter for off-line use                                                              | ✓                     | ✓                     |              |               |                     |               |                 |
| Field case set/field case                                                                         | -/✓                   | -/✓                   |              |               | ✓/✓                 | ✓/✓           | ✓/✓             |
| see page                                                                                          | 138                   | 139                   | 141          | 141           | 144                 | 145           | 145             |

|                                                | Thermoreactors |         |         |
|------------------------------------------------|----------------|---------|---------|
|                                                | CR 2200        | CR 3200 | CR 4200 |
| Routine analysis                               | ✓              | ✓       | ✓       |
| Routine programs for wastewater/electroplating | ✓              | ✓       | ✓       |
| User-defined programs up to 170°C              |                | ✓       | ✓       |
| Two different digestion programs in parallel   |                |         | ✓       |
| AQA                                            |                | ✓       | ✓       |

# Systematic and spectral analysis – routine measurement and photometric investigation

Photometric determinations can be divided into two large groups.

The **routine measurement** of measuring parameters in water analysis, also known as systematic analysis, facilitates a simple and quickly readable measurement with minimum effort using commercial test kits and the associated method data in the photometer. Thus, the analyte to be measured is transformed to a measurable colorant with the relevant reagents. The coloration results from the absorption of particular light components (wavelengths) from white light. Measurements are usually taken at the wavelength with the highest absorption.

Such routine measurements are standard tasks in water analysis of wastewater, drinking water or environmental monitoring.

Photometers and optimized test kits for various measurement ranges form a system, which is harmonized. Method data and programs as well as measuring ranges for the respective test kits are not identical in different photometer models due to the optical variations such as light sources.

**Spectral analysis** is particularly useful for studies of unknown substances, methods development and for optimizing testing systems: In order to, for example, determine the maximum absorption and thus the suitable wavelength for test systems, spectra are taken over a wider wavelength range. Thus, the highest peak and most suitable absorption is detected. In addition there are investigations such as enzyme kinetics or multi-wavelength measurements. A further aspect is color measurement for the product quality analysis and assurance.

## What do all of the series offer?

- **Proven quality**
- **Intuitive operation**
- **The highest precision**

Three classes of photometric instruments for different applications:  
pHotoFlex® series portable LED photometers (left)  
photoLab® S series filter photometers (bottom right)  
photoLab® 7000 series spectrophotometers (top right)



# Portable and precise: the pHotoFlex®, photoLab® and photoLab® 7000 Series

| Mobile measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Lab Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| with the pHotoFlex® Series                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | with photoLab® S6/S12 and the photoLab® 7000 Series                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Measurement in changing locations is the focus. The meters are: <ul style="list-style-type: none"> <li>energy-efficient</li> <li>robust</li> <li>portable</li> <li>precise</li> </ul> These requirements are backed up by special optics with a combination of LED and filters. The robustness of the portable pHotoFlex® meters is based on the low warm-up and long lifetime of LEDs used. With two cuvette sizes, the largest possible measurement ranges and the use of most common test kits are made possible using the LabStation and LSdata PC software for comfortable data management. | Highest standards are required in the laboratory as basis of research, routine measurements and to ensure effluent compliance. To meet these needs, the instruments offer: <ul style="list-style-type: none"> <li>AQA/IQC</li> <li>precise measurement</li> <li>wide measurement ranges</li> <li>convenience features, such as test and cuvette recognition.</li> <li>The reference beam optics and stable laboratory temperatures enable full pre-settings with higher work comfort.</li> </ul> Additional features of the photoLab® 7000 Series: <ul style="list-style-type: none"> <li>Testing from 190 - 1100 nm</li> <li>Reagent-free measurement of COD, nitrate and nitrite</li> <li>AQA and user administration</li> <li>Spectra, kinetics and multi-wavelength readings</li> <li>Data transfer via USB, even in large user environments</li> </ul> |

## Photometer applications

|                                   | Portable photometers                                                                                        |                                                                                                                                                                  |                                              | Filter photometer                                                    |                                                                                                             | Spectrophotometers                                                                                                                                                                                              |                                             |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
|                                   | pHotoFlex®                                                                                                  |                                                                                                                                                                  |                                              | photoLab®                                                            |                                                                                                             |                                                                                                                                                                                                                 |                                             |
|                                   | STD                                                                                                         | pH                                                                                                                                                               | Turb                                         | S6                                                                   | S12                                                                                                         | 7100 UV                                                                                                                                                                                                         | 7600 UV-VIS                                 |
| Applications / Application fields | Environmental monitoring, water analysis                                                                    | Environmental monitoring, water analysis, drinks industry, wine industry, process monitoring, areas with different measurement tasks (photometry, pH, turbidity) |                                              | Routine measurements in waste and drinking water, field use optional | Routine measurements in waste and drinking water, wide-ranging laboratory testing tasks, field use optional | Spectral and special analyses in industry, teaching and research, and all analyses of routine measurements with standard parameters in waste and drinking water, as well as environmental analysis, on-site use |                                             |
| Wavelengths                       | 436, 517, 557, 594, 610, 690 nm                                                                             | 436, 517, 557, 594, 610, 690 nm                                                                                                                                  | 436, 517, 557, 594, 610, 690 nm, 860 nm (IR) | 340, 445, 525, 550, 605, 690 nm                                      | 340, 410, 445, 500, 525, 550, 565, 605, 620, 665, 690, 820 nm                                               | 320 nm - 1100 nm (VIS), fully adjustable                                                                                                                                                                        | 190 nm - 1100 nm (UV-VIS), fully adjustable |
| Optical system                    | LED with filter                                                                                             | LED with filter                                                                                                                                                  | LED with filter                              | Filter/reference beam                                                |                                                                                                             | Monochromator/beam-in + AutoCheck                                                                                                                                                                               |                                             |
| Special functions                 | –                                                                                                           | pH/ORP                                                                                                                                                           | pH/ORP, turbidity                            | –                                                                    | Kinetics                                                                                                    | Absorption spectra, kinetics, multiple wavelength measurement, environmental parameters, routine and special measurements with AQA support, PC software photoLab® spectral data                                 |                                             |
|                                   | optional: LabStation with LSdata PC software, rechargeable battery set, LSdata PC software (single package) |                                                                                                                                                                  |                                              |                                                                      |                                                                                                             |                                                                                                                                                                                                                 |                                             |
| Data sets                         | 100                                                                                                         | 1000                                                                                                                                                             | 1000                                         |                                                                      |                                                                                                             |                                                                                                                                                                                                                 |                                             |
| Custom methods                    | 50                                                                                                          | 100                                                                                                                                                              | 1000                                         | no                                                                   | 50                                                                                                          | 1000, 20 profiles                                                                                                                                                                                               |                                             |
| Cuvettes                          | Round: 16 mm (variable height: 91 – 104 mm), 28 mm                                                          |                                                                                                                                                                  |                                              | Round 16 mm                                                          | Round and rectangular 10, 20, 50 mm                                                                         |                                                                                                                                                                                                                 |                                             |

# The photoLab®7000 Spectrophotometers

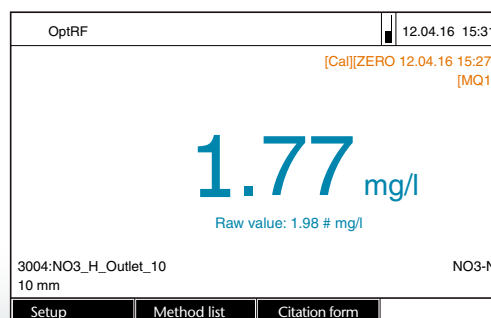
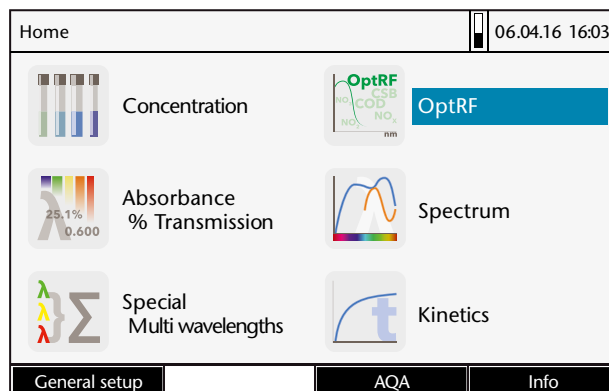
## All in one, one for all!

WTW spectrophotometers offer a unique combination in this instruments class of systematic and spectral analysis functions with the revolutionary reagent-free OptRF measurement for COD, nitrate and nitrite. They can be used for a wide variety of applications, from water analysis to the wine industry to science and teaching.

The quality reference beam optics ensures the greatest precision and is supported by comprehensive user management for the highest level of data security.

Thanks to the self-explanatory menu, the user can intuitively and quickly achieve the desired result:

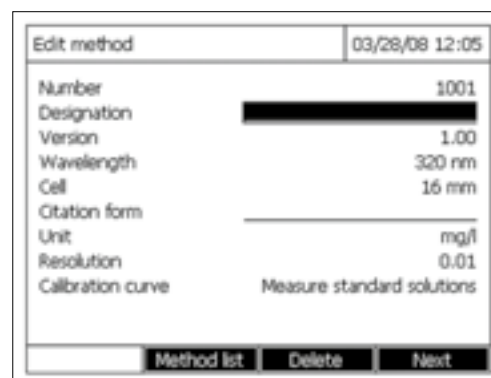
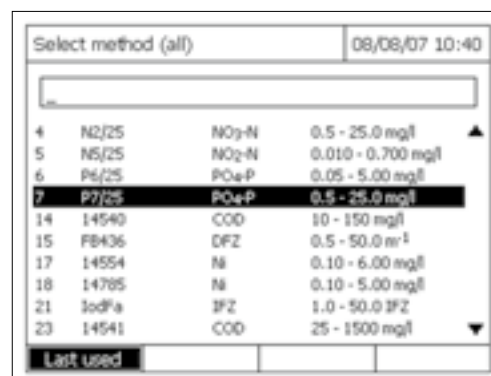
- Bright color screen for a clear view of work processes with color-marked additional information and visual evaluations.
- Direct function call-ups via function keys F1 to F4 for standard functions such as menu-related settings, dilution, unit, etc.
- Search masks for the simplest selection of parameters, methods, etc.
- Reliable and robust tactile keypad
- Filter data for specific measurement datasets
- Input screens for user-defined methods and complex programming
- USB and Ethernet connection for data processing: Update, printing to PDFs and printers, saving and data export with LIMS connection



## Systematic analysis - routine measurement of standard parameters

The photoLab® 7000 Series offers proven and innovative functionalities for routine measurements in water analysis as well as standard laboratory tasks.

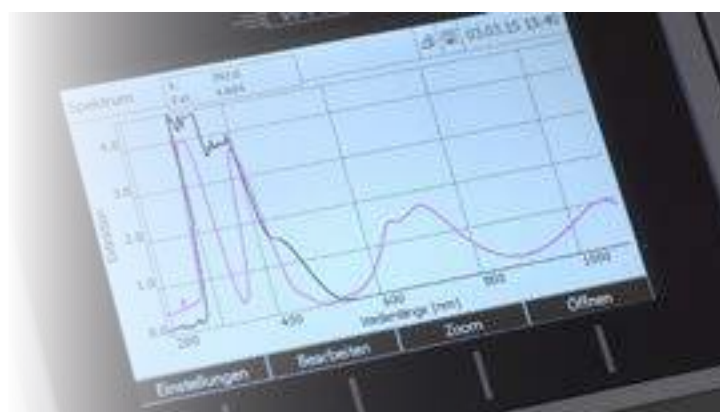
- Round *and* rectangular cuvettes with barcode recognition for large measurement ranges
- Automatic cuvette recognition with automatic measurement range selection
- More than 250 methods for commercial test kits
- Direct methods such as SAC, UVT, coloring
- Color measurement as per APHA 2120F
- Application packets and methods such as chlorophyll, brewing trade, etc.
- Custom routine methods
- OptRF: Unique optical reagent-free measurement of COD, nitrate and nitrite with photoLab® 7600



## Spectral analysis - from spectra to kinetics to programming

The photoLab® 7000 Series facilitates comprehensive laboratory analysis from water to research and teaching, even when on the go:

- Optical reagent-free measurement (OptRF) of COD, nitrate and nitrite via spectral measurement with evaluation between 200 and 390 nm,
- Kinetics with maximum or freely adjustable measurement count, time intervals and start delay.
- Spectra with custom definable wavelength range
- Multiple wavelength measurements
- Special tasks/form inputs for comprehensive measurement processes
- 20 profiles and 6 colors can be saved





## Analytic quality assurance – for result security

Analytic quality assurance (AQA) has become a must for all branches of industry to ensure and document plausible and correct measurement results.

The photoLab® 7000 Series enables AQA with monitoring of the photometer and measurements. AQA can be switched on and off as desired and offers a monitoring function through:

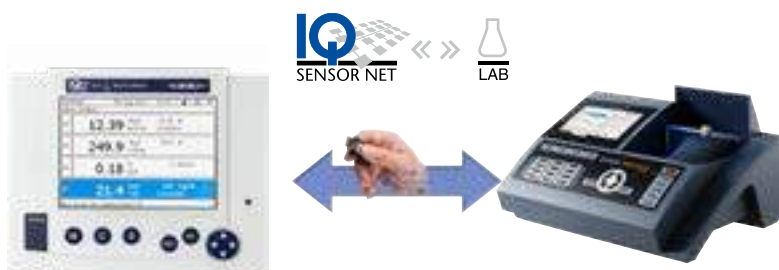
- Administrator, user and guest rights
- Adjustable inspection intervals for Photometer and test kits
- PhotoCheck: Photometer check incl. check for linearity (3 wavelengths at 4 measurement points)
- Selection for gray filter and test standards
- Standards for individual parameters and CombiChecks
- Matrix check with pile-up



| 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 <sub>4</sub> -P |                |
| Tolerance    | 0.08 mg/l PO <sub>4</sub> -P |                |
| Standard ID  |                              |                |
| Method       |                              | Apply          |

- Comprehensive test equipment
- MatrixCheck documentation
- User management

## IQ LabLink – the connection to the IQ SENSOR NET process monitoring system



|                                                                                        |                     |                                                                                                      |          |
|----------------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------|----------|
| IQ-LabLink                                                                             |                     |  08/21/08 11:51 |          |
| Job number:                                                                            | 850                 | Date:                                                                                                | 08/21/08 |
| Sensor type:                                                                           | PHILION+730Q        | Serial number:                                                                                       | 04460001 |
| Sensor name:                                                                           | 04460001            |                                                                                                      |          |
| Photometer:                                                                            | photoLab 6100 YCS   | Serial number:                                                                                       | 07440001 |
| User:                                                                                  | admin               | Date:                                                                                                | 08/21/08 |
| Parameter                                                                              | Value of sensor     | Lab value                                                                                            | Status   |
| am-N                                                                                   | 2.2 mg/l (2.31 mV)  | ---                                                                                                  | ---      |
| NO3-N                                                                                  | 8.5 mg/l (1291 mV)  | ---                                                                                                  | ---      |
| I                                                                                      | 23.9 mg/l (21.7 mV) | ---                                                                                                  | ---      |
| Job status: In process                                                                 |                     |                                                                                                      |          |
| Please select the parameters and start measurement process by pressing <[START/ENTER]> |                     |                                                                                                      |          |
| Select Job                                                                             |                     |                                                                                                      |          |

IQ LabLink creates an automatic connection between the WTW IQ SENSOR NET process monitoring system and photometric laboratory measurement.

As all wastewater has a specific material composition (matrix), from time to time a fine adjustment of the online measurement is carried out via a matrix adjustment. The values for the matrix adjustment are determined with a photometer and transferred back to the correct sensor – without any cable clutter!

- Simple selection of the measurement settings
- Clearly listed multiple measurements
- Data output with commentary function

- Comfortable and menu-prompted reconciliation procedure
- Secure and fast data transfer via USB
- Automatic allocation when several sensors are used

## photoLab® color – color measurement instead of color perception

The photometric color measurement stands out in comparison to the visual procedure due to its objective and precise measurement: photoLab® color enables PC-controlled color measurement with the spectrophotometers of the photoLab® 6000 and 7000 Series for the quality control of substances from water to wine or from resin to sugar.

photoLab® color shines with its easy method selection and clearly listed multiple measurements with data output and commentary options. Supported measurements include CIE 15:2004, ADMI, Hazen, Yellowness, Gardner, etc.



-  **PC-controlled**
-  **Conforming to standards**
-  **CSV and PDF export**



### photoLab® Data spectral – data management made simple

The PC software module photoLab® Data spectral is for the photometers of the photoLab® 6000/7000 Series photometers. It offers a clear interface for easy data exchange between PCs and photometers as well as the GLP compliant further processing of datasets with LIMS or spreadsheet programs.

## Brewery application package for the photoLab® 6000/7000 Series

The package contains MEBAK standard methods for the measurement of the typical parameters in the brewing industry (EBC)

| <u>α-acids</u>                                 | <u>Standard methods</u>           |
|------------------------------------------------|-----------------------------------|
| Anthocyanins (Harris - Rickett method)         | EBC                               |
| Bear measurement in beer*                      | EBC                               |
| Beer coloring                                  | EBC                               |
| Beer measurement in wort*                      | EBC                               |
| Copper                                         | EBC, cuprethol method             |
| Flavonoids                                     | EBC                               |
| Free amino nitrogen (FAN) in darker beers      | EBC (with notification)           |
| Free amino nitrogen (FAN) in darker worts      | EBC (with notification)           |
| Free amino nitrogen (FAN) in light beer        | EBC (with notification)           |
| Free amino nitrogen (FAN) in light worts       | EBC (with notification)           |
| Iron                                           | EBC methods with calibration line |
| Iso-α-acids (only with photoLab® 7600 UV-VIS!) | Multiple wavelength method        |
| Nickel                                         | EBC                               |
| Photometric iodine test                        | Method with adjustment factor     |
| Reduction capacity                             |                                   |
| Steam-volatile phenols                         | Methods with calibration line     |
| Thiobarbituric acid count TBA in beer and wort |                                   |
| Thiobarbituric acid count TBA in congress wort |                                   |
| Total carbohydrate                             | EBC                               |
| Total polyphenols                              | EBC                               |
| Vicinal diketones (diacetyl, 2,3-pentanedione) | EBC                               |

## photoLab® 7100 VIS Spectrophotometer - Simplifying the routine



photoLab® 7100 VIS

- 320 - 1100 nm
- More than 250 standard methods
- Special methods
- Color measurement

### From aquaculture to environmental monitoring

Fast and cost-effective routine analysis with AQA for wastewater, drinking water, environmental monitoring, and monitoring authorities as well as special procedures for environmental parameters such as chlorophyll or industrial fish farming.

### From wine to science

Menu based guidance makes complex application procedures in the food and beverage industry, production operations, or service laboratories fast, simple, and clear.

- Preprogrammed multi-step or multiple wavelength methods
- Comprehensive programming options for user applications
- Absorption spectra and kinetics measurements
- Instruction in essentials and modern photometrics in teaching and training.
- Complex color measurement with the PC-based software photoLab® color (see page 143).

## photoLab® 7600 UV-VIS Spectrophotometer - with OptRF



photoLab® 7600 UV-VIS

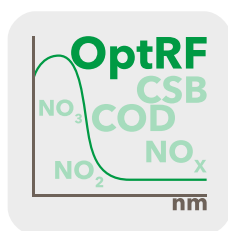
The photoLab® 7600 UV-VIS spectrophotometers combines tried and tested routine functions with pathbreaking spectral analytical functions and OptRF for reagent-free measurement. It is the one system for reference measurements for process systems to special applications in laboratory analysis.

- **190 - 1100 nm**
- **OptRF reagent free methods for COD, NO<sub>3</sub>, NO<sub>2</sub>**
- **Comprehensive programming options**

**OptRF - optical reagent-free measurement of COD, nitrate and nitrite**

OptRF has brought online measurement into the laboratory: COD, nitrate and nitrite can be recorded, calculated, and immediately displayed as a measurement value using a spectral scan in a quartz cuvette. The range of application for OptRF include:

- Communal wastewater treatment plants and, partially, septic tanks
- Many surface waters (COD, NO<sub>3</sub>; after pre-tests)
- Cost-free measurement range check for routine analysis
- Quick reference measurement for the matrix adjustment of online sensors



- **Faster than the fastest digestion**
- **Free of cost due to no reagents or chemicals**
- **Environmentally-friendly and harmless to health**

**UVT and SAC**

These parameters are increasingly important for checking UV disinfection as well as monitoring of the organic load: There are a total of five methods with and without turbidity adjustment available.

**From training to the sugar industry**

There are special methods and comprehensive programming for user-defined applications available for varied and mixed tasks in the range of 190–1100 nm. This supports universities in research and training, mixed applications in the food and beverage production industries, or service laboratories with specialist tasks.



## On the go with the photoLab® 7000 Series – mobile applications



photoLab® in the field case

The light and handy photoLab® 7000 series spectrophotometers can be used on-site with a car battery to, for example, monitor and take reference measurements of water operations and for official monitoring.

Alongside a transport case, a 12 V adapter cable for operation with standard trade car batteries is available as an accessory.

## photoLab® Technical Data Spectrophotometer

| Model                           | photoLab 7100 VIS                                                     | photoLab 7600 UV-VIS        |
|---------------------------------|-----------------------------------------------------------------------|-----------------------------|
| Wavelength range (nm)           | 320-1100 nm                                                           | 190-1100 nm                 |
| Optical system                  | Grating monochromator                                                 |                             |
| Light source                    | Wolfram halogen                                                       | Xenon flashbulb             |
| Spectral bandwidth [nm]         | 4 nm                                                                  |                             |
| Display                         | Backlit color 7-inch graphic display                                  |                             |
| Wavelength precision (nm)       | ± 1 nm                                                                |                             |
| Wavelength reproducibility (nm) | < 0.5nm                                                               |                             |
| Photometric precision           | - 0.003 E for E < 0.600; - 0.5 % of the display for 0.600 < E < 2.000 |                             |
| Photometric reproducibility     | - 0.003 E for E < 0.600; - 0.5 % of the display for 0.600 < E < 2.000 |                             |
| Photometric dissolution         | 0.5% of the measurement value or 0.005 E in absorbance 2              |                             |
| Photometric linearity           | < 1% for E ≤ 2.000 in the range from 340 to 900 nm                    |                             |
| Scan speed [nm/s]               | approx. 13 nm/s                                                       | approx. 16 nm/s             |
| Scattered light                 | < 0.1% T at 340 and 408 nm                                            | < 0.05% T at 340 and 408 nm |
| Interfaces                      | Ethernet, USB B, USB A                                                |                             |
| Dimensions (L x W x H in cm)    | 404 x 197 x 314 mm (width x height x depth)                           |                             |
| Weight [kg]                     | approx. 4.5 kg                                                        |                             |

## Order information

| Model                                                                               |                                                                          | Order no. |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------|
| photoLab® 7100 VIS                                                                  | Spectrophotometer for spectral and systematic analytics of 320 – 1100 nm | 250 203   |
| photoLab® 7600 UV-VIS                                                               | Spectrophotometer for spectral and systematic analytics of 190 – 1100 nm | 250 204   |
| photoLab® color + Data spectral                                                     | PC software for color measurement and for simple data management         | 902 763   |
| PL6-BREW                                                                            | Application package for the brewing industry as per MEBAK/EBC            | 250 214   |
| FC spectral 6/7                                                                     | Transport case for the photoLab® 6000 and 7000 Series                    | 250 212   |
| ADA 12V                                                                             | Adapter for 12V (auto-) operation for the photoLab® 6000 and 7000 Series | 902 760   |
| Accessories & cables see price list or <a href="http://www.WTW.com">www.WTW.com</a> |                                                                          |           |



# photoLab® S6 and S12 – measure instantly and precisely!

The photoLab® Filter Photometers S6/S12 offer laboratory precision in combination with the greatest speed. This is particularly advantageous in routine operations for water analysis:

- **Multilevel AQA/IQC**
- **Automatic cuvette recognition**
- **Barcode recognition for all cuvette types**

**2 year  
guarantee**



## Open cover, insert cuvette, read measurement immediately!

Speed and precision come from the filter technology used with reference beam technology. In connection with coded round and rectangular cuvette tests, a highly efficient and cost-effective measurement is possible for all requirements. The set wavelengths via highly precise filters provides a mechanical and therefore practically maintenance-free measurement instrument:

- AutoCheck for greater stability and precision
- Automatic cuvette recognition for *all* cuvette sizes used
- Automatic test recognition via barcodes for round *and* rectangular cuvette tests
- Automatic measurement activation
- **Analytic Quality Assurance AQA/IQC:**
- Large selection of programmed test kits: from easy round cuvette tests to cost-effective reagent tests

photoLab® S12 and S6



## photoLab® S6

Filter photometers with 6 wavelengths for all current routine determinations with round cuvettes in wastewater and drinking water analytics, but also in training.

The instrument is therefore uncomplicated and easy to operate during:

- Occasional measurements
- The use of round cuvette tests for quick measurement results
- Standard measurements with simpler safeguarding

## photoLab® S12

Filter photometers with 12 wavelengths for comprehensive routine measurements in service laboratories. Alongside coded quick test kits (round cuvettes), there are a large number of cost-effective reagent test kits for rectangular cuvettes available. The barcode support is also unique for these test kits in 10 mm, 20 mm and 50 mm rectangular cuvettes. As a result, the lowest concentration ranges can be determined even in drinking water analysis. In addition, 50 custom methods are programmable and kinetic measurements are possible:

The instrument is therefore highly efficient and cost-effective for:

- Routine determinations with a large number of samples
- Measurement of the lowest concentrations
- Custom applications with custom methods

## Technical specifications: Filter photometer photoLab® S6/S12

|                                     | photoLab® S6 and S6-A                                                             | photoLab® S12 and S12-A                                                                     |
|-------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| <b>Type</b>                         | Filter photometer                                                                 | Filter photometer                                                                           |
| <b>Photodiode array for</b>         | 6 wavelengths                                                                     | 12 wavelengths                                                                              |
| <b>Wavelengths nm</b>               | 340, 445, 525, 550, 605, 690                                                      | 340, 410, 445, 500, 525, 550, 565, 605, 620, 665, 690, 820                                  |
| <b>Custom methods</b>               | -                                                                                 | 50                                                                                          |
| <b>Auto zero adjustment</b>         | Yes                                                                               | Yes                                                                                         |
| <b>AutoSelect function</b>          | Yes                                                                               | Yes                                                                                         |
| <b>Cuvette recognition</b>          | Yes                                                                               | Yes                                                                                         |
| <b>Cuvette type</b>                 | Round                                                                             | Round, 10 mm, 20 mm and 50 mm                                                               |
| <b>Data storage and time</b>        | 500 data sets; with date and time                                                 | 1000 data sets; with date and time                                                          |
| <b>Essential functions</b>          | Concentration, absorption and transmission measurement, AQA/IQC, RS 232 interface | Concentration, absorption and transmission measurement, AQA/IQC, kinetics, RS 232 interface |
| <b>Battery operation (optional)</b> | 1 work day, deep discharge protection, trickle charging with mains operation      | 1 work day, deep discharge protection, trickle charging with mains operation                |
| <b>Test mark</b>                    | CE                                                                                | CE                                                                                          |
| <b>Guarantee period</b>             | 2 years                                                                           | 2 years                                                                                     |

## Order information: Filter photometer photoLab® S6/S12

| Model                                                                                                 | Description                                                                      | Order No. |
|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------|
| <b>photoLab® S6</b>                                                                                   | Mains version, universal plug (other mains supplies/country variants on request) | 250013    |
| <b>photoLab® S6-A</b>                                                                                 | Battery version                                                                  | 250022    |
| <b>photoLab® S12</b>                                                                                  | Mains version, universal plug (other mains supplies/country variants on request) | 250024    |
| <b>photoLab® S12-A</b>                                                                                | Battery version                                                                  | 250026    |
| For additional accessories and cables, see price list or <a href="http://www.WTW.com">www.WTW.com</a> |                                                                                  |           |

# pHotoFlex®: The “real” multi-parameter photometer for mobile applications

The pHotoFlex® Series offers the unique combination of photometrics, pH, ORP and turbidity measurements. It combines precision with low energy needs due to the use of optical filters in combination with LEDs for six wavelengths.

The electrochemical pH/ORP measurement and the turbidity measurement are integrated in the pHotoFlex® pH and pHotoFlex® Turb. This makes them the perfect companion for all on-site measurements: in treatment plants for wastewater and reference measurements, in drinking water analysis at wellheads or in cisterns, and last but not least for general water monitoring.

pHotoFlex® field case set - the outdoor lab



pHotoFlex® instruments are handy, energy-efficient, and also offer many extras:

- Clever adapter solution for different cuvette types:  $\varnothing$  28 mm and 16 mm, lengths from 92 to 104 mm
- User guidance for simple operation, even without the manual
- Large test selection and large measurement ranges
- Storage with sample identification

- Integrated pH function with pHotoFlex® pH
- Turbidity measurement as per DIN 27027 / ISO 7027 and pH measurement with pHotoFlex® Turb
- Custom methods via the LSdata PC software
- Quick selection of the ten most common test kits from a favorites list
- Case sets with integrated “laboratory table” for comfortable on-site work (see page 146)
- Easy work via barcode: Barcodes are contained in the analysis requirements. Simply hang barcode lists up in the workplace and select them via LabStation test with the barcode scanner

2 year guarantee

IP67





## pHotoFlex® STD – portable photometer for on-site water analysis and routine measurement

The portable pHotoFlex® STD makes taking on-site photometric measurements for water analysis and other routine measurements simple, comfortable and energy-efficient. The basic model from the pHotoFlex® Series offers six wavelengths using LEDs, with approx. 3000 measurements possible per battery set.

100 pieces of measurement data can be stored, filtered and transferred to the PC or easily managed and processed using the optional LSdata PC software in a GLP-compliant way.

The pHotoFlex® STD is even easier to use in the laboratory in connection with a LabStation: mains operation and the use of a barcode reader is then possible. The LabStation also serves as a charging station for the rechargeable battery delivered along with it.



pHotoFlex® STD

- **Pure photometry**
- **Intuitive and easy to operate**
- **More than 180 methods**



## pHotoFlex® pH – Portable photometer with pH measurement function



with pH measurement chain SenTix® 41

The pHotoFlex® pH portable photometer shows its strength in more complex tasks in multi-site environmental and process applications.

### Integrated pH function

The integrated pH function facilitates measurements from pH 0-16 with automatic buffer recognition (TEC/NIST). The temperature compensation takes place automatically in the reliable measurement range of -5 ... 100 °C. The MultiCal® Routine facilitates automatic calibration with up to three calibration points.

- **Integrated pH and ORP measurement**
- **Automatic temperature compensation**
- **CO<sub>2</sub> and NH<sub>3</sub> determination**

## pHotoFlex® Turb – the real multi-parameter photometer

pHotoFlex® Turb is the real multi-parameter photometer with pH, ORP, and turbidity measurement all-in-one instrument. It corresponds to the pHotoFlex® pH and also has an infrared light source (IR) for nephelometric turbidity measurement (90°) per DIN 27027/ISO 7027. The precision is equivalent to a laboratory turbidity meter. In combination with the AMCO Clear® Standards, the highest possible precision is also provided for the sensitive drinking water sector. As a result users with high AQA requirements can also carry out in-the-field water analysis at on-site cisterns or wells.

The calibration of the AMCO Clear® Standards delivered can be documented and – in addition to the measurement values – displayed via a RS 232 interface.



pHotoFlex® Turb

- **Turbidity measurement as per DIN 27027 / ISO 7027**
- **Measurement range 0-1100 NTU/FNU**
- **On-site quality control (QC)**



## Sets in a portable case – secure on-site work!

The mini-laboratory with integrated "laboratory table" has compartments for the measurement instrument, cuvettes, measuring beakers, and a stand for the pH electrode.

Complete sets with:

- pH electrode SenTix® 41
- Calibration standard (pHotoFlex® Turb)
- LSdata for easy data management and method establishment
- Lots of useful accessories: Empty cuvettes, buffer solutions with pH 4.01 and 7.00, AK Laboratory 540 PC cable, stand for the pH electrode, cleaning cloths, screwdriver
- Optionally available with variably adjustable 5 ml pipette no. 250 546 (pHotoFlex® pH/Turb) or segmented syringes (pHotoFlex® STD)

- **The laboratory for enroute**
- **Integrated "laboratory table"**
- **Data management**



Mobile laboratory

## LabStation and LSdata – The smart way to manage your measurement data!

With the portable pHotoFlex® pH photometers and the Turb® 430 turbidity meters, the LabStation provides the ideal laboratory solution. With the LSdata PC software the measurement data recorded can be easily processed on the PC. It is included in the LabStation and case set delivery package. LSdata is also available as an individual package. The LabStation also serves as a charging station for the included rechargeable battery set.

- GLP-compliant data export from the measurement instrument to the PC with user recognition
- Processing in \*.XLS format, for, for example, the clear documentation of the respective individual sampling locations
- Custom methods can be created, managed and synchronized between PC and measurement instrument via a user-friendly dialog window.
- The calculation of the calibration curve for custom methods



## Even more tests:

For field use, alongside lot-certified reagents, there are also simple powder tests for when you're on the go. pHotoFlex® offers the option to adjust the incline of calibration curves.

*You can find the complete reagent program from page 150.*



## Technical data: pHotoFlex® portable photometers

| Model                   | pHotoFlex® STD                        | pHotoFlex® pH                         | pHotoFlex® Turb                       |
|-------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Light source            | LED                                   | LED                                   | LED                                   |
| Wavelengths nm          | 436, 517, 557, 594, 610, 690          | 436, 517, 557, 594, 610, 690          | 436, 517, 557, 594, 610, 690 + 860    |
| Custom methods          | 50                                    | 100                                   | 100                                   |
| Methods/software update | Via the Internet                      | Via the Internet                      | Via the Internet                      |
| Data memory             | 100 measurements                      | 1000 measurements                     | 1000 measurements                     |
| pH                      | –                                     | 0-16                                  | 0-16                                  |
| Turbidity               | –                                     | –                                     | 0-1100 NTU/FNU                        |
| Precision               | Photometry                            | Photometry                            | Photometry                            |
|                         | pH                                    | pH                                    | pH                                    |
|                         | Turbidity (NTU/FNU)                   | Turbidity (NTU/FNU)                   | Turbidity (NTU/FNU)                   |
|                         |                                       |                                       |                                       |
| Calibration:            | pH/turbidity                          | pH/turbidity                          | pH/turbidity                          |
| Interface               | RS 232, USB via adapter (optional)    | RS 232, USB via adapter (optional)    | RS 232, USB via adapter (optional)    |
| Measurement type        | Photometry                            | Photometry, pH, ORP                   | Photometry, pH, ORP, turbidity        |
| Battery                 | 4 Mignon (AA), over 3000 measurements | 4 Mignon (AA), over 3000 measurements | 4 Mignon (AA), over 3000 measurements |
| Rechargeable battery    | Optional: LabStation                  | Optional: battery or Lab station      | Optional: battery or Lab station      |
| Test mark               | cETLus                                | cETLus                                | cETLus                                |
| Guarantee               | 2 years                               | 2 years                               | 2 years                               |

## Order info: pHotoFlex® portable photometers and accessories

| Model                   | Description                                                                                                                                          | Order No. |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| pHotoFlex® STD          | Portable photometer                                                                                                                                  | 251105    |
| pHotoFlex® pH           | Portable photometer with pH measurement                                                                                                              | 251100    |
| pHotoFlex® Turb         | Portable photometer with pH and turbidity measurement as per DIN 27027/ISO 7027                                                                      | 251110    |
| pHotoFlex® pH/SET       | Portable, universal LED filter photometer in field case with table insert, LSdata and accessories                                                    | 251200    |
| pHotoFlex® Turb/SET     | Portable, universal LED filter photometer with pH and turbidity measurement in field case with table insert, calibration kit, LSdata and accessories | 251210    |
| LSdata                  | PC software for pHotoFlex®/Turb® 430 Series                                                                                                          | 902762    |
| FC pHotoFlex®/Turb® 430 | Field case and table insert for all pHotoFlex® and Turb® 430 models                                                                                  | 251304    |
| LS Flex/430             | LabStation for all pHotoFlex® and Turb® 430 models with LSdata software, rechargeable battery and universal power supply                             | 251301    |
| RB Flex/430             | Rechargeable battery for pHotoFlex® pH/Turb and Turb® 430 IR/T with universal power plug                                                             | 251300    |

For further accessories & cables see price list or [www.WTW.com](http://www.WTW.com)

# Thermoreactors for COD and all other thermal digestions

Thermoreactors are required for the determination of COD, total nitrogen or total phosphorous as well as electroplating. Due to the high reaction temperature over a defined time, the complete digestion of the sample is guaranteed. There are also three crack sets available for the sample digestion: Crack Set 10 (Model 14687, 100 digestions) and Crack Set 10-C (Model 14688, 25 cuvettes) for heavy metals, as well as Crack Set 20 for total nitrogen (Model 14963, 90 determinations).

The most important temperatures and digestion times are stored in the programs in each of the WTW Thermoreactors: there are eight easily selectable programs available. In addition, thermoreactors CR 3200 and CR 4200 also offer, alongside the eight set programs, the option of storing a further eight custom programs. The bores are suitable for cuvettes with an outer diameter of 16 mm.

## CR 2200

If you have to carry out routine tasks in water analysis with smaller sample amounts, the CR 2200 is perfect for you: 12 sample cuvettes can be unlocked here with 8 programs at 100, 120, 148 and 150 °C.



## CR 3200

The CR 3200 has 2x12 cuvette slots, all of which can be opened with the same program. The CR 3200 also allows for eight custom programs with free selection of temperature up to 170 °C.



## CR 4200

If you need to carry out several measurements at the same time, the CR 4200 is the right choice: using the two separately controlled thermo blocks for each 12 cuvettes, here, for example, you can carry out measurements for COD (148 °C) and total-N (120 °C) at the same time. 8 user-defined programs up to 170 °C are also possible.



## TFK CR Temperature Probe for quality assurance

The external TFK CR Temperature Probe (order no. 250100) is available as test equipment for the CR 3200 and CR 4200 models. The temperature probe can be inserted into the thermo reactor instead of a sample and provides the target and actual values determined either via a printer or via the PC.

It is therefore possible to monitor the digestion temperature and document it.



## Quick digestion for COD

There are various programs in accordance with international standards for the COD digestion. Due to many user requests, a quick digestion is also available for 20 minutes at 148 °C, as this time period has been proven to be sufficient in practice in communal wastewater operations.

All devices have relevant timer functions. There will be a display on all thermoreactors when the reaction temperature is reached.

### Safety measures

All thermoreactors have optimal heat transfer between the heat block and cuvette, and have a high level of safety. An integrated safety cover provides protection in the case of a potential cuvette break. On the heat block surface, a cover prevents the heat block being touched.

## Application scopes and technical data: Thermoreactors

| Application scope                          | CR 2200                                                                                                    | CR 3200                                                                                                    | CR 4200                                                                                                    |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Routine measurements                       | ●                                                                                                          | ●                                                                                                          | ●                                                                                                          |
| Wastewater                                 | ●                                                                                                          | ●                                                                                                          | ●                                                                                                          |
| Specialist tasks in wastewater             | –                                                                                                          | ●                                                                                                          | ●                                                                                                          |
| Different programs in parallel             | –                                                                                                          | –                                                                                                          | ●                                                                                                          |
| Number of samples, max.                    | 1 x 12                                                                                                     | 2 x 12, same program                                                                                       | 2 x 12, different programs                                                                                 |
| 8 saved programs incl. COD quick digestion | 100 °C 30 min, 60 min<br>120 °C with 30 min, 60 min, 120 min,<br>148 °C 120 min, 20 min,<br>150 °C 120 min | 100 °C 30 min, 60 min<br>120 °C with 30 min, 60 min, 120 min,<br>148 °C 120 min, 20 min,<br>150 °C 120 min | 100 °C 30 min, 60 min<br>120 °C with 30 min, 60 min, 120 min,<br>148 °C 120 min, 20 min,<br>150 °C 120 min |
| Custom programs                            | –                                                                                                          | 8 freely selectable 25-170 °C                                                                              | 8 freely selectable 25-170 °C                                                                              |
| Control accuracy                           | ±1 °C ±1 digit                                                                                             |                                                                                                            |                                                                                                            |
| Protection class                           | I (as per DIN VDE 0700 Part 1/11.90)                                                                       |                                                                                                            |                                                                                                            |
| Device safety                              | EN 61010, UL 3101, CAN/CSA C22.2-1010; EN 61010-2-010, IEC-CAN/CSA C22.2-1010.2.010                        |                                                                                                            |                                                                                                            |
| Dimensions                                 | B: 256 mm H: 185 mm (closed) 290 mm (open) D: 315 mm                                                       |                                                                                                            |                                                                                                            |

## Order information: Thermoreactors

| Model                                                                                    | Description                                                                                                                                                                            | Order No. |
|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| CR 2200                                                                                  | Reactor (230 VAC with Euro plug*) for COD and other chemical developments<br>Suitable for the reception of 2x12 reaction cuvettes                                                      | 1P21-1    |
| CR 3200                                                                                  | Universal reactor (230 VAC with Euro plug*) for COD and other chemical developments<br>Suitable for the reception of 2x12 reaction cuvettes                                            | 1P22-1    |
| CR 4200                                                                                  | Universal reactor (230 VAC with Euro plug*) for COD and other chemical developments<br>Suitable for the reception of 2x12 reaction cuvettes<br>Two separately controllable heat zones. | 1P23-1    |
| For accessories & cables, see price list or <a href="http://www.WTW.com">www.WTW.com</a> |                                                                                                                                                                                        |           |

\*) other power plugs available

# Reagents from A to Z – for every application the right test kit

Depending on the application, there are a variety of test kits available for routine investigations. Photometers and test kits together form a system in which each is coordinated with the other depending on optics and the wavelength used, and which offers various advantages:

For use with in-the-field photometers, test kits must be simple: The energy-efficient LED optics facilitate the monitoring process via the use of often simpler and more cost-effective test kits, for example, for a powder test. In the laboratory, on the other hand, the elaborate instrument technology with barcodes and the highest level of optical sensitivity is also mirrored in the highly-precise test kits available: through the use of barcodes, lot certificates and quality assurance support.

The reagent offering is continuously expanding with the development of new tests and inclusion of existing tests in the photometer offering. Just as important as selecting the right reagent is understanding that the instrument technology may impact the test range, depending on light source and optics. For example, LED photometers typically have a smaller measurement range vs. other light sources for the same test.

## Reagents for routine tests

- **Quick, reliable, cost-effective**
- **The right test for every application**
- **Guaranteed results through AQA/IQC**



## Measure correctly

Most errors result from the selection of the incorrect measurement range: Measurement tolerance increases closer to the upper and lower ends of the

measurement range. This is particularly significant in the lower range. Lot certificates show borders and key procedural data. So, once again, please measure with the right test kit!

## Test type overview

| Labeling: ● = round cuvette test   TC = cuvette test   TP = powder test   ■ = reagent tests |                                                                                                                                                                          |                                                                                                                                                                                   |                                                                                       |
|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Type                                                                                        | Cuvette test                                                                                                                                                             | Reagent test                                                                                                                                                                      | Powder test                                                                           |
| <b>Lot certificate</b>                                                                      | With certificate (●) for the highest precision<br>Without certificate (TC) for very good precision                                                                       | With certificate (■) for the highest precision                                                                                                                                    | Without certificate (TP), precise                                                     |
| <b>Test recognition</b>                                                                     | Barcode (●) and/or method selection                                                                                                                                      | Barcode and/or method selection                                                                                                                                                   | Method selection, barcode optional (external)                                         |
| <b>Advantages:</b>                                                                          | Reaction cuvette with barcode or method selection, 16 mm: Sample addition, insertion, measurement and reading with minimum work effort<br>AQA support for stored results | Large measurement range for 10, 20 and 50 mm rectangular cuvettes, recording of the smallest concentrations in rectangular cuvettes up to 50 mm<br>AQA support for stored results | Lowest pack size, simple test procedure, few utensils, for cuvettes in Ø 16 and 28 mm |
| <b>Area of application:</b>                                                                 | Laboratory, infrequent work, or ease with very large sample sizes                                                                                                        | Laboratory, low concentrations, routine, cost-effective work with very large sample sizes                                                                                         | Portable field measurements, screening and monitoring tasks                           |



stry



|                                                                                                                   |                                           |                                              |                    |                                     |        |                                 |    | photoLab®                   |     |           |   | pHotoFlex® |
|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------|--------------------|-------------------------------------|--------|---------------------------------|----|-----------------------------|-----|-----------|---|------------|
| Model                                                                                                             | Measurement range<br>(max. specification) | Cuvette (mm)1)<br>depending on<br>photometer | ml                 | Order No.                           | Total  | CC                              | SW | S6                          | S12 | 6000/7000 |   |            |
| 00088 Reagent Cl <sub>2</sub> -3                                                                                  |                                           |                                              |                    | 252079                              | 600    |                                 |    |                             |     |           |   |            |
| 00089 Accessories Cl <sub>2</sub> (empty cuvettes etc.)                                                           |                                           |                                              |                    | 252080                              | 25     |                                 |    |                             |     |           |   |            |
| Chromate (chrome VI and total chrome) Cr                                                                          |                                           |                                              |                    |                                     |        |                                 |    |                             |     |           |   |            |
| ●                                                                                                                 | 14552                                     | 0.05 - 2.00 mg/l Cr                          | 16                 | 10                                  | 250341 | 25                              | -  | ✓                           | ●   | ●         | ● | ●          |
| ■                                                                                                                 | 14758                                     | 0.01 - 3.00 mg/l Cr                          | 10, 20, 50         | 5                                   | 250433 | 250                             | -  | ✓                           | -   | ●         | ● | -          |
| Chrome bath CrO <sub>3</sub> : see reagent-free tests                                                             |                                           |                                              |                    |                                     |        |                                 |    |                             |     |           |   |            |
| COD Chemical Oxygen Demand                                                                                        |                                           |                                              |                    |                                     |        |                                 |    |                             |     |           |   |            |
| ●                                                                                                                 | 14560                                     | 4.0 - 40.0 mg/l COD (148 °C, 2 h)            | 16                 | 3                                   | 250303 | 25                              | ✓  | -                           | ●   | ●         | ● | -          |
| ●                                                                                                                 | 01796                                     | 5.0 - 80.0 mg/l COD (148 °C, 2 h)            | 16                 | 2                                   | 252092 | 25                              | ✓  | -                           | ●   | ●         | ● | -          |
| ●                                                                                                                 | C3/25                                     | 10 - 150 mg/l COD (148 °C, 2 h)              | 16                 | 3                                   | 252070 | 25                              | ✓  | -                           | ●   | ●         | ● | ●          |
| ●                                                                                                                 | 14895                                     | 15 - 300 mg/l COD (148 °C, 2 h)              | 16                 | 2                                   | 250359 | 25                              | ✓  | -                           | ●   | ●         | ● | ●          |
| ●                                                                                                                 | 14690                                     | 50 - 500 mg/l COD (148 °C, 2 h)              | 16                 | 2                                   | 250304 | 25                              | ✓  | -                           | ●   | ●         | ● | ●          |
| ●                                                                                                                 | C4/25                                     | 25 - 1500 mg/l COD (148 °C, 2 h)             | 16                 | 3                                   | 252071 | 25                              | ✓  | -                           | ●   | ●         | ● | ●          |
| ●                                                                                                                 | 14691                                     | 300 - 3500 mg/l COD (148 °C, 2 h)            | 16                 | 2                                   | 250351 | 25                              | ✓  | -                           | ●   | ●         | ● | ●          |
| ●                                                                                                                 | 14555                                     | 500 - 10000 mg/l COD (148 °C, 2 h)           | 16                 | 1                                   | 250309 | 25                              | ✓  | -                           | ●   | ●         | ● | ●          |
| ●                                                                                                                 | 01797                                     | 5000 - 90000 mg/l COD (148 °C, 2 h)          | 16                 | 0.1                                 | 252093 | 25                              | -  | -                           | ●   | ●         | ● | ●          |
| TC                                                                                                                | COD1 TC (LR)                              | 3 - 150 mg/l COD (148 °C, 2 h)               | 16                 | 2                                   | 251990 | 25                              | -  | -                           | -   | -         | ● | ●          |
| TC                                                                                                                | COD2 TC (MR)                              | 20 - 1500 mg/l COD (148 °C, 2 h)             | 16                 | 2                                   | 251991 | 25                              | -  | -                           | -   | -         | ● | ●          |
| TC                                                                                                                | COD3 TC (HR)                              | 200 - 15000 mg/l COD (148°C, 2h)             | 16                 | 0.2                                 | 251992 | 25                              | -  | -                           | -   | -         | ● | ●          |
| COD Chemical Oxygen Demand (quicksilver-free, chloride is also recorded and/or disrupts in higher concentrations) |                                           |                                              |                    |                                     |        |                                 |    |                             |     |           |   |            |
| ●                                                                                                                 | 09772                                     | 10 - 150 mg/l COD (148 °C, 2h)               | 16                 | 2                                   | 250301 | 25                              | ✓  | -                           | ●   | ●         | ● | ●          |
| ●                                                                                                                 | 09773                                     | 100 - 1500 mg/l COD (148 °C, 2h)             | 16                 | 2                                   | 250306 | 25                              | ✓  | -                           | ●   | ●         | ● | ●          |
| Copper bath Cu: see reagent-free tests                                                                            |                                           |                                              |                    |                                     |        |                                 |    |                             |     |           |   |            |
| Copper Cu                                                                                                         |                                           |                                              |                    |                                     |        |                                 |    |                             |     |           |   |            |
| ●                                                                                                                 | 14553                                     | 0.05 - 8.00 mg/l Cu                          | 16                 | 5                                   | 250408 | 25                              | -  | ✓                           | ●   | ●         | ● | ●          |
| ■                                                                                                                 | 14767                                     | 0.02 - 6.00 mg/l Cu                          | 10, 20, 50, 16, 28 | 10                                  | 250441 | 250                             | -  | ✓                           | -   | ●         | ● | ●          |
| TP                                                                                                                | Cu-1 TP                                   | 0.04 - 5.00 mg/l Cu                          | 20, 28             | 10                                  | 251403 | 100                             | -  | ✓                           | -   | -         | ● | ●          |
| Cyanide (free and easily released cyanide) CN                                                                     |                                           |                                              |                    |                                     |        |                                 |    |                             |     |           |   |            |
| ●                                                                                                                 | 14561                                     | 0.010 - 0.500 mg/l CN                        | 16                 | 5                                   | 250344 | 25                              | -  | -                           | ●   | ●         | ● | ●          |
| ■                                                                                                                 | 09701                                     | 0.002 - 0.500 mg/l CN                        | 10, 20, 50         | 5, 10                               | 250492 | 100                             | -  | -                           | -   | ●         | ● | -          |
| ● = round cuvette test;<br>■ = reagent tests;                                                                     |                                           | TC = cuvette test;<br>TP = powder test;      |                    | CC = CombiCheck;<br>SW = sea water; |        | ml = sample volume (photoLab®); |    | 1) Ø 16, 28<br>□ 10, 20, 50 |     |           |   |            |

● = round cuvette test; TC = cuvette test; CC = CombiCheck; ml = sample volume (photoLab®); 1) Ø 16, 28  
 ■ = reagent tests; TP = powder test; SW = sea water; □ 10, 20, 50

## Photometry



|                                                       |                                                                                                            |                                              |           |                                                     |           |                             |    |    |     | photoLab® |   |  | pHotoFlex® |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------|-----------------------------------------------------|-----------|-----------------------------|----|----|-----|-----------|---|--|------------|
| Model                                                 | Measurement range<br>(max. specification)                                                                  | Cuvette (mm)1)<br>depending on<br>photometer | ml        | Order No.                                           | Total     | CC                          | SW | S6 | S12 | 6000/7000 |   |  |            |
| ■ 09713/2                                             | 0.10 - 25.0 mg/l NO <sub>3</sub> -N<br>0.40 - 110.7 mg/l NO <sub>3</sub>                                   | 10, 20, 50                                   | 0.5       | 252085                                              | 250       | ✓                           | -  | -  | ●   | ●         | - |  |            |
| TC NO <sub>3</sub> -1 TC                              | 0.2 - 30.0 mg/l NO <sub>3</sub> -N<br>1 -133.0 mg/l NO <sub>3</sub>                                        | 16                                           | 1         | 251993                                              | 50        | -                           | -  | -  | -   | ●         | ● |  |            |
| Nitrite NO <sub>2</sub>                               |                                                                                                            |                                              |           |                                                     |           |                             |    |    |     |           |   |  |            |
| ● N5/25                                               | 0.010 - 0.700 mg/l NO <sub>2</sub> -N<br>2.2 - 2.30 mg/l NO <sub>2</sub>                                   | 16                                           | 5         | 252074                                              | 25        | -                           | ✓  | ●  | ●   | ●         | ● |  |            |
| ■ 14776/1                                             | 0.002 - 1.00 mg/l NO <sub>2</sub> -N<br>0.007 - 3.28 mg/l NO <sub>2</sub>                                  | 10, 20, 50, 16, 28                           | 5         | 250445                                              | 1000      | -                           | ✓  | -  | ●   | ●         | ● |  |            |
| ■ 14776/2                                             | 0.002 - 1,000 mg/l NO <sub>2</sub> -N<br>0.007 - 3.28 mg/l NO <sub>2</sub>                                 | 10, 20, 50, 16, 28                           | 5         | 250440                                              | 335       | -                           | ✓  | -  | ●   | ●         | ● |  |            |
| ● 00609                                               | 1.0 - 90.0 mg/l NO <sub>2</sub> -N<br>3.3 - 295.2 mg/l NO <sub>2</sub>                                     | 16                                           | 8         | 252069                                              | 25        | -                           | -  | ●  | ●   | ●         | - |  |            |
| TP NO <sub>2</sub> -1 TP                              | 0.002 - 0.300 mg/l NO <sub>2</sub> -N<br>0.007 - 0.985 mg/l NO <sub>2</sub>                                | 20, 28                                       | 10        | 251409                                              | 100       | -                           | -  | -  | -   | ●         | ● |  |            |
| TC NO <sub>2</sub> -2 TC                              | 0.03 - 0.60 mg/l NO <sub>2</sub> -N (LR)                                                                   | 16                                           | 2         | 251994                                              | 24        | -                           | -  | -  | -   | ●         | ● |  |            |
|                                                       | 0.10 - 1.97 mg/l NO <sub>2</sub> (LR)                                                                      | 16                                           | 0.5       |                                                     |           |                             |    |    |     |           |   |  |            |
|                                                       | 0.30 - 3.00 mg/l NO <sub>2</sub> -N (HR)<br>0.99 - 9.85 mg/l NO <sub>2</sub> (HR)                          | 16                                           | 0.5       |                                                     |           |                             |    |    |     |           |   |  |            |
| TP NO <sub>2</sub> -3 TP                              | 0.002 - 0.300 mg/l NO <sub>2</sub> -N<br>0.007 - 0.985 mg/l NO <sub>2</sub>                                | 20, 28                                       | 25        | 251419                                              | 100       | -                           | -  | -  | -   | ●         | ● |  |            |
| Nitrogen (total): see total nitrogen N <sub>ges</sub> |                                                                                                            |                                              |           |                                                     |           |                             |    |    |     |           |   |  |            |
| Organic acids (volatile)                              |                                                                                                            |                                              |           |                                                     |           |                             |    |    |     |           |   |  |            |
| ● 01749                                               | 50-3000 mg/l                                                                                               | round                                        | 0.5       | 252096                                              | 25        | -                           | -  | ●  | ●   | ●         | - |  |            |
| ● / ■ 01809                                           | 50-3000 mg/l (100 °C, 15 min.)                                                                             | 16                                           | 0.5       | 252095                                              | 100       | -                           | -  | ●  | ●   | ●         | - |  |            |
| Oxygen capacity up to pH 4.3                          |                                                                                                            |                                              |           |                                                     |           |                             |    |    |     |           |   |  |            |
| ● / ■ 01758                                           | KS <sub>4,3</sub> 0.40 - 8.00 mmol/l<br>20 - 400 mg/l CaCO <sub>3</sub>                                    | 16                                           | 1         | 252087                                              | 120       | -                           | -  | ●  | ●   | ●         | ● |  |            |
| Oxygen O <sub>2</sub>                                 |                                                                                                            |                                              |           |                                                     |           |                             |    |    |     |           |   |  |            |
| ● 14694                                               | 0.5 - 12.0 mg/l O <sub>2</sub>                                                                             | 16                                           | -         | 250403                                              | 25        | -                           | -  | ●  | ●   | ●         | - |  |            |
| Ozone O <sub>3</sub>                                  |                                                                                                            |                                              |           |                                                     |           |                             |    |    |     |           |   |  |            |
| ■ 00607/1                                             | 0.010 - 4.00 mg/l O <sub>3</sub>                                                                           | 10, 20, 50, 16, 28                           | 10        | 252016                                              | 200       | -                           | -  | -  | ●   | ●         | ● |  |            |
| ■ 00607/2                                             | 0.010 - 4.00 mg/l O <sub>3</sub>                                                                           | 10, 20, 50, 16, 28                           | 10        | 252054                                              | 1200      | -                           | -  | -  | ●   | ●         | ● |  |            |
| pH                                                    |                                                                                                            |                                              |           |                                                     |           |                             |    |    |     |           |   |  |            |
| ● 01744                                               | pH 6.4 - 8.8                                                                                               | 16                                           | 10        | 252050                                              | 280       | -                           | ✓  | ●  | ●   | ●         | - |  |            |
| Phenol C <sub>6</sub> H <sub>5</sub> OH               |                                                                                                            |                                              |           |                                                     |           |                             |    |    |     |           |   |  |            |
| ■ 00856                                               | 0.002 - 0.100 mg/l C <sub>6</sub> H <sub>5</sub> OH<br>0.025 - 5.00 mg/l C <sub>6</sub> H <sub>5</sub> OH  | 20<br>10, 20, 50                             | 200<br>10 | 252058                                              | 50<br>250 | -                           | ✓  | -  | ●   | ●         | - |  |            |
| ● 14551                                               | 0.10 - 2.50 mg/l C <sub>6</sub> H <sub>5</sub> OH                                                          | 16                                           | 10        | 250412                                              | 25        | -                           | ✓  | -  | ●   | ●         | ● |  |            |
| Phosphate PO <sub>4</sub>                             |                                                                                                            |                                              |           |                                                     |           |                             |    |    |     |           |   |  |            |
| ● P6/25                                               | 0.05 - 5.00 mg/l PO <sub>4</sub> -P<br>0.05 - 5.0 mg/l P <sub>ges</sub><br>0.2 - 15.3 mg/l PO <sub>4</sub> | 16                                           | 5         | 252075                                              | 25        | ✓                           | ✓  | ●  | ●   | ●         | ● |  |            |
| ● = round cuvette test;<br>■ = reagent tests;         |                                                                                                            | TC = cuvette test;<br>TP = powder test;      |           | CC = CombiCheck;    ml = sample volume (photoLab®); |           | 1) Ø 16, 28<br>□ 10, 20, 50 |    |    |     |           |   |  |            |

|                                                                                                                                                                              |                                                                                                                                       |                                              |       |           |       |    |    | photoLab® |     |           |   | pHotoFlex® |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------|-----------|-------|----|----|-----------|-----|-----------|---|------------|
| Model                                                                                                                                                                        | Measurement range<br>(max. specification)                                                                                             | Cuvette (mm)1)<br>depending on<br>photometer | ml    | Order No. | Total | CC | SW | S6        | S12 | 6000/7000 |   |            |
| ● P7/25                                                                                                                                                                      | 0.5 - 25.0 mg/l PO <sub>4</sub> -P<br>0.5 - 25.0 mg/l P <sub>ges</sub><br>1.5 - 76.7 mg/l PO <sub>4</sub>                             | 16                                           | 1     | 252076    | 25    | ✓  | ✓  | ●         | ●   | ●         | ● |            |
| ● 14546                                                                                                                                                                      | 0.5 - 25.0 mg/l PO <sub>4</sub> -P<br>1.5 - 76.7 mg/l PO <sub>4</sub>                                                                 | 16                                           | 5     | 250413    | 25    | ✓  | ✓  | ●         | ●   | ●         | ● |            |
| ● 00616                                                                                                                                                                      | 3.0 - 100.0 mg/l PO <sub>4</sub> -P<br>9.0 - 307.0 mg/l PO <sub>4</sub>                                                               | 16                                           | 0.2   | 252021    | 25    | -  | ✓  | ●         | ●   | ●         | ● |            |
| ■ 14848/1                                                                                                                                                                    | 0.005 - 5.00 mg/l PO <sub>4</sub> -P<br>0.005 - 5.00 mg/l PO <sub>4</sub> -P <sub>ges</sub><br>0.020 - 15.3 mg/l PO <sub>4</sub>      | 10, 20, 50, 16, 28                           | 5     | 250446    | 420   | ✓  | ✓  | -         | ●   | ●         | ● |            |
| ■ 14848/2                                                                                                                                                                    | 0.005 - 5.00 mg/l PO <sub>4</sub> -P<br>0.005 - 5.00 mg/l PO <sub>4</sub> -P <sub>ges</sub><br>0.020 - 15.3 mg/l PO <sub>4</sub>      | 10, 20, 50, 16, 28                           | 5     | 252086    | 220   | ✓  | ✓  | -         | ●   | ●         | ● |            |
| ■ 14842                                                                                                                                                                      | 0.5 - 30.0 mg/l PO <sub>4</sub> -P<br>1.5 - 92.0 mg/l PO <sub>4</sub>                                                                 | 10, 20                                       | 5     | 250447    | 400   | -  | ✓  | -         | ●   | ●         | - |            |
| ■ 00798                                                                                                                                                                      | 1.0 - 100.0 mg/l PO <sub>4</sub> -P<br>3.0 - 307.0 mg/l PO <sub>4</sub>                                                               | 10, 16                                       | 8     | 252045    | 100   | -  | ✓  | -         | ●   | ●         | ● |            |
| TP PO <sub>4</sub> -1 TP                                                                                                                                                     | 0.007 - 0.800 mg/l PO <sub>4</sub> -P<br>0.02 - 2.50 mg/l PO <sub>4</sub>                                                             | 20, 28                                       | 10    | 251410    | 100   | -  | -  | -         | -   | ●         | ● |            |
| TC PO <sub>4</sub> -2 TC                                                                                                                                                     | 0.02 - 1.63 mg/l PO <sub>4</sub> -P<br>0.06 - 5.00 mg/l PO <sub>4</sub>                                                               | 16                                           | 5     | 251989    | 50    | -  | -  | -         | -   | ●         | ● |            |
| TC PO <sub>4</sub> -3 TC                                                                                                                                                     | 0.02 - 1.10 mg/l PO <sub>4</sub> -P<br>0.02 - 1.10 mg/l P <sub>ges</sub><br>(development, 100 °C)<br>0.06 - 3.37 mg/l PO <sub>4</sub> | 16                                           | 5     | 251988    | 50    | -  | -  | -         | -   | ●         | ● |            |
| TC PO <sub>4</sub> -4 TC                                                                                                                                                     | 0.02 - 1.10 mg/l PO <sub>4</sub> -P<br>0.02 - 1.10 mg/l P <sub>ges</sub><br>(development, 100 °C)<br>0.06 - 3.37 mg/l PO <sub>4</sub> | 16                                           | 5     | 251987    | 50    | -  | -  | -         | -   | ●         | ● |            |
| Potassium K                                                                                                                                                                  |                                                                                                                                       |                                              |       |           |       |    |    |           |     |           |   |            |
| ● 14562                                                                                                                                                                      | 5.0 - 50.0 mg/l K                                                                                                                     | 16                                           | 2     | 250407    | 25    | -  | ✓  | ●         | ●   | ●         | ● |            |
| ● 00615                                                                                                                                                                      | 30 - 300 mg/l K                                                                                                                       | 16                                           | 0.5   | 252020    | 25    | -  | ✓  | ●         | ●   | ●         | ● |            |
| Reagent-free COD Chemical Oxygen Demand with OptRF: see page 159                                                                                                             |                                                                                                                                       |                                              |       |           |       |    |    |           |     |           |   |            |
| SAC see reagent-free tests                                                                                                                                                   |                                                                                                                                       |                                              |       |           |       |    |    |           |     |           |   |            |
| Silica: see silicon Si                                                                                                                                                       |                                                                                                                                       |                                              |       |           |       |    |    |           |     |           |   |            |
| Silicon/silica Si                                                                                                                                                            |                                                                                                                                       |                                              |       |           |       |    |    |           |     |           |   |            |
| ■ 14794                                                                                                                                                                      | 0.005 - 5.00 mg/l Si<br>0.01 - 10.70 mg/l SiO <sub>2</sub>                                                                            | 10, 20, 50, 16, 28                           | 5     | 250438    | 300   | -  | ✓  | -         | ●   | ●         | ● |            |
| ■ 00857                                                                                                                                                                      | 0.5 - 500 mg/l Si<br>1.1 - 1070 mg/l SiO <sub>2</sub>                                                                                 | 10, 16                                       | 4/0.5 | 252046    | 100   | -  | -  | -         | ●   | ●         | ● |            |
| TP Si-1 TP (LR)                                                                                                                                                              | 0.005 - 0.748 mg/l Si<br>0.01 - 1.60 SiO <sub>2</sub>                                                                                 | 20, 28                                       | 10    | 251411    | 100   | -  | ✓  | -         | -   | ●         | ● |            |
| TP Si-2 TP (HR)                                                                                                                                                              | 0.3 - 46.7 mg/l Si<br>0.7 - 100 mg/l SiO <sub>2</sub>                                                                                 | 20, 16, 28                                   | 10    | 251412    | 100   | -  | ✓  | -         | -   | ●         | ● |            |
| TP Si-3 TP (HR)                                                                                                                                                              | 0.5 - 93 mg/l Si<br>1 - 200 mg/l SiO <sub>2</sub>                                                                                     | 20, 28                                       | 25    | 251422    | 100   | -  | ✓  | -         | -   | ●         | ● |            |
| Silver Ag                                                                                                                                                                    |                                                                                                                                       |                                              |       |           |       |    |    |           |     |           |   |            |
| ■ 14831                                                                                                                                                                      | 0.25 - 3.00 mg/l Ag                                                                                                                   | 10, 20, 16                                   | 10    | 250448    | 100   | -  | -  | -         | ●   | ●         | ● |            |
| (Total Ag: 100 °C oder 120 °C, 1 h) digestion reagents contained in test kit                                                                                                 |                                                                                                                                       |                                              |       |           |       |    |    |           |     |           |   |            |
| ● = round cuvette test; TC = cuvette test; CC = CombiCheck; ml = sample volume (photoLab®); 1) Ø 16, 28<br>■ = reagent tests; TP = powder test; SW = sea water; □ 10, 20, 50 |                                                                                                                                       |                                              |       |           |       |    |    |           |     |           |   |            |

Multi-parameter

pH

ORP

ISE

Dissolved Oxygen

Conductivity

BOD/Respiration

Photometry

Turbidity

Software, Documentation

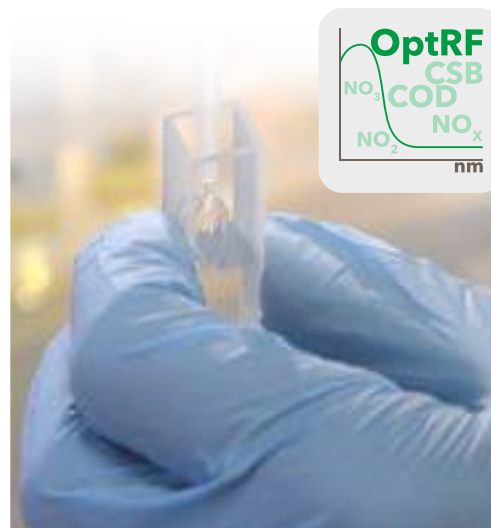
|                                                                                                                                                                                                   |                                                   |                                                      |        |           |        |    |    | photoLab® |     |           |   | pHotoFlex® |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------------------------------------------------------|--------|-----------|--------|----|----|-----------|-----|-----------|---|------------|
| Model                                                                                                                                                                                             | Measurement range<br>(max. specification)         | Cuvette (mm)1)<br>depending on<br>photometer         | ml     | Order No. | Total  | CC | SW | S6        | S12 | 6000/7000 |   |            |
| Sulfide/hydrogen sulfide S                                                                                                                                                                        |                                                   |                                                      |        |           |        |    |    |           |     |           |   |            |
| ● 14779                                                                                                                                                                                           | 0.020 - 1.50 mg/l S                               | 10, 20, 50                                           | 5      | 250450    | 220    | –  | –  | –         | ●   | ●         | – |            |
| Sulfite SO <sub>3</sub>                                                                                                                                                                           |                                                   |                                                      |        |           |        |    |    |           |     |           |   |            |
| ● 14394                                                                                                                                                                                           | 1.0 - 20.0 mg/l SO <sub>3</sub>                   | 16                                                   | 3      | 250416    | 25     | –  | –  | –         | ●   | ●         | – |            |
| ■ 01746                                                                                                                                                                                           | 1.0 - 60.0 mg/l SO <sub>3</sub>                   | 10                                                   | 2      | 252053    | 150    | –  | –  | –         | ●   | ●         | – |            |
| Sulphate SO <sub>4</sub>                                                                                                                                                                          |                                                   |                                                      |        |           |        |    |    |           |     |           |   |            |
| ● 14548                                                                                                                                                                                           | 5 - 250 mg/l SO <sub>4</sub>                      | 16                                                   | 5      | 250414    | 25     | ✓  | ✓  | ●         | ●   | ●         | ● |            |
| ● 00617                                                                                                                                                                                           | 50 - 500 mg/l SO <sub>4</sub>                     | 16                                                   | 2      | 252022    | 25     | ✓  | ✓  | ●         | ●   | ●         | – |            |
| ● 14564                                                                                                                                                                                           | 100 - 1000 mg/l SO <sub>4</sub>                   | 16                                                   | 1      | 250415    | 25     | ✓  | ✓  | ●         | ●   | ●         | – |            |
| ■ 14791                                                                                                                                                                                           | 25 - 300 mg/l SO <sub>4</sub>                     | 10                                                   | 2.5    | 250449    | 200    | ✓  | –  | ●         | ●   | ●         | – |            |
| TP                                                                                                                                                                                                | SO <sub>4</sub> -1 TP                             | 2 - 70 mg/l SO <sub>4</sub>                          | 20, 28 | 251413    | 100    | –  | ✓  | –         | –   | ●         | ● |            |
| TP                                                                                                                                                                                                | SO <sub>4</sub> -2 TP                             | 2 - 70 mg/l SO <sub>4</sub>                          | 20, 28 | 251423    | 100    | –  | ✓  | –         | –   | ●         | ● |            |
| Tensides                                                                                                                                                                                          |                                                   |                                                      |        |           |        |    |    |           |     |           |   |            |
| a-Ten<br>(anion.) ●                                                                                                                                                                               | 02552                                             | 0.05 - 2.00 mg/l SDSA                                | 16     | 5         | 252102 | 25 | –  | –         | –   | –         | ● | –          |
| c-Ten<br>(cation.) ●                                                                                                                                                                              | 01764                                             | 0.05 - 1.50 mg/l k-ten                               | 16     | 5         | 252062 | 25 | –  | –         | –   | ●         | ● | –          |
| n-Ten<br>(non-ion.) ●                                                                                                                                                                             | 01787                                             | 0.10 - 7.50 mg/l n-ten                               | 16     | 4         | 252061 | 25 | –  | –         | –   | ●         | ● | ●          |
| Tin Sn                                                                                                                                                                                            |                                                   |                                                      |        |           |        |    |    |           |     |           |   |            |
| ● 14622                                                                                                                                                                                           | 0.10 - 2.50 mg/l Sn                               | 16                                                   | 5      | 250401    | 25     | –  | ✓  | –         | ●   | ●         | – |            |
| TOC total organically-bound carbon                                                                                                                                                                |                                                   |                                                      |        |           |        |    |    |           |     |           |   |            |
| ● 14878                                                                                                                                                                                           | 5.0 - 80.0 mg/l TOC                               | 16                                                   | 3      | 252036    | 25     | –  | –  | ●         | ●   | ●         | – |            |
| ● 14879                                                                                                                                                                                           | 50 - 800 mg/l TOC                                 | 16                                                   | 3      | 252037    | 25     | –  | –  | ●         | ●   | ●         | – |            |
| Total nitrogen N <sub>ges</sub>                                                                                                                                                                   |                                                   |                                                      |        |           |        |    |    |           |     |           |   |            |
| ● 14537                                                                                                                                                                                           | 0.5 - 15.0 mg/l N <sub>ges</sub><br>(120 °C, 1 h) | 16                                                   | 10     | 250358    | 25     | ✓  | –  | ●         | ●   | ●         | ● |            |
| ● 14763                                                                                                                                                                                           | 10 - 150 mg/l N <sub>ges</sub><br>(120 °C, 1 h)   | 16                                                   | 1      | 250494    | 25     | ✓  | –  | ●         | ●   | ●         | – |            |
| ● 00613                                                                                                                                                                                           | 0.5 - 15.0 mg/l N <sub>ges</sub><br>(120 °C, 1 h) | 16                                                   | 10     | 252018    | 25     | ✓  | –  | ●         | ●   | ●         | – |            |
| TC                                                                                                                                                                                                | N <sub>tot</sub> 1 TC (LR)                        | 0.5 - 25.0 mg/l N <sub>ges</sub><br>(120°C, 30 min.) | 16     | 2; 2      | 251995 | 50 | –  | –         | –   | –         | ● | ●          |
| TC                                                                                                                                                                                                | N <sub>tot</sub> 2 TC (HR)                        | 10 - 150 mg/l N <sub>ges</sub><br>(120°C, 30 min.)   | 16     | 0.5; 2    | 251996 | 50 | –  | –         | –   | –         | ● | ●          |
| Total phosphate: see phosphate PO <sub>4</sub>                                                                                                                                                    |                                                   |                                                      |        |           |        |    |    |           |     |           |   |            |
| Water hardness, TH total hardness                                                                                                                                                                 |                                                   |                                                      |        |           |        |    |    |           |     |           |   |            |
| ● 00961                                                                                                                                                                                           | 0.7 - 30.1 °d,<br>5 - 215 mg/l Ca                 | 16                                                   | 1      | 252039    | 25     | –  | –  | ●         | ●   | ●         | ● |            |
| Water hardness, RH remaining hardness                                                                                                                                                             |                                                   |                                                      |        |           |        |    |    |           |     |           |   |            |
| ● 14683                                                                                                                                                                                           | 0.075 - 0.700 °d<br>0.50 - 5.00 mg/l Ca           | 16                                                   | 4      | 250404    | 25     | –  | –  | ●         | ●   | ●         | – |            |
| ● = round cuvette test;    TC = cuvette test;    CC = CombiCheck;    ml = sample volume (photoLab®);    1) Ø 16, 28<br>■ = reagent tests;    TP = powder test;    SW = sea water;    □ 10, 20, 50 |                                                   |                                                      |        |           |        |    |    |           |     |           |   |            |

|                                               |                                                |                                              |                                     |                                 |       |                             |    |    | photoLab® |           |   | pHotoFlex® |
|-----------------------------------------------|------------------------------------------------|----------------------------------------------|-------------------------------------|---------------------------------|-------|-----------------------------|----|----|-----------|-----------|---|------------|
| Model                                         | Measurement range<br>(max. specification)      | Cuvette (mm)1)<br>depending on<br>photometer | ml                                  | Order No.                       | Total | CC                          | SW | S6 | S12       | 6000/7000 |   |            |
| Zinc Zn                                       |                                                |                                              |                                     |                                 |       |                             |    |    |           |           |   |            |
| ● 00861                                       | 0.025 - 1.000 mg/l Zn                          | 16                                           | 2                                   | 252049                          | 25    | –                           | –  | ●  | ●         | ●         | ● |            |
| ● 14566                                       | 0.20 - 5.00 mg/l Zn                            | 16                                           | 0.5                                 | 250417                          | 25    | ✓                           | –  | ●  | ●         | ●         | ● |            |
| ■ 14832                                       | 0.05 - 2.50 mg/l Zn                            | 10                                           | 5                                   | 250451                          | 90    | –                           | –  | –  | ●         | ●         | – |            |
| 06146                                         | Extraction agent, required<br>(zinc reagent 6) |                                              |                                     | 250452                          | 180   |                             |    |    |           |           |   |            |
| ● = round cuvette test;<br>■ = reagent tests; |                                                | TC = cuvette test;<br>TP = powder test;      | CC = CombiCheck;<br>SW = sea water; | ml = sample volume (photoLab®); |       | 1) Ø 16, 28<br>□ 10, 20, 50 |    |    |           |           |   |            |

## OptRF: optical reagent-free methods for COD, NO<sub>3</sub> and NO<sub>2</sub> measurements

The OptRF measurement of a liquid sample is based on a direct, spectral absorbance measurement in the UV range of 200 - 390 nm without the use of reagents. The measured spectrum is evaluated across the entire wavelength range. The concentration value calculation takes place automatically via complex algorithms and evaluation models saved as OptRF methods on the photometer. The OptRF methods available are specific for the respective measurement parameters and the application and/or measurement location.

The OptRF methods currently available have been developed and optimized for municipal wastewater treatment plant processes, and cover the following measurement parameters and measurement ranges in standard solutions:



## Measurement parameters and areas of application

| OptRF measurement methods | Parameter                             | Measurement range related to measurements in standards |
|---------------------------|---------------------------------------|--------------------------------------------------------|
| 3001 CODt_H_Outlet_10     | COD <sub>total</sub> <sup>a</sup>     | 2 - 75 mg/L                                            |
| 3002 CODs_H_Outlet_10     | COD <sub>dissolved</sub> <sup>b</sup> | 2 - 75 mg/L                                            |
| 3003 NO3_H_Outlet_10      | NO <sub>3</sub> -N                    | 0.1 - 3.0 mg/L                                         |
| 3004 NO2_H_Outlet_10      | NO <sub>2</sub> -N                    | 0.1 - 4.0 mg/L                                         |

A user calibration can impact the borders of the measurement range for actual samples. OptRF methods can also be applied in samples with similar matrices, for example, certain surface waters. Other substances such as alcohols and sugar are not currently compatible with OptRF.

# Test equipment

## CombiCheck

CombiCheck solutions are ready-to-use multi-parameter standards. Every package contains a standard solution and an addition solution. Both solutions can be directly used, **without dilution**, for quality assurance.

- The standard solution ensures the accuracy of the results from the entire system: Work methods – analysis procedures – reagents – photometers.
- The addition solution allows you to check sample-dependent influences (MatrixCheck) through the measurement of the recovery rate and establishes the sample preparation necessary.

The maximum number of determinations with a CombiCheck standard solution depends on the test kit used. 280 determinations are always possible with the addition solution. Please take note of the instructions in the descriptions for the test kits!

| Parameter                        | Concentration                | Compatible test kit model                          | maximum number of determinations  |
|----------------------------------|------------------------------|----------------------------------------------------|-----------------------------------|
| <b>Model 14676 CombiCheck 10</b> |                              |                                                    | Order No. 250482                  |
| Ammonium                         | 4.00 mg/l NH <sub>4</sub> -N | A6/25<br>14558                                     | 90<br>90                          |
| Chloride                         | 25.0 mg/l Cl                 | 14730                                              | 90                                |
| COD                              | 80 mg/l COD                  | C3/25<br>14540                                     | 30<br>30                          |
| Nitrate                          | 2.5 mg/l NO <sub>3</sub> -N  | 14556<br>14773                                     | 45<br>60                          |
| Phosphate                        | 0.80 mg/l PO <sub>4</sub> -P | P6/25<br>14543<br>14848                            | 18<br>18<br>9                     |
| Sulphate                         | 100 mg/l SO <sub>4</sub>     | 14548<br>14791<br>00617                            | 18<br>40<br>48                    |
| <b>Model 14675 CombiCheck 20</b> |                              |                                                    | Order No. 250483                  |
| Ammonium                         | 12.0 mg/l NH <sub>4</sub> -N | 14544                                              | 180                               |
| Chloride                         | 60 mg/l Cl                   | 14730                                              | 90                                |
| COD                              | 750 mg/l COD                 | C4/25<br>14541                                     | 30<br>30                          |
| Nitrate                          | 9.0 mg/l NO <sub>3</sub> -N  | N2/25<br>14542<br>14563<br>14773<br>14942<br>09713 | 90<br>60<br>90<br>60<br>60<br>180 |
| Phosphate                        | 8.0 mg/l PO <sub>4</sub> -P  | P7/25<br>14729                                     | 90<br>90                          |
| Sulphate                         | 500 mg/l SO <sub>4</sub>     | 14564                                              | 90                                |
| <b>Model 14695 CombiCheck 50</b> |                              |                                                    | Order No. 250486                  |
| Ammonium                         | 1.00 mg/l NH <sub>4</sub> -N | 14739<br>14752                                     | 19<br>19                          |
| Nitrogen                         | 5.0 mg/l N <sub>ges</sub>    | 14537<br>00613                                     | 9<br>9                            |
| COD                              | 20.0 mg/l COD                | 14560                                              | 32                                |

|                                   |                              |                         |                  |
|-----------------------------------|------------------------------|-------------------------|------------------|
| <b>Model 14696 CombiCheck 60</b>  |                              |                         | Order no. 250487 |
| COD                               | 250 mg/l COD                 | 14690<br>14895          | 48<br>48         |
| Chloride                          | 125 mg/l Cl                  | 14897                   | 96               |
| <b>Model 14689 CombiCheck 70</b>  |                              |                         | Order No. 250488 |
| Ammonium                          | 50.0 mg/l NH <sub>4</sub> -N | 14559<br>00683          | 950<br>480       |
| COD                               | 5,000 mg/l COD               | 14555                   | 95               |
| Nitrogen                          | 50.0 mg/l N <sub>ges</sub>   | 14763                   | 95               |
| <b>Model 14738 CombiCheck 80</b>  |                              |                         | Order no. 250489 |
| COD                               | 1.500 mg/l COD               | 14691                   | 48               |
| Nitrate                           | 25.0 mg/l NO <sub>3</sub> -N | 14764                   | 190              |
| Phosphate                         | 15.0 mg/l PO <sub>4</sub> -P | 14729<br>P7/25          | 95<br>95         |
| <b>Model 18700 CombiCheck 90</b>  |                              |                         | Order No. 252501 |
| Cadmium                           | 0.250 mg/l Cd                | 01745<br>14834          | 9<br>19          |
| Copper                            | 2.00 mg/l Cu                 | 14553<br>14767          | 19<br>19         |
| Iron                              | 1.00 mg/l Fe                 | 14549<br>14761<br>00796 | 19<br>19<br>12   |
| Manganese                         | 1.00 mg/l Mn                 | 14770<br>00816          | 9<br>13          |
| <b>Model 18701 CombiCheck 100</b> |                              |                         | Order No. 252502 |
| Aluminum                          | 0.40 mg/l Al                 | 00594<br>14825          | 16<br>19         |
| Nickel                            | 2.00 mg/l Ni                 | 14554<br>14785          | 19<br>19         |
| Lead                              | 2.00 mg/l Pb                 | 14833<br>09717          | 19<br>11         |
| Zinc                              | 0.75 mg/l Zn                 | 00861<br>14832          | 9<br>19          |



## Standard solutions

| Parameter        | Conc.<br>[mg/l] | Amount<br>[ml]        | Model                     | Order no. |
|------------------|-----------------|-----------------------|---------------------------|-----------|
| Aluminum         | 1000            | 500                   | SL Al 19770               | 250460    |
| Ammonium         | 1000            | 500                   | SL NH <sub>4</sub> 19812  | 250461    |
| AOX              | 20              | 85 (8-16 tests)       | AOX 00680                 | 252026    |
| BOD              | 210             | 10 Fl.<br>for 10 x 1l | BOD 00718                 | 252030    |
| Boron            | 1000            | 500                   | SL B 19500                | 250463    |
| Cadmium          | 1000            | 500                   | SL Cd 19777               | 250464    |
| Calcium          | 1000            | 500                   | SL Ca 19778               | 250465    |
| Chloride         | 1000            | 500                   | SL Cl 19897               | 250466    |
| Chromate         | 1000            | 500                   | SL CrO <sub>3</sub> 19780 | 250468    |
| Chrome           | 1000            | 500                   | SL Cr 19779               | 250467    |
| COD 100          | 100             | 100                   | SL COD 100                | 252450    |
| COD 1500         | 400             | 30                    | SL COD 400                | 252451    |
| Copper           | 1000            | 500                   | SL Cu 19786               | 250473    |
| Flouride         | 1000            | 500                   | SL F 19814                | 250470    |
| Iron             | 1000            | 500                   | SL Fe 19781               | 250469    |
| Lead             | 1000            | 500                   | SL Pb 19776               | 250462    |
| Manganese        | 1000            | 500                   | SL Mn 19789               | 250474    |
| Nickel           | 1000            | 500                   | SL Ni 19792               | 250475    |
| Nitrate          | 1000            | 500                   | SL NO <sub>3</sub> 19811  | 250476    |
| Nitrite          | 1000            | 500                   | SL NO <sub>2</sub> 19899  | 250477    |
| Phosphate        | 1000            | 500                   | SL PO <sub>4</sub> 19898  | 250478    |
| Potassium        | 1000            | 500                   | SL K 70230                | 252471    |
| Silica (silicon) | 1000            | 500                   | SL Si 70236               | 252472    |
| Silver           | 1000            | 500                   | SL Ag 19797               | 250479    |
| Sulphate         | 1000            | 500                   | SL SO <sub>4</sub> 19813  | 250480    |
| TOC              | 1000            | 100                   | SL TOC 09017              | 250499    |
| Zinc             | 1000            | 500                   | SL Zn 19806               | 250481    |

List of the standard solutions that required regular fresh preparation due to limited stability:

- free chlorine
- bound chlorine
- formaldehyde
- hydrazine
- hydrogen sulfide
- phenol
- silicon
- sulfide
- sulphate
- anionic tensides
- hydrogen peroxide

## Order information: Test equipment

| Model                    | Description                        | Order No. |
|--------------------------|------------------------------------|-----------|
| <b>PhotoCheck 14693*</b> | Test equipment for photoLab®       | 250490    |
| <b>PipeCheck 14962</b>   | Test equipment for pipette volumes | 250498    |

\*) also for pHotoFlex upon request

## PhotoCheck

### AQA/IQC: comprehensive test equipment for the measurement's optics and linearity!

The stable color solutions facilitate the checking of the filter and the wavelength settings 445 nm/446 nm, 520 nm/525 nm and 690 nm.

With four solutions per wavelength, the accuracy of the wavelength settings and the linearity of the absorbance measurement are checked. The check takes place quickly and easily via a simple menu-guided function.

## PipeCheck

### Test equipment for the right pipette volume!

The use of the pipette to be tested leads to the dilution of the relevant test solution with dist. water and compares the absorbance of the diluted solution with the absorbance of a reference solution. Pipettes with variations in volume of more than 2.5% are identified as defective.



# General instructions

- **Certificates** for test kits marked ■ (coded reagent tests) and ● (coded round cuvette tests) can be found on our homepage at [www.WTW.com](http://www.WTW.com).
- **Storage:** If not stated otherwise, the test kit can be stored at +15 °C to +25 °C .
- We recommend regularly checking reagents and photometers, for example, with **PhotoCheck** and **CombiCheck**.
- Coded round cuvette tests are marked with ●. The external diameter of the cuvette is 16 mm. The round cuvette tests are quick tests with just one measurement range.
- Coded reagent tests are marked with ■. The measurement range specification is based on the total usable measurement range without pre-dilution of the sample and generally includes one (rectangular) cuvette switch.
- All reagent tests require a reaction vessel or RK 14/25 empty cuvettes and rectangular cuvettes.
- Not all cuvette types are recognized for the use of single-use cuvettes; We recommend the use of PMMA cuvettes (250 607).
- The labels "TC" and "TP" stand for test kits suitable for pHotoFlex® without a lot certificate. TCs are round cuvette tests in 16 mm cuvettes, TPs are powder tests and are measured depending on the measurement range in round cuvettes with external diameters of 28 or 16 mm..
- Round cuvettes are not suitable for multiple use.
- For some tests the measurement ranges are provided in a second citation form, for example, nitrate as nitrate (NO<sub>3</sub>) and as nitrate nitrogen (NO<sub>3</sub>-N). Further dimensions and citations forms which can be adjusted can be found in the operating manual for the photometer in use.
- Tests that require a **digestion** , for example, COD, are labeled with the digestion temperature and length (e.g. 148°C, 2 h). The WTW thermoreactors offer suitable programs for this purpose. For digestion, there are crack sets for heavy metals and total nitrogen (see *price list*).
- The current **analysis regulations** are contained in the respective packaging.

*The information for DIN/ISO/EN/US EPA and precise measurement ranges for the photometer models can be found in the price list.*

## Reagent-free tests

### % transmission

0 – 100% T, 10, 20 and 50 mm cuvettes (self absorption).

### Absorbance

Absorbance is proportionally connected with the concentration of a substance held in water as per the Beer Lambert Law  $E = \epsilon(\lambda) \cdot c \cdot d$ . The proportionality constant  $\epsilon(\lambda)$  depends on wavelength. These constants and further data, which are required for the determination of the substance contained in water, are stored as method data in modern photometers. The basic measurement size, however, is and remains the absorbance.

### Coloring (EN ISO 7887: 1994)

If pure water is viewed under directly transmitted light from a viewpoint of several meters away, it appears to be colored light blue. This coloring can change to a variety of colors in the presence of impurities. Natural waters are usually colored yellowish-brown by iron or clay particles, or by humic substances. (A green coloring may be caused by algae). The "real" coloring of a water sample can be determined following filtration through a 0.45 µm filter.

Usually most yellowish-brown-colored waters and runoff from communal wastewater treatment plants can be measured at 436 nm. The runoff from industrial wastewater treatment plants does not show any steep or pronounced absorbance maximum. To investigate these waters, they must

be measured at 436 nm (quicksilver line), while the other two measuring wavelengths of 525 nm and 620 nm can only deviate slightly from these wavelengths based on the filter used. The standard allows for discontinuous filter photometer measurements with spectral bandwidths from < 20 nm for measurements at 436 nm, 535 nm and 620 nm. Photometers with 445 nm- and 520 nm-interference filters with a bandwidth of 10 nm are therefore also suitable, for example. A spectrophotometer is required for comparison with the standard.

The result is provided in  $\text{m}^{-1}$  with the additional display of the measurement wavelengths and the spectral bandwidth, the water temperature, and the pH value. In some publications the result is also provided in CIT (color index transparency), which is identical to the result in  $\text{m}^{-1}$ . (DIN ISO 6271: 1988)

Clear liquids: Determination of the color index with the Platinum-Cobalt Scale (Hazen Color Index, APHA Color Index).

Spectrophotometers for the measurement of the stock solution with 430 nm, 455 nm, 480 nm and 510 nm are listed as suitable photometers. The actual measurement takes place as per the standard with a color comparison device enabling a visual comparison.

### Chrome bath

Reagent-free measurement of the self-coloring of a galvanizing bath: Pipette in a 5 ml sample to a 100 ml graduated cuvette, fill up to the mark with distilled water and mix well. Pipette in 4 ml of the diluted sample to a 100 ml graduated cuvette, fill up with distilled water and mix well. Add 5 ml of the 1:500-diluted sample to a glass with a screw top, add 5 ml 40% sulfuric acid. Seal the glass and mix the contents well. Decant into a rectangular cell for measurement

### Nickel bath

Reagent-free measurement of the self-coloring of a galvanizing bath: Fill a 5 ml sample with 5 ml 40% sulfuric acid in a round cuvette, seal and mix. Decant into a rectangular cell for measurement

### Copper bath

Reagent-free measurement of the self-coloring of a galvanizing bath: Add a 25 ml sample to a 100 ml

graduated cuvette, fill up to the mark with distilled water and mix well. Add 5 ml of the diluted sample to a glass with a screw top, add 5 ml 40% sulfuric acid. Seal the glass and mix the contents well. Decant into a rectangular cell for measurement

### SAC - spectral absorption coefficient

The spectral absorption coefficient is generally designated as SAC (unit  $1/\text{m}$ ) and photometrically determined as the sum of the dissolved organic substances contained in the water. In the area of drinking water, the SAC is usually measured at a wavelength of 436 nm, and at 254 nm in the wastewater sector. In doing so, differentiation must be made between clear and turbid samples. To be noted as a limitation is the fact that this summary determination can only be sensibly applied if the qualitative composition of the substances contained in the water does not significantly change. SAC methods are available in the photoLab® 6000/7000 Series.

### Further application methods for photoLab® 6000/7000

Application methods are photometric procedures usually based on completed test kits and which usually require multi-level steps. The selection of application methods is carried out manually via the input of the method number. A complete list of the programmed procedures can be found in the photometer's analysis regulations.

- ADMI color measurement
- Chlorophyll-a as per DIN
- Chlorophyll-a as per ASTM
- Chlorophyll-a, -b, -c as per ASTM
- Glucose
- TSS (total suspended solids)

# Turbidity measurement



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# Application areas and meters overview

The turbidity of a sample is a subjective perception and in shows variable effects in contrast to electrochemical or physical parameters. It is based on particles that are dispersed in a solution, of different sizes, differently shaped and movable. Turbidity measurement serves as a quality and indicator parameter in many applications.

● yes

✓ yes

– not recommended/not present

| Applications                                                          | Turb® 430 IR | Turb® 430 T | Turb® 355 IR |
|-----------------------------------------------------------------------|--------------|-------------|--------------|
| Turbidity in drinking water as per EN ISO 7027                        | ●            |             | ●            |
| Turbidity in drinking water as per US EPA 180.1                       |              | ●           |              |
| Official monitoring                                                   | ●            | ●           | ●            |
| Environmental monitoring                                              | ●            | ●           | ●            |
| Industry, quality control with IR 860 nm                              | ●            |             | ●            |
| Industry, quality control with halogen 560 nm                         |              | ●           |              |
| Service laboratories, mixed applications                              | ●            | ●           | ●            |
| Field applications and mobile QC                                      | ●            | ●           |              |
| <b>Properties</b>                                                     |              |             |              |
| Standard measurement < 1 NTU                                          | ✓            | ✓           | –            |
| AMCO Clear® calibration standards                                     | ✓            | ✓           | ✓            |
| AQA with documentation/protocol                                       | ✓            | ✓           | –            |
| Calibration interval                                                  | ✓            | ✓           | –            |
| Data management PC software LSdata (on request)                       | ✓            | ✓           | –            |
| LIMS connection via LSdata                                            | ✓            | ✓           | –            |
| PC port                                                               | ✓            | ✓           | –            |
| Battery/battery packs                                                 | ✓/✓          | ✓/✓         | ✓/–          |
| Data memory                                                           | ✓            | ✓           | –            |
| Software methods update                                               | ✓            | ✓           | –            |
| Standalone instrument / LabStation (as laboratory solution, optional) | ✓/✓          | ✓/✓         | –/–          |
| Carrying case kits                                                    | ✓            | ✓           | ✓            |
|                                                                       | Turb® 430 IR | Turb® 430 T | Turb® 355 IR |
| see page                                                              | 169          | 169         | 170          |



# Turbidity measurement: A parameter for quality control

In quality monitoring, the measured value "turbidity" is a meaningful indicator parameter. This applies e.g. for drinking water treatment, where the number of particles must be less than 1 NTU as a possible base for bacteria. In beverage production, in the chemical industry, in the production of vaccines or even fuels for engine development, turbidity is a quality control with "in-house" limit value definitions.

Undissolved solids in liquid, as e.g. algae, sludge, microbes or other particles, absorb and scatter light passing through. As the number of particles increases, the turbidity degree also increases noticeably for our eyes. The shape, size and composition of the particles influence the degree of turbidity. The measurement of the scattered light at a 90 ° angle has proven to be superior, especially in the low measuring ranges, and is therefore standard for measuring in drinking water control.



## Various standard specifications for drinking water monitoring

There are different types of measuring instruments that differ with respect to the light source: For standard-compliant measurements in accordance with ISO 7027 / DIN EN 27027 (EN ISO 7027), an IR LED (infrared) with a wavelength of 860 nm is required. The Standard Methods for the Examination of Water and Waste water / US EPA require a tungsten broadband light source ("white light").

## Infrared or white light depending on the application

For applications without standard specifications, the optimum solution is sought. As the turbidity measurement is often used for quality control, the measurement should be carried out in a previously internally defined measured value window.

- Infrared (IR) light sources minimize or eliminate the influence of coloring in a solution, as at the wavelength of 860 nm virtually no absorption takes place. It is therefore particularly advantageous for colored solutions. The detection sensitivity for small particles is somewhat lower at this wavelength due to the generally lower scattering of small particles.
- White light has a higher sensitivity for small particles, on the other hand an intrinsic coloring of the solution has a reinforced disturbing factor.

## Various measuring methods

Especially in the field of industrial quality control, different methods are used: In addition to the nephelometric measurement with 90 ° scattered light for low turbidity values, the transmitted light method at 180 ° is advantageous for medium and higher turbidity, as the scattered light and the shadow effect between the particles increases with increasing turbidity and the decrease of the light intensity provides a more accurate result.

Depending on the manufacturer or industry, the ratio method measures at different angles and calculates the results. There is no single standard for this.



Turbidity measuring cuvette and standard cuvette

## AMCO Clear® turbidity standards

- **±1% Production accuracy**
- **High precision and long-term stability**
- **Does not pose a health hazard**
- **Easy to dispose of**

The calibration of turbidity meters is based on the reproduction of differently sized and shaped particles in the real world. The turbidity standards AMCO Clear® for Turb® instruments are polymeric calibration standards with a defined particle composition and are distinguished from formazine by significantly higher result accuracy and stability without drift behavior. The conventional formazine standards with a tolerance of 5-10% are compared with the production accuracy with regard to the particle composition of 1%. They are batch-certified and N.I.S.T. traceable to formazine.

The standards are optimally matched in the particle composition to the respective instrument optics and are particularly well suited for applications in the lowest measuring range such as drinking water.



AMCO Clear turbidity standards

# Mobile turbidity meter with laboratory quality

## Turb® 430 IR/Turb® 430 T

The Turb® 430 series turbidity meters are equally well suitable for portable and laboratory use due to their accuracy and laboratory comfort. They cover the measuring range of 0.02-1100 NTU / FNU for nephelometric measurements with 90° scattered light.

Turb® 430 IR fulfils the requirements of DIN 27027/ISO 7027, Turb® 430 T those of US EPA 180.1. The turbidity meters are characterised by many extras:

- Intuitive operation with menu navigation
- Automatic measuring range switching
- Simple and high precision calibration
- AQA by means of calibration protocol and calibration interval adjustment
- 1000 data sets can be stored
- Sample identification number (ID)
- Scattered light behaviour as per Pharmacopoeia 9
- Data output
- Optional PC software LSdata for convenient data management (see page 175)

Turb® 430 turbidity meter with AMCO Clear® turbidity standards

- **Highest precision from 0.02 NTU**
- **According to DIN/EN ISO and US EPA**
- **AQA with GLP-complying documentation**



**2 year**  
guarantee

**IP 67**

**CE**





## Portable turbidity measurement with the Turb® 430 Series

- **Mobile Laboratory quality**
- **Safe working on site**
- **GLP-compliant documentation**

For the mobile monitoring of the drinking water quality of wellheads, cisterns and springs or for environmental monitoring and measurement at various production sites, there is the practical carrying case kit with a small "laboratory table", battery pack and the PC software LSData for data management.



The mobile turbidity laboratory - the carrying case kits for Turb® 430 IR/T

## Turbidity measurement in the laboratory with the Turb® 430 Series

- **Highest precision**
- **Data memory and sample ID**
- **Documentation via PC software LSdata (see page 175)**
- **Optional LabStation**

The precision optics together with the long-term stable calibration through the AMCO Clear® turbidity standards and GLP-compliant documentation make the Turb® 430 series the ideal partner for service laboratories, health authorities and manufacturing industry, wherever mobile as well as laboratory use is required.

Turb® 430 turbidity meter with LabStation in mineral water industry



## Turb® 355 T / Turb® 355 IR

- 0 - 1100 NTU/FNU
- Simple operation
- Quality control > 1 NTU



Turb® 355 IR/T field case set

2 year  
guarantee

IP 67

**Small, portable turbidity meters**

Battery-powered turbidity meter with Infrared LED (860 nm) for nephelometric measurements in accordance with ISO 7027/DIN EN 27027 (EN ISO 7027) or as white light model with tungsten lamp in accordance with US EPA.

It is handy, light and very easy to use.

The Turb® 355 IR/T is supplied as a kit in a small carrying case, which contains all necessary accessories (calibration standards 0.02 – 10.0 and 1000 NTU, empty cuvettes and batteries). The instrument operates with 4 MICRO (AAA) Alkali manganese batteries.

## Technical specifications: Turbidity meters

|                                        | Turb® 430 IR / Turb® 430 T                                                                   | Turb® 355 IR / 355 T                                                                                                                               |
|----------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Measurement principles</b>          | Nephelometric (90° scattered light)                                                          | Nephelometric (90° scattered light)                                                                                                                |
| <b>Light source</b>                    | IR LED / Tungsten lamp                                                                       | IR-LED/Tungsten lamp                                                                                                                               |
| <b>Measuring ranges</b>                | <b>NTU</b> 0.02 - 1100 / 0 - 1100<br><b>FNU</b> 0.02 - 1100                                  | 0 - 1100<br>0 - 1100                                                                                                                               |
| <b>Resolution</b>                      | 0.01 for the range 0.00 - 9.99<br>0.1 for the range 10 - 99.90<br>1 for the range 100 - 1100 | 0.01 NTU in the range 1 - 9.99<br>0.1 NTU in the range 10.0 - 99.9<br>1 NTU in the range 100 - 1000                                                |
| <b>Accuracy</b>                        | 0.01 NTU or ±2 % of the measured value                                                       | ±2 % of the measured value or ±0.1 NTU<br>last decimal point in the range 1 ... 500 NTU<br>±3% of the measured value in the range 500 ... 1100 NTU |
| <b>Repeatability</b>                   | <0.5 % of the measured value or 0.01 NTU/FNU                                                 | ±1% of the measured value or ±0.05 NTU/FNU                                                                                                         |
| <b>Calibration</b>                     | Automatic 3 point calibration                                                                | Automatic 1...3 point calibration                                                                                                                  |
| <b>Response time</b>                   | Approx. 3 seconds (IR) / approx 7 seconds (T)                                                | 14 seconds                                                                                                                                         |
| <b>Cuvette</b>                         | 28 x 60 mm, 20 ml sample volume                                                              | 25 x 45 mm, 15 ml sample volume                                                                                                                    |
| <b>Interface</b>                       | RS 232, USB via adapter                                                                      |                                                                                                                                                    |
| <b>Particular calibration protocol</b> | Yes                                                                                          | —                                                                                                                                                  |
| <b>Functions Measured value memory</b> | 1000                                                                                         | —                                                                                                                                                  |
| <b>RS 232</b>                          | Yes                                                                                          | —                                                                                                                                                  |
| <b>Date/time:</b>                      | Yes                                                                                          | —                                                                                                                                                  |
| <b>Data evaluation</b>                 | Yes                                                                                          | —                                                                                                                                                  |
| <b>Battery</b>                         | optional                                                                                     | —                                                                                                                                                  |
| <b>Operating temperature</b>           | 0 - +50 °C                                                                                   | 0 - +50 °C                                                                                                                                         |
| <b>Power Supply</b>                    | 4 Mignon (AA) for approx. 3000 measurements                                                  | 4 MICRO (AAA) Alkaline batteries sufficient for more than 1,500 measurements                                                                       |



## Order information: Turbidity meters

| Model                                                                                                          | Description                                                                                                                                                                       | Order no. |
|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Turb® 355 IR</b>                                                                                            | Portable meters a carrying case as per ISO 7027 / DIN EN 27027 (EN ISO 7027), with 3 calibration standards 0.02 - 10.0 - 1000 NTU                                                 | 600311    |
| <b>Turb® 355 T</b>                                                                                             | as Turb® 355 IR, but with tungsten light source as per US EPA 180.1                                                                                                               | 600312    |
| <b>Turb® 430 IR</b>                                                                                            | Portable turbidity meter for nephelometric measurements (90 °) according to DIN EN 27027, incl. calibration kit 0.02 - 10 - 1000 NTU, suitable for drinking water                 | 600320    |
| <b>Turb® 430 T</b>                                                                                             | as Turb® 430 IR, but with tungsten light source as per US EPA 180.1                                                                                                               | 600325    |
| <b>Turb® 430 IR/SET</b>                                                                                        | Portable turbidity meter (90 °) with infrared light source as per DIN EN 27027 in a field carrying case with table insert, calibration set 0.02 - 10.0 - 1000 NTU and accessories | 600321    |
| <b>Turb® 430 T/SET</b>                                                                                         | as Turb® 430 IR/SET, but with tungsten light source as per US EPA 180.1                                                                                                           | 600326    |
| For additional products, sets, and accessories, see price list or <a href="http://www.WTW.com">www.WTW.com</a> |                                                                                                                                                                                   |           |



Multi parameter

pH

ORP

ISE

Dissolved Oxygen

Conductivity

BOD/Respiration

Photometry

Turbidity

Software, Documentation

# Software, documentation



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## Content

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# Software and data documentation

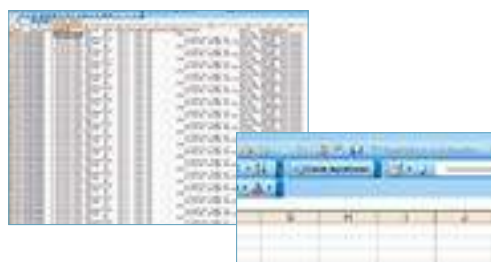
Documentation of measurement data for the storage and, further processing, is an important task to be completed. Tailor-made programs for each product are available:

## MultiLab® Importer

**For the transfer of measurement data incl. sensor and instrument parameters to Excel®; for MultiLine®, ProfiLine and inoLab® meters**

The MultiLab® Importer is a free Excel® add-in for the simple transfer of measurement values

- Automatic recognition of the connected device
- Structured data structure for quick processing
- Clear documentation of the calibration protocol via text fields



Software screenshots

## MultiLab® User

**For setting up user administration; for all current MultiLine® or inoLab® Multi IDS meters (Multi 3510 IDS, 3620 IDS, 3630 IDS, inoLab® Multi 9310 IDS, 9620 IDS, 9630 IDS)**

- User administration setup as per GLP/GMP guidelines
- Up to 50 users with password possible
- Three access levels with different authorizations
- Password-protected administrator access
- Traceability through the allocation of measurement data/users
- For Multi 3620 IDS, 3630 IDS, inoLab® Multi 9620 IDS and 9630 IDS: Individual digital designation of IDS sensors possible

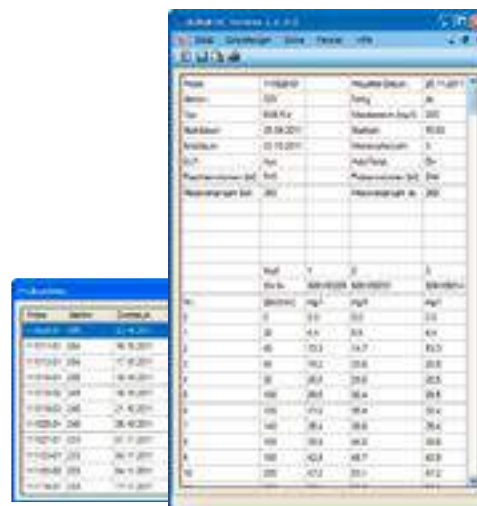


## ACHAT OC

### For the recording of measurement data; for OxiTop® Controller OC 100 or OC 110 (free download)

The Achat OC is a program compatible with the most recent PC environments for the recording of data from the OxiTop® Control systems. With a redesigned interface, it presents the data clearly and ensures the export in \*.csv format.

- Import of all data from the controller
- Export for processing in Excel or CSV format
- Simple data transfer with one mouse click



## photoLab® color – color measurement instead of color perception

### For PC-controlled color measurement; for photoLab® 7100 VIS and 7600 UV-VIS

photoLab® color offers a clear and intuitive user interface for multiple measurements, method switches, and direct data management and printouts of the measuring results.

- CIE color measurement XYZ, x,y,z, CIE-L\* a\* b\*,
- CIE-L\* u\* v\*
- Hazen (Pt-Co)
- Yellowness index
- ADMI color number
- ASTM
- Gardner
- Sugar color ICUMSA
- Beer color as per EBC and ASBC
- Iodine color number



Software screenshots

## photoLab® Data spectral

### For simple data management; for the photoLab® 6000/7000 Series

- GLP-compliant data management
- Convenient data transfer from measurement instrument to the PC for processing (e.g. with LIMS, XLS, CSV)
- Export of spectra in specialist software for the comprehensive display and processing of spectra
- Reconciliation of methods, profiles and meter updates in several photometers

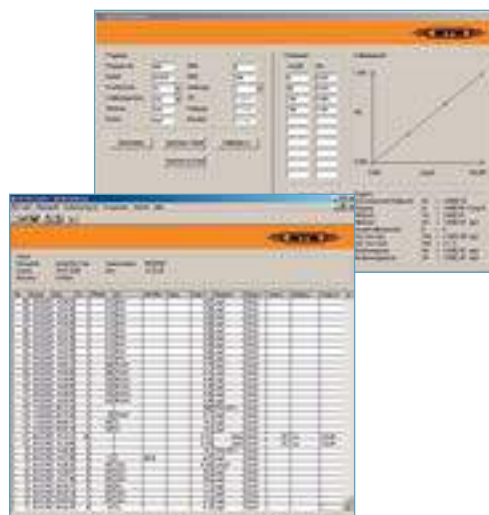


## LSdata

### Simple data management for the photoFlex® and Turb® 430 Series

The LSdata PC software for photoFlex®/Turb® 430 meters offers a clear interface for:

- GLP-compliant data transfer (CSV/Excel format)
- The creation and management of user-defined methods via a clear dialog window
- Automatic calculation of the calibration curve for custom-defined methods, method reconciliation between PC and meter(s)
- Documentation of calibration protocols



## Overview meters software/connection cable PC or printer

MI = MultiLab® Importer    Mp = MultiLab® pilot    AO = ACHAT OCMA = Multi/ACHAT II    pDS = photoLab® Data spectral    LS = LSdata  
b = bidirectional    r = remote-controlled    u = unidirectional

| meter                                                                      | Software | Connection cable  | Type | meter (discontinued) | Software | Connection cable | Type |
|----------------------------------------------------------------------------|----------|-------------------|------|----------------------|----------|------------------|------|
| inoLab® pH 7310                                                            | MI       | AK USB A-Mini     | b    | pH 340i              | Mp       | AK 340/B         | b    |
| inoLab® Oxi 7310                                                           | MI       | AK USB A-Mini     | b    | Oxi 340i             | Mp       | AK 340/B         | b    |
| inoLab® Cond 7310                                                          | MI       | AK USB A-Mini     | b    | Cond 197i, 1970i     | Mp       | AK 340/B         | b    |
| inoLab® pH/ION 7320                                                        | MI       | AK USB A-Mini     | b    | Cond 340i            | Mp       | AK 340/B         | b    |
| inoLab® Multi 9310 IDS                                                     | MI       | AK USB A-Mini     | b    | pH 197i, 1970i       | Mp       | AK 340/B         | b    |
| inoLab® Multi 9420 IDS, 9620 IDS                                           | MI       | AK USB A-Mini     | b    | pH/Cond 340i         | Mp       | AK 340/B         | b    |
| inoLab® Multi 9430 IDS, 9630 IDS                                           | MI       | AK USB A-Mini     | b    | pH/ION 340i          | Mp       | AK 340/B         | b    |
| pH 3310                                                                    | MI       | AK USB A-Mini     | b    | pH/Oxi 340i          | Mp       | AK 340/B         | b    |
| Oxi 3310                                                                   | MI       | AK USB A-Mini     | b    | inoLab® 730          | Mp       | AK 340/B         | b    |
| Cond 3310                                                                  | MI       | AK USB A-Mini     | b    | inoLab® 735          | Mp       | AK 340/B         | b    |
| pH/Cond 3320                                                               | MI       | AK USB A-Mini     | b    | inoLab® Level 2      | Mp       | AK 340/B         | b    |
| Multi 3320                                                                 | MI       | AK USB A-Mini     | b    | Multi 197i, 1970i    | Mp       | AK 340/B         | b    |
| pH 3310 IDS                                                                | MI       | AK USB A-Mini     | b    | Multi 340i           | Mp       | AK 340/B         | b    |
| Oxi 3310 IDS                                                               | MI       | AK USB A-Mini     | b    | Multi 350i           | Mp       | AK 340/B         | b    |
| Cond 3310 IDS                                                              | MI       | AK USB A-Mini     | b    | Oxi 197i, 1970i      | Mp       | AK 340/B         | b    |
| MultiLine® IDS: Multi 34x0, Multi 3510 IDS, Multi 3620 IDS, Multi 3630 IDS | MI       | AK USB A-Mini     | b    | Oxi 3315             | MI       | AK USB A-Mini    | b    |
| pHotoFlex® Series                                                          | LS       | AK 540 B, ADA USB | u    |                      |          |                  |      |
| photoLab® S6, S12                                                          | MA       | AK Laboratory     | b    |                      |          |                  |      |
| photoLab® 6000/7000 Series                                                 | pDS      | Standard cable    | b    |                      |          |                  |      |
| Turb® 430 Series                                                           | LS       | AK 540 B, ADA USB | u    |                      |          |                  |      |
| OxiTop® OC 100/110                                                         | AO       | AK 540 B          | u    |                      |          |                  |      |

#### Note:

USB adapter without cable for meters with RS232 interface available; meters-compatible cable required.

## Order information: Software

| Item                                                     | Description                                                                                  | Order No. |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------|
| <b>KOM pilot</b>                                         | Communications package, consisting of: 1 x MultiLab® pilot and one AK 340/B connection cable | 902915    |
| <b>photoLab® color + photoLab® Data spectral</b>         | PC software for color measurement and for simple data management                             | 902763    |
| <b>LSdata</b>                                            | PC software for pHotoFlex®/Turb® 430 Series                                                  | 902762    |
| <b>Multi/ACHAT II</b>                                    | Software for PC in Windows, German and English                                               | 902750    |
| <b>KOM Labor</b>                                         | Communications package, consisting of: 1 x Multi/ACHAT II and 1 AK Labor                     | 902754    |
| <b>ADA USB/Ser</b>                                       | USB adapter to serial interface RS 232 (9-pin socket)                                        | 902880    |
| For connection cables/further accessories see price list |                                                                                              |           |



# Services/ certificates



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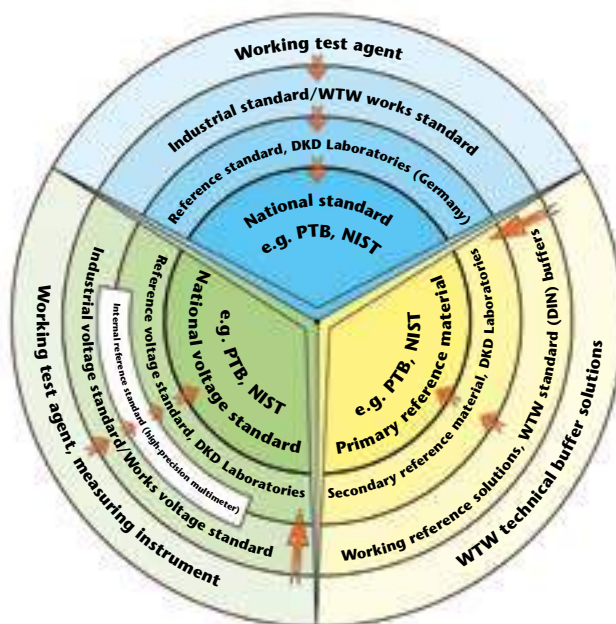
# Certified, traceable reagents

Measurements are naturally afflicted with errors. This particularly applies for the calibration of meters and sensors. To be able to quantify these errors you have to indicate the deviation of the measurement value in comparison to national or international standards. In a figurative sense, these are the "original meter" for the relevant measurement sizes.

In chemical analysis reference materials are used which are measured by metrological equipment. The uncertainty of the measurement value for any such material is documented. Such institutes include, for example, the National Institute of Standards, NIST, Gaithersburg USA) and the Physikalisch-Technische Bundesanstalt (PTB, Braunschweig).

Comparative measurements in further stages derive secondary, tertiary, etc. materials from the primary reference materials. Each stage sees uncertainties in relation to the "original meter" which meets the requirements of the measurement equipment and procedures. It is important that the calibration of a measurement system can be traced back in an unbroken chain with defined uncertainty to the relevant standard.

In practice, work reference buffer solutions are used, which are obtained by comparison with primary or secondary material. WTW pH buffers meet these needs. Certificates document the respective uncertainty of the pH value of the solution.



## IQ/OQ/PQ qualifications

Xylem Analytics Germany offers the qualification of measurement systems, particularly for the pharmaceutical industry. The basis for this is the design qualification based on the requirements for the measurement system. Here the customer states what they would like to measure, in what environment, and how this measurement task should be fulfilled.

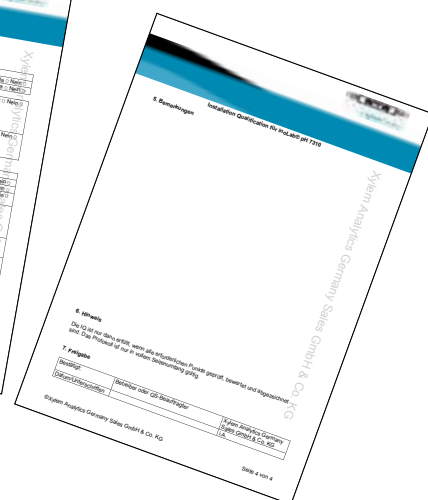
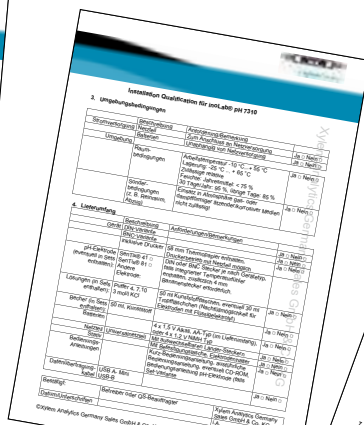
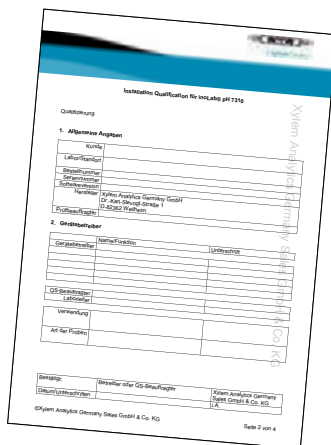
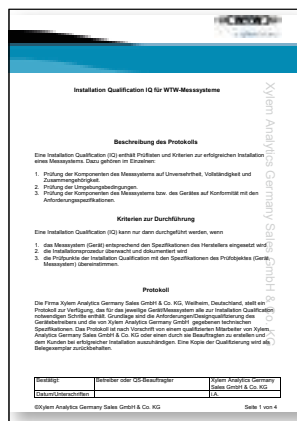
Following the selection of a suitable system, Xylem Analytics Germany can, upon request, provide documentation for the qualification of the system on-site. This will be carried out by one of our employees following on a mutually arranged date.

In the **Installation Qualification (IQ)** the scope of supply is checked for completion and appropriateness and attention is paid to compliance with the environmental conditions. The documentation is prepared via a pre-printed record to be signed.

The **Operational Qualification (OQ)** helps monitor the correct functioning of the meter under the conditions specified. The calibrations carried out for this have the advantage that the

measurement values can be checked against certified reference materials (exception: dissolved oxygen). Here too the results are recorded.

For the **Performance Qualification (PQ)** the customer receives appropriate templates from us which they can generally use for two requirements: for routine monitoring on the one hand, and for a fault procedure on the other. In addition, they can copy the templates provided as much as necessary.



Xylem Analytics Germany offers IQ/OQ/PQ documentation for the following WTW meters inoLab® 7110, 7310, 9310 IDS, 9620 IDS, 9630 IDS, 7320 (pH only). MultiLine® IDS upon request.

## Certifications

Calibration of measurement systems for the determination of conductivity, pH value and oxygen released in aqueous solutions

### The certification per DIN ISO 9001 assumes test equipment monitoring

The correct functioning of the test equipment used is a set prerequisite for the accuracy and comparability of measurement values. As a result, regularly monitoring the precision of every test equipment after a set period of use alongside a calibration counts as one of the primary rules of **quality assurance** and **good laboratory practice**.

This is a task facing a constantly growing number of businesses and laboratories which are aiming for or have already achieved the certification of their QA system as per the DIN ISO 9001 series of standards.

### Why you should use the manufacturer's specialist knowledge

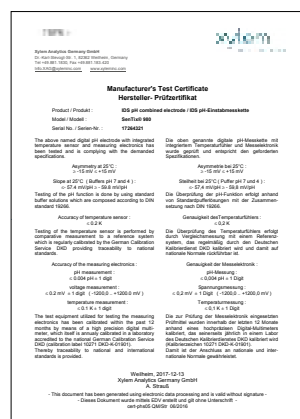
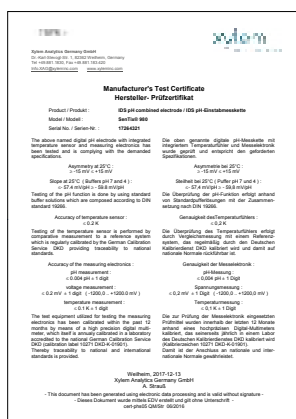
Specially-qualified staff with specific knowledge of the relevant meters are required for correct calibration and suitable calibration means must be used. As a result it is usually more efficient and more economical to have an inspection of test equipment carried out by an external calibration laboratory or even by the manufacturer.

We are here for you as a competent partner and can carry out this service for all WTW measurement systems for the determination of pH value, conductivity and dissolved oxygen.

We have been ISO 9001-certified since 1993 and are experts of the standard's requirements. Our calibration devices conform with national standards. Calibration equipment for which no national norms exist are manufactured in accordance with acknowledged national and international standard procedures.

We can carry out a manufacturer calibration and provide you a calibration certificate.

If required, we can also carry out the inspection of test equipment for our photometers and BOD meters. We are happy to advise you.



## Freely available certificates (Certificates available free of charge)

### Certificate of compliance

General certificate (without provision of a serial number) certifying that the product conforms with the technical data laid down in the operating manual. The certificate does not carry a signature and is free of charge.

### Manufacturer's test certificate

Individual certificate (with provision of the serial number) stating that the product has been checked and the accuracy specifications listed in the certificate have been fulfilled. Contains a passage regarding the regular calibration of the test equipment used by us and its traceability as per national and international standards. Provides the customer as proof for the purposes of the ISO 9001.

### Certificates for brand new products:

These certificates are provided for all meters. The certificate does not carry a signature and is free of

charge. If required, it can be obtained from us up to three months after the purchase of the meter or sensor.

### CE conformance declarations

Declaration of the product's conformity with the applicable EU guidelines.

### Manufacturer's certificate for calibration solutions

For the pH buffer solutions and the conductivity calibration solutions offered in our product range, upon ordering or within 3 months of purchase we can issue a manufacturer's certificate in which the controlled manufacture is certified on the basis of national or international standards.

## Calibration certificates with additional costs

### Calibration certificates for meters

The meter's measurement functions are calibrated independently of the sensor under the use of electrical standards.

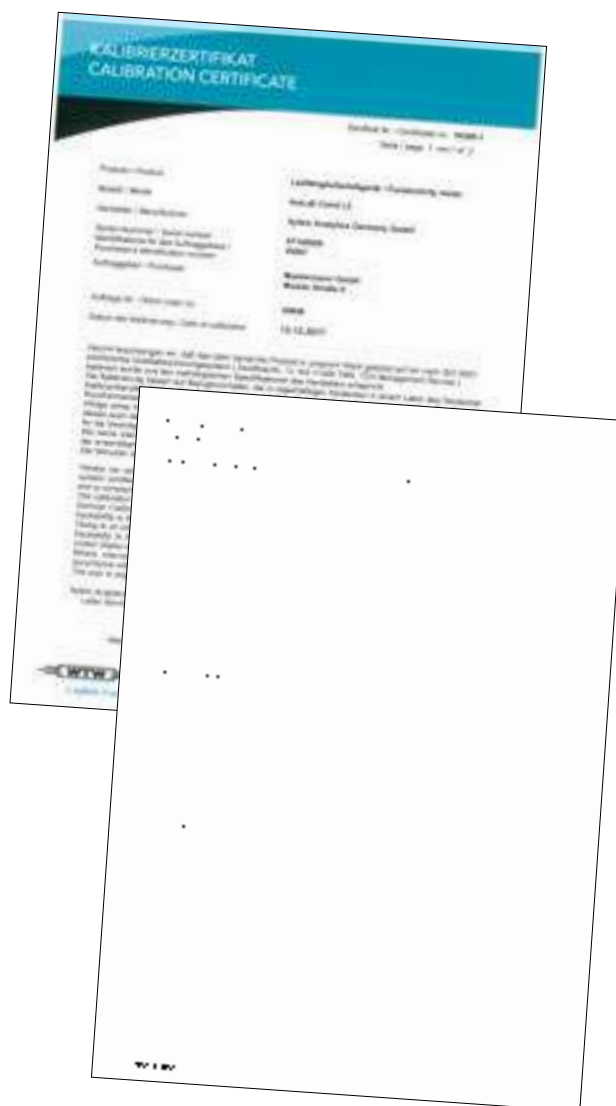
### Calibration certificate for sensors

The calibration will be made with pH electrodes and conductivity-cells by using calibration solutions. For dissolved oxygen sensors, the slope is calibrated using vapor-saturated air and the zero current will be calibrated with a zero solution or pure nitrogen.

pH electrodes and dissolved oxygen sensors are underlying a slow altering of their specifications ("ageing"). As a result, these must be re-calibrated by the user at regular intervals, as described in the operating manual of the corresponding meter.

### Certificates for used products

Upon customer request, in connection with a repair order. Test dates are stored in a record. The certificate is signed by QM representatives and invoiced.





| Highlights |                                                                                                                                                                                                                                                                                                                                                                                           |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1954       | Introduction of the first WTW pH meter                                                                                                                                                                                                                                                                                                                                                    |
| 1965       | Introduction of the first WTW oxygen sensor                                                                                                                                                                                                                                                                                                                                               |
| 1982       | Introduction of the first zero current-free (zero point-stable) dissolved oxygen sensor in the world for field measurements                                                                                                                                                                                                                                                               |
| 1983       | Introduction of online measurement technology                                                                                                                                                                                                                                                                                                                                             |
| 1986       | First provider of a 3-electrode dissolved oxygen sensor (TriOxmatic®) with fully automated precision air calibration (OxiCal®)                                                                                                                                                                                                                                                            |
| 1987       | First provider of a 4-electrode conductivity sensor (TetraCon®) for water analysis                                                                                                                                                                                                                                                                                                        |
| 1993       | First ISO 9001-certified manufacturer of O <sub>2</sub> , pH, conductivity measurement systems                                                                                                                                                                                                                                                                                            |
| 1995       | <ul style="list-style-type: none"> <li>• Introduction of the mercury-free system, <b>OxiTop®</b> for BOD determination.</li> <li>• First global provider of transmitters with integrated lightning protection</li> </ul>                                                                                                                                                                  |
| 1997       | The new <b>photoLab®</b> laboratory photometers combine exemplary technical measurement precision with ease of use                                                                                                                                                                                                                                                                        |
| 1998       | <ul style="list-style-type: none"> <li>• With the <b>PurCon®</b> sample preparation system WTW succeeds in the replacement for traditional filtration systems</li> <li>• First WTW spectrophotometer</li> </ul>                                                                                                                                                                           |
| 1999       | The new laboratory meters from the <b>inoLab®</b> family set new standards in the measurement of pH, O <sub>2</sub> , conductivity, ISE and temperature                                                                                                                                                                                                                                   |
| 2000       | Introduction of <b>TresCon®</b> , the modular analysis system for the continuous measurement of ammonium, nitrite, nitrate, phosphate                                                                                                                                                                                                                                                     |
| 2001       | <ul style="list-style-type: none"> <li>• <b>IQ SENSOR NET</b> - the multi-parameter measurement system offers unlimited possibilities for online measurement</li> <li>• The new <b>VisoTurb®</b> and <b>ViSolid®</b> turbidity and TSS (total suspended solids) sensors, with their revolutionary ultrasound cleaning system, bring a whole new dimension to "low-maintenance"</li> </ul> |
| 2002       | • <b>AmmoLyt® 700 IQ</b> facilitates reliable online "in-situ measurement" of ammonium                                                                                                                                                                                                                                                                                                    |
| 2003       | <b>NitraLyt® 700 IQ</b> expands the AmmoLyt® with an additional nitrogen parameter (nitrate) in online "in-situ" measurements                                                                                                                                                                                                                                                             |
| 2004       | <ul style="list-style-type: none"> <li>• The multi-parameter <b>Multi 350i</b> instrument sets standards for portable meters.</li> <li>• The spectral sensors <b>NitraVis®</b>, <b>CarboVis®</b> and <b>NiCaVis®</b> are introduced for online carbon, nitrate, and suspended solids measurements in wastewater</li> </ul>                                                                |
| 2005       | <ul style="list-style-type: none"> <li>• Portable photometers and turbidity meters for universal use: <b>pHotoFlex®/pHotoFlex® Turb/Turb 430 IR</b></li> <li>• <b>IQ SENSOR NET</b> System 182 - the compact 2-channel measurement system</li> </ul>                                                                                                                                      |



a xylem brand

## About us

As a brand of Xylem Analytics Germany GmbH, rich in tradition, we see our task in using our expertise and innovative technologies to find solutions for our customer's measurement tasks.

You can find out more about Xylem on our website: [www.xyleminc.com](http://www.xyleminc.com)

### Laboratory and field meters

With the slogan "We supply know-how", our more than 70 years of experience have resulted in a comprehensive product range of pH, ORP, conductivity, oxygen/BOD/respirometric and turbidity meters as well as photometers with reagents. The product range includes both robust, waterproof portable meters and modern laboratory meters with versatile accessories. A variety of multi-parameter instruments made with state-of-the-art technology cover a wide spectrum of measurement parameters for laboratory and field applications.

The WTW IDS sensors convert the measurement values within the sensor directly into fail-safe digital signals and transfer these to the connected meters, guaranteeing a maximum level of precision and security. As a result they form the core of a comprehensive system of digital MultiLine® portable and inoLab® laboratory meters.



We have taken the further step of using wireless modules to make the IDS system independent of sensor cables. The new MultiLine® and inoLab® meters therefore represent the state-of-the-art in electrochemical measurement technology.

We also offer top technology with our optical systems in the form of the spectrophotometers of the photoLab® 7000 Series for the UV and VIS range.

### Online systems

For many years the IQ SENSOR NET has been a technology leader in wastewater quality measurement. It can be used both as single on-site measurement and in a network.

Here too the innovative digital sensors represent the heart of the system. As a result the IQ SENSOR NET is the most flexible digital multi-parameter system for one to 20 measurement points.

With the new MIQ/MC3 controller family with integrated USB and LAN interfaces, the IQ Sensor Net System is expanded to internet communication via TCP/IP technology.

### Service

With over more than 70 years of existence, the WTW brand has established a first-class reputation through its exemplary customer-support. Our Care Center is ready to find an individual solution for any customer's measurement problems. WTW's comprehensive application collection, in connection with expert application specialists, ensures fast solutions for technical challenges. The dealer and service network extends around the world.

As before, the largest percentage of our products are produced at our facility in Weilheim in Upper Bavaria, south of Munich, by nearly 400 employees – quality-measurement technology with expert support, "Made in Germany".

| Highlights |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2006       | <ul style="list-style-type: none"> <li>• <b>VARiON®</b> multisensor for ammonium and nitrate with dynamic compensation</li> </ul>                                                                                                                                                                                                                                                                                                       |
| 2007       | <ul style="list-style-type: none"> <li>• The new optical online dissolved oxygen sensor <b>FDO® 700 IQ</b></li> <li>• The new spectrophotometers of the <b>photoLab® 6000</b> Series combine systematic and spectral analysis with proven AQA quality assurance</li> </ul>                                                                                                                                                              |
| 2008       | <p>Further development of the IQ SENSOR NET system:</p> <ul style="list-style-type: none"> <li>• New <b>TC 2020 XT</b> terminal/controller with USB and dual-processor function</li> <li>• <b>System 182 XT-4:</b> for up to four sensors</li> <li>• <b>IQ LabLink</b> combines online measurement with laboratory calibration</li> </ul>                                                                                               |
| 2009       | The new <b>ProfiLine</b> single parameter portable meters offer the highest levels of robustness and ease of use                                                                                                                                                                                                                                                                                                                        |
| 2010       | <p><b>MultiLine® IDS</b> – the new digital world:</p> <ul style="list-style-type: none"> <li>• <b>MultiLine®</b> – the digital multi-parameter portable meters and</li> <li>• <b>FDO® 925</b> – the new optical dissolved oxygen sensor for field and laboratory</li> </ul>                                                                                                                                                             |
| 2011       | <b>inoLab® Multi IDS</b> – IDS technology for the laboratory                                                                                                                                                                                                                                                                                                                                                                            |
| 2012       | <ul style="list-style-type: none"> <li>• <b>MPP-IDS</b> multi-parameter depth sondes for digital IDS sensors and portable meters</li> <li>• UV-VIS sensors – the next generation: <b>CarboVis®, NitraVis®</b> and <b>NiCaVis®</b> with new optics, integrated ultrasound cleaning and high-tech materials</li> <li>• <b>IFL 700 IQ</b> sensor – sludge-level measurement for sludge management in wastewater treatment plant</li> </ul> |
| 2013       | UV-VIS sensors for nitrite measurement: <b>NiCaVis®-NI</b> and <b>NitraVis®-NI</b> .                                                                                                                                                                                                                                                                                                                                                    |
| 2014       | Expansion of the digital <b>IDS sensor</b> range – with fixed cable or with plug head                                                                                                                                                                                                                                                                                                                                                   |
| 2015       | <ul style="list-style-type: none"> <li>• <b>OptRF</b> – the reagentfree photometric determination of COD, NO<sub>3</sub>, NO<sub>2</sub> with <b>photoLab® 7600 UV-VIS</b></li> <li>• Digital transmitter with fixed-cable sensors for individual measurement points <b>System 182</b></li> </ul>                                                                                                                                       |
| 2016       | <ul style="list-style-type: none"> <li>• IDS goes wireless: <b>IDS wireless modules</b> enable the wireless transfer of measurement data from IDS sensors to wireless ready IDS laboratory and portable meters.</li> <li>• A new mid-range segment model is introduced to the IQSN system with the <b>System 282/284</b></li> </ul>                                                                                                     |
| 2017       | The new <b>MIQ/TC 2020 3G</b> terminal/controller inspires amazement with its large, color display, automatic measurement value storage, and simplified maintenance, which is even possible remotely via IQ Web Connect.                                                                                                                                                                                                                |

## www.wtw.com - News around the clock



### New products

Take a look: Here you can find new products, developments, innovative measurement and analysis instruments, helpful accessories, useful system extensions, special sets, and much more.

### Applications

On our website you will find the solution to your measurement tasks in research, analysis and quality control - and additionally many application.

### Downloads

Are you looking for an operating manual, application report, or do you need a certificate? Everything is provided for you in our download area.

### Contact addresses

Looking for a contact in your area? Find our national and international contact persons, representatives and addresses here.

### Offers

You can find constantly updated special offers in our offers section.

## Our newsletter

Get the latest updates, product information, offers and news on services: register for the WTW newsletter on our website. Appears around 6 time/year.

## Important notes

### General information

1. Customized meters upon request.
2. Please request accessories and replacement parts for older meter models separately.
3. To spare our customers from minimum order surcharges, we deliver consumables in tried and tested minimum amounts.

### Technical modifications

The technical descriptions correspond to the product's current state. Modifications due to technical advances are possible.

### Figures

We would like to note that the figures are for illustrative purposes. Deviations from the description and figure are therefore possible.

### Liability

No liability can be taken for printing errors, typographical errors, or transmission errors in this catalog.

*Printed January 2018*

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August 2018





# General Technical Data Optical Instruments

|                                    | Laboratory Instruments |                                                        |                                                         |                                                        |                                                        |                                                        |
|------------------------------------|------------------------|--------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|
|                                    | photoLab® Series       |                                                        |                                                         | Thermoreactors                                         |                                                        |                                                        |
|                                    | S6                     | S12                                                    | 7100 VIS<br>7600 UV-VIS                                 | CR 2200                                                | CR 3200                                                | CR 4200                                                |
| Cuvette Size (mm)                  | 16                     | 16, 10,<br>20, 50                                      | 16, 10,<br>20, 50                                       | 16                                                     | 16                                                     | 16                                                     |
| Self Check                         | ●                      | ●                                                      | ●                                                       | ●                                                      | ●                                                      | ●                                                      |
| Drain                              | ●                      | ●                                                      | ●                                                       | -                                                      | -                                                      | -                                                      |
| Display                            | LCD                    | LCD                                                    | Graphic/<br>backlit                                     | LCD                                                    | LCD                                                    | LCD                                                    |
| Keypad                             | Silicone               | Silicone                                               | Foil with<br>prompts                                    | Foil with<br>prompts                                   | Foil with<br>prompts                                   | Foil with<br>prompts                                   |
| Language Selection                 | ●                      | ●                                                      | ●                                                       | ●                                                      | ●                                                      | ●                                                      |
| Memory: Dat sets                   | 500                    | 1000                                                   | 5000/<br>40 MB                                          |                                                        |                                                        |                                                        |
| Methods/<br>User Defined Methods   | 130/-                  | 150/50                                                 | 250/<br>1000                                            | 5;-                                                    | 5;8                                                    | 5,8                                                    |
| Real Time Clock                    | ●                      | ●                                                      | ●                                                       | ●                                                      | ●                                                      | ●                                                      |
| GLP Supporting<br>Functions        | ●                      | ●                                                      | ●                                                       | ●                                                      | ●                                                      | ●                                                      |
| AQA                                | ●                      | ●                                                      | ●                                                       | -/●/●                                                  | -/●/●                                                  | -/●/●                                                  |
| Identification no.                 | ●                      | ●                                                      | ●                                                       |                                                        |                                                        |                                                        |
| Calibration Protocol               | ●                      | ●                                                      | ●                                                       |                                                        |                                                        |                                                        |
| Calibration Intervall              | ●                      | ●                                                      | ●                                                       |                                                        |                                                        |                                                        |
| Password Protection                | ●                      | ●                                                      | ●                                                       |                                                        |                                                        |                                                        |
| Interface                          | RS 232                 | RS 232                                                 | 2 USB<br>1 Ethernet                                     | RS 232                                                 | RS 232                                                 | RS 232                                                 |
| PC Connection                      | ●                      | ●                                                      | ●                                                       | ●                                                      | ●                                                      | ●                                                      |
| PC Software (optional)             | -                      | ●                                                      | ●                                                       | -                                                      | -                                                      | -                                                      |
| Alarm function                     | -                      | -                                                      | ●                                                       | ●                                                      | ●                                                      | ●                                                      |
| Method Update<br>via Internet      | ●                      | ●                                                      | ●/USB                                                   | -                                                      | -                                                      | -                                                      |
| Dimensions<br>(H x W x D)          | mm<br><br>(in.)        | 140x270<br>x260<br>(5.51<br>(5.51<br>x10.63<br>x10.24) | 404x197<br>x314<br>(15.91<br>(15.91<br>x7.76<br>x12.36) | 185x256<br>x315<br>(7.28<br>(7.28<br>x10.08<br>x12.40) | 185x256<br>x315<br>(7.28<br>(7.28<br>x10.08<br>x12.40) | 185x256<br>x315<br>(7.28<br>(7.28<br>x10.08<br>x12.40) |
| Weight                             | kg<br>(lb.)            | 2.3<br>(5.07)                                          | 2.3<br>(5.07)                                           | 4.5<br>(9.92)                                          | 3<br>(6.61)                                            | 4<br>(8.82)                                            |
| Universal Power Supply             | ●                      | ●                                                      | ●                                                       | Switchable                                             | Switchable                                             | Switchable                                             |
| Rechargeable Batteries             | optional               | optional                                               | Yes/12V                                                 |                                                        | -                                                      |                                                        |
| Certificates                       | CE                     | CE                                                     | CE                                                      | CE                                                     | CE                                                     | CE                                                     |
| Warranty for defects of<br>quality | 2 Years                | 2 Years                                                | 2 Years                                                 | 2 Years                                                | 2 Years                                                | 2 Years                                                |

|                                                         | Portable Instruments |                                        |                                        |                                        |                                       |
|---------------------------------------------------------|----------------------|----------------------------------------|----------------------------------------|----------------------------------------|---------------------------------------|
|                                                         | pHotoFlex® Series    |                                        |                                        | Turb®                                  |                                       |
|                                                         | pHotoFlex®<br>STD    | pHotoFlex® pH                          | pHotoFlex®<br>Turb                     | Turb® 430 IR/T                         | Turb® 355T/IR                         |
| Cuvette Size (mm)                                       | 16, 28               | 16, 28                                 | 16, 28                                 | 28                                     | 25                                    |
| Self Check                                              | ●                    | ●                                      | ●                                      | ●                                      | ●                                     |
| Waterproof Housing                                      | IP 67                | IP 67                                  | IP 67                                  | IP 67                                  | -                                     |
| Display                                                 | Graphic/<br>backlit  | Graphic/<br>backlit                    | Graphic/<br>backlit                    | Graphic/<br>backlit                    | LCD                                   |
| Temperature Display                                     | -                    | ●                                      | ●                                      | -                                      | -                                     |
| pH/Turbidity                                            | -/-                  | ●/-                                    | ●/●                                    | -/●                                    | -/●                                   |
| Keypad/Acoustic<br>prompts                              | Silicone/●           | Silicone/●                             | Silicone/●                             | Silicone/●                             | Foil with<br>prompts                  |
| Language Selection                                      | ●                    | ●                                      | ●                                      | ●                                      | -                                     |
| Memory: Data sets                                       | 100                  | 1000                                   | 1000                                   | 1000                                   | -                                     |
| Real Time Clock                                         | ●                    | ●                                      | ●                                      | ●                                      | -                                     |
| GLP Supporting<br>Functions                             | ●                    | ●                                      | ●                                      | ●                                      | -                                     |
| Identification no.                                      | ●                    | ●                                      | ●                                      | ●                                      | -                                     |
| Calibration Protocol                                    | -                    | ●                                      | ●                                      | ●                                      | -                                     |
| Calibration Interval                                    | -                    | ●                                      | ●                                      | ●                                      | -                                     |
| Interface                                               | RS 232               | RS 232                                 | RS 232                                 | RS 232                                 | -                                     |
| PC Connection                                           | ●                    | ●                                      | ●                                      | ●                                      | -                                     |
| LabStation for lab use<br>incl. Rech. Batt.             | optional             | optional                               | optional                               | optional                               | -                                     |
| PC-Software (optional)                                  | ●                    | ●                                      | ●                                      | ●                                      | -                                     |
| Alarm function                                          | ●                    | ●                                      | ●                                      | ●                                      | -                                     |
| Clock/Timer                                             | ●/●                  | ●/●                                    | ●/●                                    | ●/-                                    | -                                     |
| Method Update<br>via Internet                           | ●                    | ●                                      | ●                                      | ●                                      | -                                     |
| Firmware Update<br>via Internet                         | ●                    | ●                                      | ●                                      | ●                                      | -                                     |
| Dimensions<br>(H x W x D)                               | mm<br><br>(in.)      | 117x86<br>x236<br>(4.61x3.39<br>x9.29) | 117x86<br>x236<br>(4.61x3.39<br>x9.29) | 117x86<br>x236<br>(4.61x3.39<br>x9.29) | 48x70<br>x165<br>(1.89x2.76<br>x6.50) |
| Weight                                                  | kg<br>(lb.)          | 0.6<br>(1.32)                          | 0.6<br>(1.32)                          | 0.6<br>(1.32)                          | 0.420<br>(0.93)                       |
| Battery operated                                        | ●                    | ●                                      | ●                                      | ●                                      | ●                                     |
| Rechargeable Batteries<br>and Universal Power<br>Supply | -                    | optional                               | optional                               | optional                               | -                                     |
| Certificates                                            | CE                   | CE                                     | CE                                     | CE                                     | CE                                    |
| Sets                                                    | -                    | ●                                      | ●                                      | ●                                      | ●                                     |
| Warranty for defects of<br>quality                      | 2 Years              | 2 Years                                | 2 Years                                | 2 Years                                | 2 Years                               |