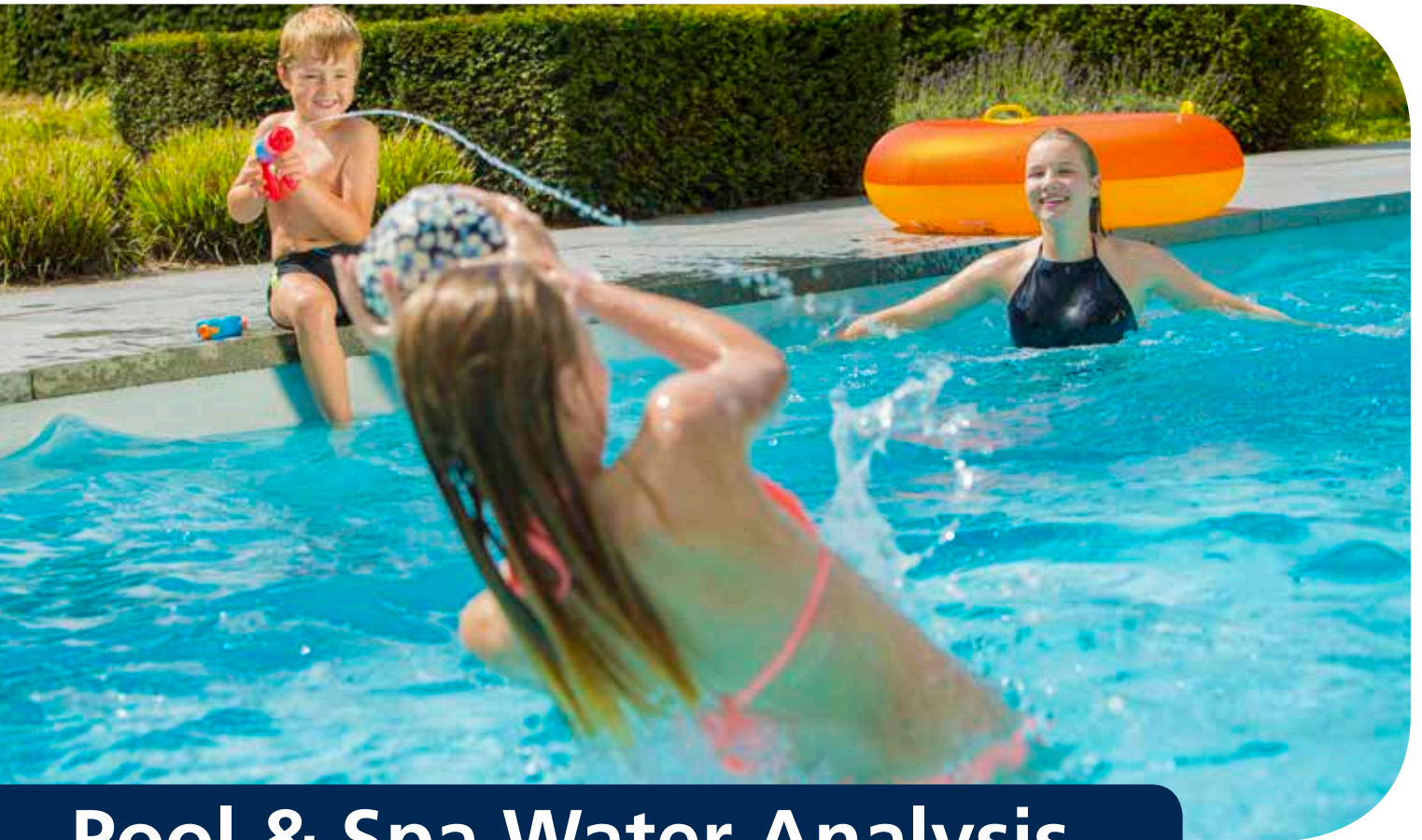


# Lovibond® Water Testing

Tintometer® Group



## Pool & Spa Water Analysis

Instruments and Reagents

[www.lovibond.com](http://www.lovibond.com)

03/19

# Lovibond®-Handbook

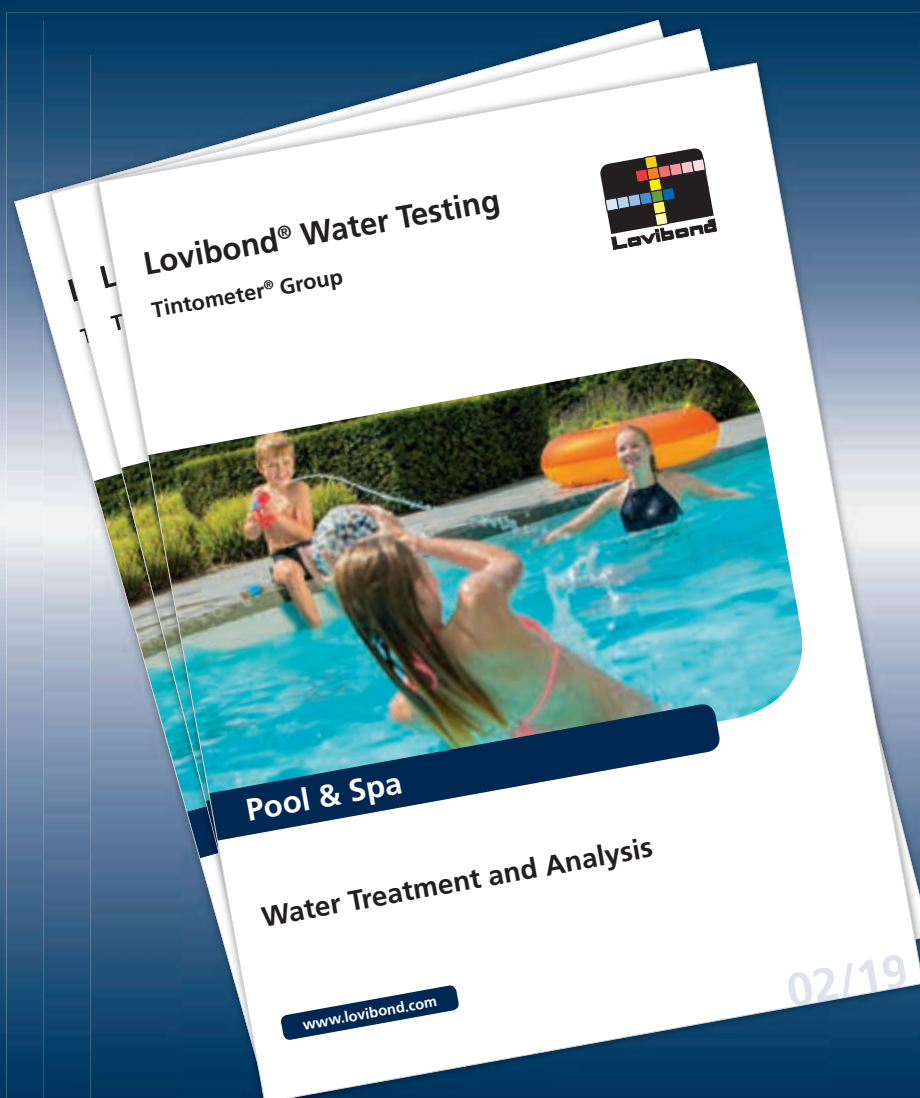
## Pool & Spa

## Water Treatment and Analysis

The handbook includes detailed information on topics relating to swimming pools and spas with reference to the standard methods used for water treatment and testing. National and international standards and regulations are also covered.

**Handbook order code: 93 81 01**

Visit the support area on our website at **[www.lovibond.com](http://www.lovibond.com)** to obtain a copy of the handbook.



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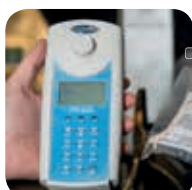


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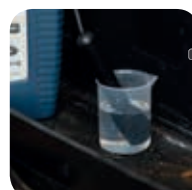
## SCUBA II



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# Pool & Spa

Swimming and bathing are without doubt some of the most popular leisure activities, whether at school, in a competitive environment, for exercise or simply relaxation.

The concept of "Wellness" has created a new trend; wellness enthusiasts are people who have made a conscious decision to stay fit and active with the aim of achieving/maintaining good health and a general feeling of well-being and attaining harmony of body, mind and soul.

In order to achieve this goal, people make wide-ranging use of swimming pools, spas, and many other similar facilities.

Regardless of the motivation for swimming and similar activities, people attach great importance to clean and hygienic water both indoors and out.







## Water Treatment and Water Testing

State-of-the-art water treatment is an essential precondition for safe and healthy bathing and swimming – whether in private or public facilities. In order to satisfy health-related criteria while maintaining the value of such a facility, the golden rule for water treatment is "as much as necessary and as little as possible".

It goes without saying that the main water quality parameters need to be checked on a regular basis

in order to ensure an optimum water treatment programme in changing operating conditions. If testing shows that the hygiene-related parameters deviate from the target values or recommended limit values, the operator can immediately take corrective action to avoid potential risks to health before such risks are allowed to arise.

And this is where the system of Lovibond® water testing equipment and reagents comes into play.

The Lovibond® range of instruments provides operators of private and public baths with analysis systems that measure the actual condition and quality of the water with maximum precision. Moreover, the Lovibond® systems succeed in reconciling the seemingly irreconcilable goals of easy handling, safe reagents offering long-term stability, high detection accuracy, and reproducibility of results.

We hope you will find the information on the following pages convincing.

# RAPID TESTS



Pooltester



Three Chamber  
Tester



Minikit

Get  
the  
clip!



<http://scuba-ll.lovibond.com>



CHECKIT®  
Comparator



Comparator  
2000+



Scuba II



# Rapid Tests







## Water Treatment

### pH value

The pH value of pool & spa water should generally be between the slightly acidic value of 6.5 and the slightly basic value of 7.6. Due to the use of various water treatment chemicals as well as ambient environmental effects, pool owners have to determine the pH of the water and correct the value as necessary.

### Disinfection

Nowadays, pool owners can choose from a range of modern water treatment agents that are often used in combination.

These water treatment chemicals are only effective within a limited pH range. Therefore in addition to checking the concentration of the water treatment chemicals, the owner/operator should also monitor the pH value of pool water and adjust it if necessary.

## Rapid Tests

### Three-Chamber Tester

The Three-Chamber Tester is a competitively priced unit for the determination of disinfectants and the pH value.

### Pooltester




The Pooltester is designed for the simultaneous determination of the most popular water treatment agents and the pH value.

### Multipooltester

Additionally the Multipooltester allows the determination of cyanuric acid, total alkalinity and calcium hardness.



### Three-Chamber-Tester

Item	Code
<b>Chlorine-Bromine-pH LR, in mini case<sup>1)</sup></b> 	15 77 00
Bromine 0,2-6,8 mg/l	
Chlorine 0,1-3,0 mg/l / pH value 6,8-8,2	
<b>Chlorine-Bromine-pH LR, in blister<sup>2)</sup></b> 	15 75 20
Bromine 0,2-6,8 mg/l	
Chlorine 0,1-3,0 mg/l / pH value 6,8-8,2	
<b>Chlorine-Bromine-pH HR, in blister<sup>2)</sup></b> 	15 80 10
Bromine 0,2-6,8 mg/l	
Chlorine 0,5-6,0 mg/l / pH value 6,8-8,2	
<b>Active Oxygen-pH, in blister<sup>2)</sup></b>	15 76 10
Active Oxygen 0-10 mg/l / pH value 6,8-8,2	
<b>Biguanide (PHMB)-pH, in blister<sup>2)</sup></b>	15 61 50
Biguanide (PHMB) 10-100 mg/l	
pH-Wert 6,8-8,2	
<b>4 in 1, in plastic case</b>	15 17 00
Chlorine LR 0,1-3,0 mg/l / pH value 6,8-8,2	
Cyanuric acid 20-200 mg/l	
Alkalinity-M 50-300 mg/l	
<b>Phosphate Test Kit<sup>3)</sup></b>	15 78 00
0-1000 ppb (0-1mg/l PO <sub>4</sub> )	

<sup>1)</sup> Packaging unit 10 pc

<sup>2)</sup> Packaging unit 6 pc





<sup>3)</sup> Packaging unit 24 pc

#### Delivery content

- Three-Chamber-Tester in a bubble pack or mini case
- Tablet reagents
- Instruction manual



### Pooltester

Item	Code
<b>Chlorine-pH LR<sup>4)</sup></b> 	15 16 00
Chlorine 0,1-3,0 mg/l / pH value 6,8-8,2	
<b>Chlorine-pH HR<sup>4)</sup></b> 	15 16 01
Chlorine 0,5-6,0 mg/l / pH value 6,8-8,2	
<b>Bromine-pH<sup>4)</sup></b> 	15 16 04
Bromine 1,0-8,0 mg/l / pH value 6,8-8,2	
<b>Active Oxygen-pH<sup>4)</sup></b>	15 16 05
O <sub>2</sub> 0-10 mg/l / pH value 6,8-8,2	
<b>Copper LR/HR-pH<sup>4)</sup></b> 	15 51 90
Copper LR 0,1-1,0 mg/l & HR 0,5-5,0 mg/l	
pH value 6,8-8,2	
<b>Active Oxygen-Copper-pH<sup>4)</sup></b>	15 52 35
O <sub>2</sub> 0-10 mg/l / Copper 0,1-1,0 mg/l	
pH value 6,8-8,2	
<b>Biguanide (PHMB)-Hydrogen Peroxide (H<sub>2</sub>O<sub>2</sub>)-pH<sup>4)</sup></b>	15 61 00
PHMB 10-100 mg/l / H <sub>2</sub> O <sub>2</sub> 5-50 mg/l	
pH value 6,8-8,2	

<sup>4)</sup> Packaging unit 6 pc

#### Delivery content

- Pooltester in a sturdy plastic box
- Tablet reagents for 20 tests
- Instruction manual



### Multi Pooltester

Item	Code
<b>5 in 1 Multi-Pooltester<sup>5)</sup></b>	15 19 00
Chlorine 0,1-3,0 mg/l / pH value 6,8-8,2	
Cyanuric acid 20-200 mg/l	
Alkalinity-M 20-800 mg/l	
Calcium hardness 20-800 mg/l	


<sup>5)</sup> Packaging unit 5 pc

 Green Chemistry

#### Delivery content




- 5 in 1 Multi Pooltester
- Pooltester Chlorine - pH LR in a robust plastic case
- Cyanuric acid tube
- Dilution / shaker tube, 100 ml
- Dilution / shaker tube, 30 ml
- Cleaning brush
- Stirring rod
- 20 tablet reagents each DPD No. 1 Rapid, DPD No. 3 Rapid, Phenol Red Rapid
- 10 tablet reagents each CyA-Test, Alk-Test, CAL-Test
- Instruction manual
- Statements (phrases-H and P)






## Refill Packs

Item	Code
<b>Chlorine/Bromine/ pH*</b>  30 DPD No.1/RAPID-tablets and 30 PHENOL RED / RAPID-tablets	51 58 84
<b>Active Oxygen - pH*</b>  30 DPD No.4/RAPID-tablets and 30 PHENOL RED / RAPID-tablets	51 59 34
<b>Active Oxygen - Copper- pH*</b> 20 DPD No.4/RAPID-tablets 20 COPPER No.1-tablets and 20 PHENOL RED / RAPID-tablets	51 58 65
<b>PHMB/H<sub>2</sub>O<sub>2</sub> - pH</b> 20 PHMB-, 20 H <sub>2</sub> O <sub>2</sub> -, 20 ACIDIFYING PT- and 20 PHENOL RED / RAPID-tablets	51 58 70
<b>PHMB - pH*</b> 30 PHMB-tablets and 30 PHENOL RED / RAPID-tablets	51 61 55
<b>Copper - pH*</b>  30 COPPER No.1-tablets and 30 PHENOL RED / RAPID-tablets	51 57 78
<b>Combi pack for Three-Chamber-Tester 4 in 1</b> 20 DPD No.1/ RAPID-, 20 PHENOL RED / RAPID-, 20 CyA-TEST- 20 ALK LR-Tabletten	51 59 35
<b>Combi pack for Multipooltester 5 in 1</b> 20 DPD No.1/ RAPID-, 20 DPD No.3/ RAPID-, 20 PHENOL RED / RAPID-, 20 CyA-TEST- 10 ALK TEST- 10 CAL-TEST-tablets	51 59 80

\* Each pack contains 12 units

## Reagents

Item	Quantity	Code
<b>Acidifying PT</b>	100 pc.	51 54 90
	250 pc.	51 54 91
<b>ALK LR</b>	100 pc.	51 60 40BT
<b>ALK TEST</b>	100 pc.	51 55 70BT
<b>CAL TEST</b>	100 pc.	51 55 80BT
<b>Copper No.1</b> 	100 pc.	51 35 50BT
	250 pc.	51 35 51BT
<b>Cyanuric Acid CyA-TEST</b> 	100 pc.	51 13 70BT
	250 pc.	51 13 71BT
<b>DPD No.1/ RAPID</b> 	100 pc.	51 13 10BT
	250 pc.	51 13 11BT
	500 pc.	51 13 12BT

Item	Quantity	Code
<b>DPD No.3/ RAPID</b>  	100 pc.	51 12 90BT
	250 pc.	51 12 91BT
	500 pc.	51 12 92BT
<b>DPD No.4/ RAPID</b>  	100 pc.	51 15 70BT
	250 pc.	51 15 71BT
	500 pc.	51 15 72BT
<b>Hydrogenperoxide HR</b>	100 pc.	51 59 40BT
	250 pc.	51 59 41BT
<b>PHENOL RED/RAPID (pH)</b> 	100 pc.	51 17 90BT
	250 pc.	51 17 91BT
	500 pc.	51 17 92BT
<b>PHMB (Biguanide)</b>	100 pc.	51 58 90BT
	250 pc.	51 58 91BT

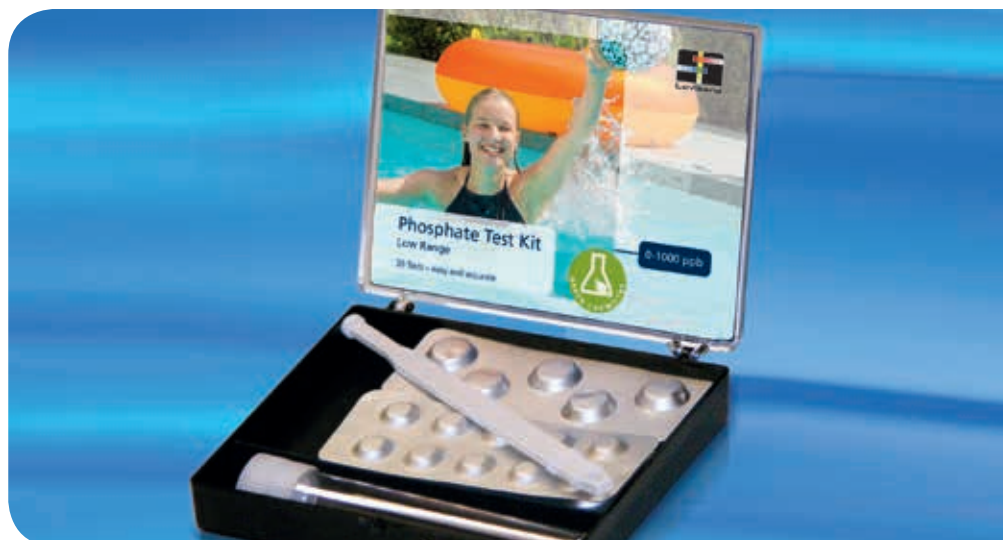
 also suitable for seawater

 Green Chemistry



Lovibond®-RAPID tablets DPD and PHENOL RED will dissolve quickly, have a guaranteed 10 year shelf-life and are provided in green-printed foil blister.

Material Safety Data Sheets:  
[www.lovibond.com](http://www.lovibond.com)





# MINIKIT



Analysis	Type	Range	Methods Tablet Count	Speed Test	Yes/No Test
Acid capacity $K_{S4.3}$	AF 444	0,4 - 16 mmol/l $\approx$ 20 - 800 mg/l $CaCO_3$		■	
Alkalinity, Total-M	AF 444	20 - 800 mg/l $CaCO_3 \approx$ 0,4 - 16 mmol/l		■	
Alkalinity, Total-M	AF 413	10 - 500 mg/l $CaCO_3 \approx$ 0,2 - 10 mmol/l	■		
Alkalinity-P	AF 414	20 - 500 mg/l $CaCO_3$	■		
Calcium Hardness	AF 446	20 - 800 mg/l $CaCO_3 \approx$ 0,4 - 16 mmol/l		■	
Calcium Hardness	AF 416	10 - 500 mg/l $CaCO_3 \approx$ 0,1 - 5 mmol/l	■		
Chloride ★	AF 418	5 - 5000 mg/l Cl	■		
Cyanuric Acid 🌿	AF 422	20 - 200 mg/l Cyanuric Acid			
QAC (Quaternary Ammonium Comp.)	AF 417	0 - 500 mg/l active QAC Limit 200 mg/l (Yes/No)	■		■
Sulphate ★	AF 431	40 - 200 mg/l $SO_4$ (40 - 4000 mg/l by dilution)			
Total Hardness	AF 445	20 - 800 mg/l $CaCO_3 \approx$ 0,4 - 16 mmol/l		■	
Total Hardness	AF 424	5 - 500 mg/l $CaCO_3 \approx$ 0,05 - 5 mmol/l	■		



## The Methods

The Minikits are developed for fast testing, mainly based on titrimetric methods

### Tablet count method

A specific number of tablets is added to a known volume of sample until a chemically induced colour change takes place. The number of tablets used is applied to a simple formula to calculate the test result. The measuring range may be expanded by varying the sample volume.

### Speed test

The speed test is based on reverse titration. After adding a reagent tablet to a calibrated test tube, the water sample is added slowly until the colour of the solution changes (e.g. from red to blue). The user can then obtain the result from the liquid level.

### Yes/No test

A Yes/No test tells the user whether a specific ingredient is present in the water and/or if its concentration is higher or lower than a defined level.

### Turbidity method

A two-section calibrated test tube is filled with the water sample and a reagent tablet added. The reagent creates a level of turbidity that is proportional to the concentration of the parameter being measured. The inner tube, which has a black dot on its base, is lowered until the dot is obscured by the turbidity. The result is read off from the water level in the inner tube.

### Delivery content

- Kit in a plastic box
- Tablet reagents for an average of 30 tests
- Sample container
- Required accessories
- Instruction manual

Turbidity	Code	Tablet Reagents	Code	Quantity
	41 44 40	ALK-TEST	51 55 70 BT	100
	41 44 40	ALK-TEST	51 55 70 BT	100
	41 41 30	TOTAL ALKALINITY-Tablets	51 53 21 BT	250
	41 41 40	ALKALINITY-P-Tablets	51 51 01	250
	41 44 60	CAL-TEST	51 55 80 BT	100
	41 41 60	CALCIUM HARDNESS	51 51 91 BT	250
	41 41 80	CHLORIDE	51 51 31	250
■	41 42 20	CyA-TEST	51 13 70 BT	100
	41 41 70	QAC-Test	51 54 10	100
			51 54 11	250
■	41 43 10	SULFATE	51 54 51 BT	250
	41 44 50	T HARDNESS-TEST	51 55 90 BT	100
	41 42 40	TOTAL HARDNESS	51 51 61 BT	250

# Scuba II

Electronic Pooltester





## Scuba II

## Technical Data

## Refill pack

Every pool owner should check the most important parameters in the pool at regular intervals. This is the only way to ensure that water quality is maintained at the right level and to arrange dosing in an optimum manner.

The Scuba II enables the operator to check the pool water quickly and accurately. The integrated sample chamber is filled by immersing it in the water. A tablet reagent is added and generates a characteristic colour which can be measured using the photometric principle. The result is then displayed on the screen.

Six parameters, **free chlorine**, **total chlorine**, **pH**, **alkalinity**, **cyanuric acid** and **bromine** are measured within a few minutes. Water analysis becomes a pleasure rather than a chore and more time is left for enjoying the pleasure of the pool.

If the Scuba II falls into the water it will simply float and, of course, it is watertight.

Why not try this compact test equipment – after all, the knowledge that you are safe in a thoroughly hygienic pool is worth it.

<b>Optics</b>	temperature-compensated LED ( $\lambda = 530 \text{ nm}$ ) and photo-sensor
<b>Power supply</b>	2 batteries (AAA), capacity approx. 90 tests
<b>Auto-Off</b>	automatic switch-off approx. 5 minutes after last key press
<b>Display</b>	LCD-display
<b>Dimensions</b> (L x W x H)	145 x 70 x 45 mm
<b>Weight</b>	approx. 165 g (incl. batteries)
<b>Operating conditions</b>	temperature: 5 – 40 °C relative humidity: 30 – 90 %, non-condensing
<b>Approval</b>	CE

### Article

#### Refill pack for Scuba II

20 DPD No.1 Photometer tablets  
10 DPD No.3 Photometer tablets  
10 PHENOL RED Photometer tablets  
10 CyA-Test tablets  
10 Alka-M-Photometer tablets

**Packaging unit = 12 packs**

### Code

52 56 00

 Green Chemistry

Scuba II

### Determination

### Range

### Resolution

### Accuracy

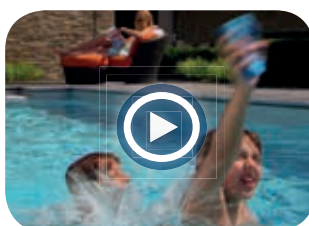
Chlorine, free	0,1 - 6 mg/l $\text{Cl}_2$	0,1 mg/l	0 - 1 mg/l $\pm 0,1 \text{ mg/l}$ ; 1 - 2 mg/l $\pm 0,2 \text{ mg/l}$ 2 - 3 mg/l $\pm 0,4 \text{ mg/l}$ ; 3 - 6 mg/l $\pm 0,5 \text{ mg/l}$
Chlorine, total	0,1 - 6 mg/l $\text{Cl}_2$	0,1 mg/l	0 - 1 mg/l $\pm 0,1 \text{ mg/l}$ ; 1 - 2 mg/l $\pm 0,2 \text{ mg/l}$ 2 - 3 mg/l $\pm 0,4 \text{ mg/l}$ ; 3 - 6 mg/l $\pm 0,5 \text{ mg/l}$
pH-value	6,5 - 8,4 pH	0,1 pH	$\pm 0,2 \text{ pH}$
Cyanuric acid	1 - 160 mg/l	1,0 mg/l	1 - 50 mg/l $\pm 10 \text{ mg/l}$ ; 50 - 160 mg/l $\pm 20 \text{ mg/l}$
Alkalinity (total)	0 - 300 mg/l $\text{CaCO}_3$	1,0 mg/l	$\pm 50 \text{ mg/l}$
Bromine	0,2 - 13,5 mg/l $\text{Br}_2$	0,1 mg/l	0 - 2 mg/l $\pm 0,2 \text{ mg/l}$ 2 - 4 mg/l $\pm 0,4 \text{ mg/l}$ 4 - 7 mg/l $\pm 0,8 \text{ mg/l}$ 7 - 13,5 mg/l $\pm 1,1 \text{ mg/l}$

### Delivery content

- Scuba II in a robust plastic box
- Tablet reagents each 20 DPD No.1 & Phenol Red Photometer each 10 DPD No.3, CyA-Test & Alka-M-Photometer
- 2 batteries (AAA)
- Stirring rod
- Instruction manual

Order code: 21 61 00-17 

Get  
the  
clip!



<http://scuba-II.lovibond.com>

# CHECKIT® Comparator





CHECKIT® Comparator Test Kits are accurate, easy to use test kits for water analysis. Simply add the reagent to the sample cell, rotate the disc until the color matches the prepared water sample and read the concentration value.

### CHECKIT® Comparator

The Lovibond® CHECKIT® Comparator is a compact and handy colorimetric unit which is suitable for both mobile and static analysis work. Supplied with a generous number of different colour scales, it provides the basis for a comprehensive, easy-to-use colorimetric analysis system.

### CHECKIT® Disc

Each CHECKIT® Disc contains a continuous colour scale which makes it possible to achieve an exact colour match between the colour standard and the sample. These CHECKIT® Discs are specially manufactured in selected materials to retain colour stability over a long period and guarantee reliable, reproducible measurement results.

➔ Please see pages 20 onwards for tests, ranges and reagents





Front view of the CHECKIT® Comparator with cells



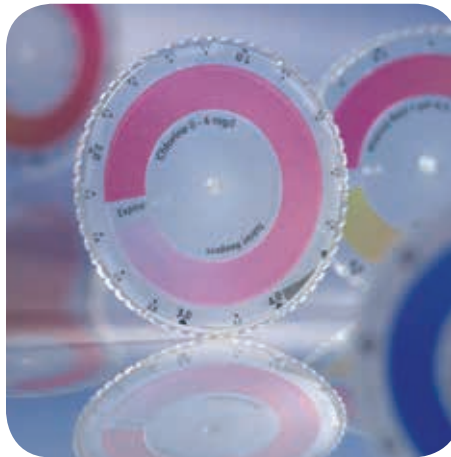
Rear view of the CHECKIT® Comparator with diffuser plate, cells and disc



Test Kit in carrying case, ready to use



Plastic cells, frosted on two sides, volume 10 ml, path length 13.5 mm, with lids



CHECKIT® Discs with continuous and stable scales



Tablet reagents in blister



Plastic cells in pack, available:

- 5 cells - 14 55 05
- 10 cells - 14 55 00
- 100 cells - 14 55 10

### Delivery content

- CHECKIT® Comparator
- CHECKIT® Disc(s)
- Reagents for an average of 30 tests
- Cuvettes
- Accessories
- Instruction manual
- Warranty information
- in case

## Single Parameter Test Kits

Test Kit		Range* (± 5 % Full Scale)	Reagent	Code
<b>Acid capacity</b> K <sub>54.3</sub>		0,5 - 5 mmol/l	Tablets	14 74 60
<b>Alkalinity-M</b>		20 - 240 mg/l CaCO <sub>3</sub>	Tablets	14 74 50
<b>Aluminium</b>		0 - 0,3 mg/l Al	Tablets	14 72 00
<b>Ammonia</b>	★	0 - 1 mg/l N	Tablets	14 72 10
<b>Bromine</b>	🌿	0 - 5 mg/l Br	Tablets	14 72 80
<b>Chlorine</b> (DPD) free, comb., total	★ 🌿	0 - 1 mg/l Cl <sub>2</sub>	Tablets	14 70 10
<b>Chlorine</b> (DPD) free, comb., total	★ 🌿	0 - 2 mg/l Cl <sub>2</sub>	Tablets	14 70 40
<b>Chlorine</b> (DPD) free, comb., total	★ 🌿	0 - 4 mg/l Cl <sub>2</sub>	Tablets	14 70 20
<b>Chlorine</b> (DPD) free + total	★	0 - 3,5 mg/l Cl <sub>2</sub>	Powder Reagents	14 70 52
<b>Copper</b> , free		0 - 1 mg/l Cu	Tablets	14 72 30
<b>Copper</b> , free + total	★	0 - 5 mg/l Cu	Tablets	14 74 30
<b>Iron</b>	★	0,05 - 1 mg/l Fe	Tablets	14 72 20
<b>Iron</b>	★	0- 10 mg/l Fe	Tablets	14 73 20
<b>Ozone</b> (DPD)	🌿	0 - 1,0 mg/l O <sub>3</sub>	Tablets	14 72 75
<b>Ozone</b> (in presence of chlorine)		0 - 1,0 mg/l O <sub>3</sub>	Tablets	14 72 70
<b>pH value</b> (Bromocresol purple)	🌿	6,5 - 8,4 pH	Tablets	14 71 00
<b>pH value</b> (Universal)		4 - 10 pH	Tablets	14 71 30
<b>Phosphate</b>		0 - 4 mg/l PO <sub>4</sub>	Tablets	14 72 40
<b>Phosphate</b>		0 - 80 mg/l PO <sub>4</sub>	Tablets	14 72 50
<b>Sodiumhypochlorite</b>		2 - 18 % NaOCl	Tablets	14 74 90 (Chlorine bleach)

\* Disc readings see following pages

★ also suitable for seawater    🌿 Green Chemistry

## Test Kits 2 in 1

Test Kit	Code
<b>Chlorine</b> 0 – 1.0 mg/l Cl <sub>2</sub> * 🌿 <b>pH value</b> 6.5 – 8.4 pH	14 70 16
<b>Chlorine</b> 0.1 – 2.0 mg/l Cl <sub>2</sub> * 🌿 <b>pH value</b> 6.5 – 8.4 pH	14 70 46
<b>Chlorine</b> 0 – 4.0 mg/l Cl <sub>2</sub> * 🌿 <b>pH value</b> 6.5 – 8.4 pH	14 70 26
<b>Bromine</b> 0 – 5.0 mg/l Br 🌿 <b>pH value</b> 6.5 – 8.4 pH	14 72 85
<b>Copper</b> 0 – 1.0 mg/l Cu <b>pH value</b> 6.5 – 8.4 pH	14 72 35

Water Balance	Code
<b>Chlorine</b> 0 – 4.0 mg/l Cl <sub>2</sub> *	14 70 28
<b>pH value</b> 6.5 – 8.4 pH	
<b>Cyanuric acid</b> (turbidity method)* 20 – 200 mg/l Cys	
<b>Calcium hardness</b> (Speed-Test)* 20 – 800 mg/l CaCO <sub>3</sub>	
<b>Total Alkalinity</b> (Speed-Test)* 20 – 800 mg/ CaCO <sub>3</sub>	

Disc readings see following pages

\* All test kits for chlorine are for "free, combined and total chlorine"

\*\* Reagents for turbidity method and speed-test (Test-Kit 5 in 1) see Minikit, page 11

## Testpak

The Testpak is a simple and cost-effective means of extending the use of an existing CHECKIT® Comparator instrument to a new test parameter.

All you need is the basic CHECKIT® Comparator, order code 14 50 00.

Testpaks: see following pages.

➔ Please see pages 20 onwards for tests, ranges and reagents

# CHECKIT® Comparator

Tests, Test Kits, Testpaks, Discs, Reagents

Test		Range	Readings (Accuracy ± 5 % Fullscale)	Test Kit	Testpak
<b>Aluminium</b> Tablets		0 - 0.3 mg/l Al	0 / 0.01 / 0.02 / 0.03 / 0.04 / 0.05 / 0.06 / 0.07 / 0.08 / 0.09 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3	14 72 00	14 77 00
<b>Ammonia</b> Tablets		0 - 1 mg/l N	0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.9 / 0.95 / 1.0	14 72 10	14 77 10
<b>Bromine</b> Tablets		0 - 5 mg/l Br	0 / 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2 / 1.4 / 1.6 / 1.8 / 2 / 2.5 / 3 / 3.5 / 4 / 4.5 / 5	14 72 80	14 77 80
<b>Chlorine</b> free, combined, total Tablets	 	0 - 1 mg/l Cl <sub>2</sub>	0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.85 / 0.9 / 0.95 / 1.0	14 70 10	14 75 10
<b>Chlorine</b> free, combined, total Tablets	 	0 - 2 mg/l Cl <sub>2</sub>	0 / 0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0 / 1.1 / 1.2 / 1.3 / 1.4 / 1.6 / 1.8 / 2.0	14 70 40	14 75 40
<b>Chlorine</b> free, combined, total Tablets	 	0 - 4 mg/l Cl <sub>2</sub>	0 / 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2 / 1.4 / 1.6 / 1.8 / 2.0 / 2.5 / 3.0 / 3.5 / 4.0	14 70 20	14 75 20
<b>Chlorine</b> free, combined, total Powder Reagent		0 - 3.5 mg/l Cl <sub>2</sub>	0 / 0.2 / 0.4 / 0.6 / 0.8 / 1 / 1.2 / 1.4 / 1.6 / 1.8 / 2 / 2.2 / 2.4 / 2.6 / 2.8 / 3 / 3.2 / 3.4 / 3.5	14 70 52	14 75 50, free 14 75 51, total
<b>Copper</b> , free (Cu <sup>2+</sup> ) Tablets		0 - 1 mg/l Cu	0 / 0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0	14 72 30	14 77 30
<b>Copper HR</b> free and total Tablets		0 - 5 mg/l Cu	0 / 0.5 / 1.0 / 1.5 / 2.0 / 2.5 / 3.0 / 3.5 / 4.0 / 4.5 / 5.0	14 74 30	14 79 30

\* RAPID: fast dissolving tablets, # including stirring rod,  also suitable for seawater

 Green Chemistry



Disc	Reagents	Quantity	Code
14 62 00	ALUMINIUM No.1	100	51 54 60 BT
		250	51 54 61 BT
	ALUMINIUM No.2	100	51 54 70 BT
		250	51 54 71 BT
	Combi pack <sup>#</sup>	each 100	51 76 01 BT
	ALUMINIUM No.1 / No.2	each 250	51 76 02 BT
14 62 10	AMMONIA No.1	100	51 25 80 BT
		250	51 25 81 BT
	AMMONIA No.2	100	51 25 90 BT
		250	51 25 91 BT
	Combi pack <sup>#</sup>	each 100	51 76 11 BT
	AMMONIA No.1 / No.2	each 250	51 76 12 BT
14 62 80	DPD No.1-RAPID*	100	51 13 10 BT
		250	51 13 11 BT
		500	51 13 12 BT
14 60 10	DPD No.1-RAPID*	100	51 13 10 BT
		250	51 13 11 BT
		500	51 13 12 BT
	DPD No.3-RAPID*	100	51 12 90 BT
		250	51 12 91 BT
		500	51 12 92 BT
	DPD No.4-RAPID*	100	51 15 70 BT
		250	51 15 71 BT
		500	51 15 72 BT
14 60 40	DPD No.1/3/4-RAPID*		
14 60 20	DPD No.1/3/4-RAPID*		
14 60 50	VARIO Chlorine Free DPD F5	100	53 00 90
	VARIO Chlorine Total DPD F5	100	53 00 80
14 62 30	COPPER/ZINC LR	100	51 26 20 BT
		250	51 26 21 BT
14 64 30	COPPER No. 1	100	51 35 50 BT
		250	51 35 51 BT
	COPPER No. 2	100	51 35 60 BT
		250	51 35 61 BT
	Combi pack <sup>#</sup>	each 100	51 76 91 BT
	COPPER No.1 / No.2	each 250	51 76 92 BT



# CHECKIT<sup>®</sup> Comparator

## Tests, Test Kits, Testpaks, Discs, Reagents

Test		Range	Readings (Accuracy ± 5 % Fullscale)	Test Kit	Testpak
<b>Iron LR</b> Tablets	★	0 - 1 mg/l Fe	0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.9 / 1.0	14 72 20	14 77 20
<b>Iron HR</b> Tablets	★	1 - 10 mg/l Fe	1 / 1.5 / 2 / 2.5 / 3 / 3.5 / 4 / 4.5 / 5 / 5.5 / 6 / 6.5 / 7 / 7.5 / 8 / 8.5 / 9 / 10	14 73 20	14 78 20
<b>Ozone (DPD)</b> Tablets	🌿	0 - 1.0 mg/l O <sub>3</sub>	0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.9 / 1.0	14 72 75	14 77 75
<b>Ozone (DPD)</b> in the presence of chlorine	🌿	0 - 1.0 mg/l O <sub>3</sub>	0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.9 / 1.0	14 72 70	14 77 70
<b>pH</b> Tablets	🌿	5.2 - 6.8 pH	5.2 / 5.3 / 5.4 / 5.5 / 5.6 / 5.7 / 5.8 / 5.9 / 6.0 / 6.1 / 6.2 / 6.3 / 6.4 / 6.5 / 6.6 / 6.7 / 6.8	14 71 10	14 76 10
<b>pH</b> Tablets		4 - 10 pH	4 / 4.5 / 5 / 5.5 / 6 / 6.5 / 7 / 7.5 / 8 / 8.5 / 9 / 9.5 / 10	14 71 30	14 76 30
<b>Phosphate HR</b> Tablets	★	0 - 80 mg/l PO <sub>4</sub>	0 / 5 / 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50 / 55 / 60 / 65 / 70 / 75 / 80	14 72 50	14 77 50
<b>Phosphate LR</b> Tablets		0 - 4 mg/l PO <sub>4</sub>	0 / 0.25 / 0.5 / 0.75 / 1.0 / 1.25 / 1.5 / 1.75 / 2.0 / 2.25 / 2.5 / 2.75 / 3.0 / 3.25 / 3.5 / 3.75 / 4.0	14 72 40	14 77 40
<b>Sodiumhypochlorite</b> Tablets		2 - 18 %	2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15 / 16 / 18	14 74 90	14 79 90
<b>Total Alkalinity</b> Tablets		20 - 240 mg/l CaCO <sub>3</sub>	20 / 30 / 40 / 50 / 60 / 70 / 80 / 90 / 100 / 110 / 120 / 130 / 140 / 150 / 160 / 170 / 180 / 190 / 200 / 220 / 240	14 74 50	14 79 50

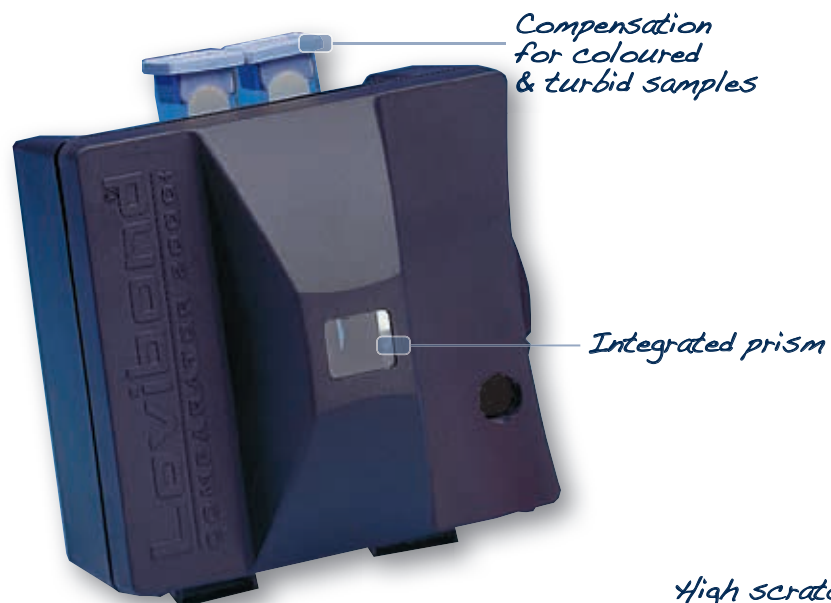
\* RAPID: fast dissolving tablets, # including stirring rod, ★ also suitable for seawater

🌿 Green Chemistry

Disc	Reagents	Quantity	Code
14 62 20	IRON LR (Fe <sup>2+</sup> and Fe <sup>3+</sup> )	100	51 53 70 BT
		250	51 53 71 BT
	IRON (II) LR (Fe <sup>2+</sup> )	100	51 54 20 BT
14 63 20	IRON HR	100	51 53 80 BT
		250	51 53 81 BT
14 62 75	DPD No. 4	100	51 12 20 BT
		250	51 12 21 BT
14 62 70	DPD No. 4	100	51 12 20 BT
		250	51 12 21 BT
	DPD Glycine	100	51 21 70 BT
		250	51 21 71 BT
14 61 10	BROMOCRESOL PURPLE	100	51 17 30
		250	51 17 31
14 61 30	UNIVERSAL PH	100	51 54 40
		250	51 54 41
14 62 50	PHOSPHATE HR	100	51 19 80 BT
14 62 40	PHOSPHATE No. 1 LR	100	51 30 40 BT
	PHOSPHATE No. 2 LR	100	51 30 50 BT
	Combi pack <sup>#</sup>	each 100	51 76 51 BT
	PHOSPHATE No.1 LR / No.2 LR		
14 64 90	CHLORINE HR (KI)	100	51 30 00 BT
		250	51 30 01 BT
	ACIDIFYING GP	100	51 54 80 BT
		250	51 54 81 BT
	Combi pack <sup>#</sup>	each 100	51 77 21 BT
	CHLORINE HR (KI)/ACIDIFYING GP	each 250	51 77 22 BT
	Dilution set for sample preparation	1	41 44 70
14 64 50	ALKACHECK	100	51 32 00 BT
		250	51 32 01 BT







# Comparator 2000+



## Colorimeter for regular testing in public pools & spas with colour-stable glass standards

### Comparator 2000+

With its accessories, the Lovibond® Comparator system 2000+ is an extremely versatile, modular system for testing water. It is simple to use yet is uncompromising in terms of precision and reproducibility of results. It is compact and portable. The integrated prism brings the glass standards of the test discs and the coloured sample into the same field of view.

### Discs

The required accuracy of results is only ensured if stable, fade-free colour standards are used.

Glass colour standards are fade-free, resistant to chemicals and scratchproof. Lovibond® standards are made from coloured glass filters. They comply with international standards, e.g. ISO 7393/2.

For a selection of the most popular test discs, see the table on page 26 onwards.

### Cells

We manufacture precision plastic and optical glass cells in line with the highest quality standards. The cells ensure high accuracy and reproducibility of results.

### Lighting unit

We recommend the use of the battery-operated Lovibond® lighting unit in variable lighting conditions. This guarantees uniform lighting conditions, and ensures greater test accuracy.

 Please see pages 28 onwards for tests, ranges and reagents



Comparator 2000+



Lighting unit, battery operated








Plastic cells




Disc

# Test Kits Comparator 2000+



Type*	Test Kits	Code
AF 112 A	<b>Chlorine</b>  0.1 – 1.0 mg/l, Type 3/40 A**	41 11 20
AF 112 B	<b>Chlorine</b>  0.2 – 4.0 mg/l, Type 3/40 B**	41 11 30
AF 112 J/J	<b>Chlorine</b>  0.1 – 2.0 mg/l, Type 3/40 J** <b>pH value</b> 6.8 – 8.4, Type 2/1 J	41 72 46
AF 116 A	<b>Chlorine</b>  0.1 – 1.0 mg/l, Type 3/40 A** <b>pH value</b> 6.8 – 8.4, Type 2/1 J	41 11 40
AF 116 B	<b>Chlorine</b>  0.2 – 4.0 mg/l, Type 3/40 B** <b>pH value</b> 6.8 – 8.4, Type 2/1 J	41 11 60

Type*	Test Kits	Code
AF 118 S	<b>Chlorine</b>  0.1 – 1.0 mg/l, Type 3/40 A** <b>Chlorine</b> 1.0 – 4.0 mg/l, Type 3/40 S** <b>pH value</b> 5.2 – 6.8, Type 2/1 G <b>pH value</b> 6.8 – 8.4, Type 2/1 J	41 11 81
AF 129	<b>Water Balance</b> <b>Chlorine</b> 0.2 – 4.0 mg/l, Type 3/40 B** <b>pH value</b> 6.8 – 8.4, Type 2/1 J <b>Total Alkalinity-M***</b> 0 – 500 mg/l CaCO <sub>3</sub> Tablet Count Method <b>Calcium Hardness***</b> 0 – 1000 mg/l CaCO <sub>3</sub> Tablet Count Method	41 12 90

Type*	Test Kits	Code
AF 405 M	<b>Municipal Kit</b> <b>Chlorine</b> 0.2 – 4.0 mg/l, Type 3/40 B** <b>pH value</b> 6.8 – 8.4, Type 2/1 J <b>Cyanuric Acid***</b> 20 – 200 mg/l Cyanuric Acid Turbidity Method <b>Total Alkalinity-M***</b> 20 – 800 mg/l CaCO <sub>3</sub> Speed-Test <b>Calcium Hardness***</b> 20 – 800 mg/l CaCO <sub>3</sub> Speed-Test	41 40 51

\* Disc readings see following pages

\*\* All test kits for chlorine are for "free, combined and total chlorine"

\*\*\* Reagents for tablet count method, turbidity method and speed-test see Minikit, page 13



## Comparator 2000+ and Accessories

Type	Item	Code
<b>TK 100</b>	Comparator 2000+	14 20 00
<b>TK 102</b>	Portable lighting unit, battery operated	14 20 50
	Daylight Unit, mains operated	17 10 10
<b>AF 631</b>	Water sampler with two 500 ml bottles and one lid (p. 29)	17 05 00
	Measuring beaker, 100 ml	38 48 01
	Vial stand for 10 vials (ø 16 mm or □ 13,5 mm), acrylic glass	41 89 57
	Glass stirring rod, 12 cm length	36 41 10
	Plastic stirring rod, 13 cm length	36 41 00
	Brush, 11 cm length	38 02 30

### Glass Cells

Type	Item	Code
<b>DB424/S</b>	5 glass cells with lid, volume 10 ml, calibrated 2 - 12 ml, path length 13,5 mm	35 42 43
<b>W680/40</b>	Glass cell 40 mm path length, calibrated at 20 ml	60 68 90

### Plastic Cells

	5 plastic cells, frosted on two sides, 13.5 mm path length, volume 10 ml, with lid	14 55 05
	10 plastic cells, as 14 55 05	14 55 00
	100 plastic cells, as 14 55 05	14 55 10

### Delivery content

- Comparator 2000+  
in a sturdy plastic case
- Disc(s)
- Cells & accessories
- Tablet reagents for 100 tests
- Warranty information
- Instruction manual



Test Kit



Comparator 2000+



Daylight unit, mains operated



Reagents

# Comparator 2000+

## Tests, Discs, Reagents, Cells

Test		Disc	Disc Readings	Range	Code
<b>Aluminium</b>		3/127 A	0; 0.05; 0.1; 0.15; 0.2; 0.25; 0.3; 0.4; 0.5 mg/l	0 - 0.5 mg/l	23 02 05
<b>Ammonia</b>	★	3/112	0; 0.05; 0.1; 0.15; 0.2; 0.25; 0.3; 0.35; 0.4 mg/l	0 - 0.4 mg/l NH <sub>4</sub>	23 00 60
<b>Ammonia</b>		3/113	0; 0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.8; 1 mg/l	0 - 1.0 mg/l N	23 00 70
<b>Bromine</b>	★ 🌿	3/53A	0.2; 0.4 ; 0.6; 0.8; 1; 1.2; 1.4; 1.6; 2 mg/l	0.2 - 2.0 mg/l	23 53 10
<b>Bromine</b>	★	3/53B	1; 2; 3; 4; 5; 6; 7; 8; 10 mg/l	1.0 - 10 mg/l	23 53 20
<b>Bromine</b>	★	3/53C	0.5; 1; 1.5; 2; 2.5; 3; 4; 5; 6 mg/l	0.5 - 6 mg/l	23 53 30
<b>Chlorine</b> free, combined, total	★ 🌿	3/40A	0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.7; 0.8; 1 mg/l	0.1 - 1.0 mg/l	23 40 10
<b>Chlorine</b> free, combined, total	★	3/40J	0.1; 0.2; 0.3; 0.4; 0.6; 0.8; 1; 1.5; 2 mg/l	0.1 - 2.0 mg/l	23 41 40
<b>Chlorine</b> free, combined, total	★	3/40B	0.2; 0.4; 0.6; 1; 1.5; 2; 2.5; 3; 4 mg/l	0.2 - 4.0 mg/l	23 40 20

★ also suitable for seawater, # including stirring rod

\* alternative reagent, used instead of DPD No.1 in case of turbidity in the water sample caused by high concentration of calcium and/or high conductivity

🌿 Green Chemistry

Reagents	Quantity	Code	Accessories	Code
ALUMINIUM No.1	100	51 54 60 BT	13.5 mm cell, 10 ml	35 42 43
	250	51 54 61 BT		
ALUMINIUM No.2	100	51 54 70 BT		
	250	51 54 71 BT		
Combi pack <sup>#</sup>	each 100	51 76 01 BT		
ALUMINIUM No.1 / No.2	each 250	51 76 02 BT		
AMMONIA No.1	100	51 25 80 BT	40 mm cell W680/40	60 68 90
	250	51 25 81 BT		
AMMONIA No.2	100	51 25 90 BT		
	250	51 25 91 BT		
Combi pack <sup>#</sup>	each 100	51 76 11 BT		
AMMONIA No.1 / No.2	each 250	51 76 12 BT		
AMMONIA No.1/2			13.5 mm cell, 10 ml	35 42 43
DPD No.1	100	51 10 50 BT	13.5 mm cell, 10 ml	35 42 43
	250	51 10 51 BT		
	500	51 10 52 BT		
DPD No.1			13.5 mm cell, 10 ml	35 42 43
DPD No.1			13.5 mm cell, 10 ml	35 42 43
DPD No.1	100	51 10 50 BT	13.5 mm cell, 10 ml	35 42 43
	250	51 10 51 BT		
	500	51 10 52 BT		
DPD No.1 HIGH CALCIUM*	100	51 57 40 BT		
DPD No.2	100	51 15 30 BT		
	250	51 15 31 BT		
DPD No.3	100	51 10 80 BT		
	250	51 10 81 BT		
	500	51 10 82 BT		
DPD No.3 HIGH CALCIUM*	100	51 57 30 BT		
Combi pack <sup>#</sup>	each 100	51 77 11 BT		
DPD No.1 / No.3	each 250	51 77 12 BT		
Combi pack <sup>#</sup>	each 100	51 77 81 BT		
DPD No.1 / No.3	each 250	51 77 82 BT		
HIGH CALCIUM*				
DPD No.4	100	51 12 20 BT		
	250	51 12 21 BT		
	500	51 12 22 BT		
DPD No.1/2/3/4			13.5 mm cell, 10 ml	35 42 43
DPD No.1/2/3/4			13.5 mm cell, 10 ml	35 42 43





# Comparator 2000+

## Tests, Discs, Reagents, Cells

Test		Disc	Disc Readings	Range	Code
<b>Chlorine</b> free, combined, total	★	3/40K	0.5; 1; 1.5; 2; 2.5; 3; 4; 5; 6 mg/l	0.5 - 6.0 mg/l	23 39 30
<b>Chlorine</b> free, combined, total	★	3/40S	1; 1.2; 1.4; 1.6; 1.8; 2; 2.5; 3; 4 mg/l	1.0 - 4.0 mg/l	23 40 90
<b>Chlorine</b> free, combined, total	★	3/40P	2; 2.3; 2.5; 2.7; 3; 3.2; 3.6; 4; 5 mg/l	2.0 - 5.0 mg/l	23 39 20
<b>Chlorine</b> free, combined, total	★	3/40HN	2; 3; 4; 5; 6; 7; 8; 9; 10 mg/l	2.0 - 10 mg/l	23 40 81
<b>Copper</b>		3/106	0; 0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.8; 1 mg/l	0 - 1.0 mg/l	23 00 50
<b>Copper</b>		3/110	0; 0.5; 1; 1.5; 2; 2.5; 3; 3.5; 4 mg/l	0 - 4.0 mg/l	23 00 40
<b>Hydrogen Peroxide</b>		3/114	2; 4; 6; 8; 10; 12; 14; 16; 20 mg/l	2 - 20 mg/l	23 00 80
<b>Hydrogen Peroxide</b>		3/115	10; 20; 30; 40; 50; 60; 70; 80; 100 mg/l	10 - 100 mg/l	23 00 90
<b>Iron,</b> total	★	3/116	0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.7; 0.8; 1 mg/l	0.1 - 1.0 mg/l	23 01 00
<b>Iron,</b> total		3/117	1; 2; 3; 4; 5; 6; 7; 8; 10 mg/l	1.0 - 10 mg/l	23 01 10
<b>Manganese</b>		3/169	0; 0.5; 1; 1.5; 2; 2.5; 3; 3.5; 4 mg/l	0 - 4.0 mg/l	23 06 90

★ also suitable for seawater, # including stirring rod

\* alternative reagent, used instead of DPD No.1 in case of turbidity in the water sample caused by high concentration of calcium and/or high conductivity

Reagents	Quantity	Code	Accessories	Code
DPD No.1/2/3/4			13.5 mm cell, 10 ml	35 42 43
DPD No.1/2/3/4			13.5 mm cell, 10 ml	35 42 43
DPD No.1/2/3/4			13.5 mm cell, 10 ml	35 42 43
DPD No.1/2/3/4			5 mm cell W680/5	60 67 90
COPPER/ZINC LR	100 250	51 26 20 BT 51 26 21 BT	13.5 mm cell, 10 ml	35 42 43
COPPER/ZINC HR	100 250	51 23 40 BT 51 23 41 BT	13.5 mm cell, 10 ml	35 42 43
HYDR. PEROXIDE HR	100 250	51 35 30 51 35 31	13.5 mm cell, 10 ml	35 42 43
ACIDIFYING PT	100 250	51 35 40 51 35 41		
HYDR. PEROXIDE HR	100 250	51 35 30 51 35 31	13.5 mm cell, 10 ml	35 42 43
ACIDIFYING PT	100 250	51 35 40 51 35 41		
IRON LR (Fe <sup>2+</sup> and Fe <sup>3+</sup> )	100 250	51 53 70 BT 51 53 71 BT	13.5 mm cell, 10 ml	35 42 43
IRON (II) LR (Fe <sup>2+</sup> )	100	51 54 20 BT		
IRON HR	100 250	51 53 80 BT 51 53 81 BT	13.5 mm cell, 10 ml	35 42 43
MANGANESE LR 1	100 250	51 60 80 BT 51 60 81 BT	13.5 mm cell, 10 ml	35 42 43
MANGANESE LR 2	100 250	51 60 90 BT 51 60 91 BT		
Combi pack#	each 100	51 76 21 BT		
MANGANESE LR 1/ MANGANESE LR 2	each 250	51 76 22 BT		





Water sampler AF 631, volume 500 ml,  
total length 85 cm,  
Order code: 17 05 00

Ensures water is sampled  
at the optimum depth.

# Comparator 2000+

## Tests, Discs, Reagents, Cells

Test	Disc	Disc Readings	Range	Code
<b>Nitrate</b>	3/142	10; 20; 30; 40; 50; 60; 70; 80; 100 mg/l	10 - 100 mg/l NO <sub>3</sub>	23 03 60
<b>Ozone (DPD)</b>	 3/67	0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.7; 0.8; 1 mg/l	0.1 - 1.0 mg/l	23 67 00
<b>Ozone (DPD)</b>	 3/67A	0.01; 0.02; 0.03; 0.04; 0.05; 0.06; 0.07; 0.08; 0.1 mg/l	0.01 - 0.1 mg/l	23 67 10
<b>Ozone (Indigo)</b>	3/148	0; 0.05; 0.1; 0.15; 0.2; 0.25; 0.3; 0.4; 0.5 mg/l	0 - 0.5 mg/l	23 04 40
<b>pH</b>	2/1G	5.2; 5.4; 5.6; 5.8; 6; 6.2; 6.4; 6.6; 6.8	5.2 - 6.8 pH	22 11 00
<b>pH</b>	 2/1J	6.8; 7; 7.2; 7.4; 7.6; 7.8; 8; 8.2; 8.4	6.8 - 8.4 pH	22 11 30
<b>pH</b>	2/1P	4; 5; 6; 7; 8; 9; 9.4; 10; 11	4.0 - 11 pH	22 12 20
<b>Phosphate</b>	3/136	0; 5; 10; 15; 20; 25; 30; 35; 40 mg/l	0 - 40 mg/l PO <sub>4</sub>	23 03 10
<b>Phosphate</b>	3/70	0; 10; 20; 30; 40; 50; 60; 70; 80; 100 mg/l	0 - 100 mg/l PO <sub>4</sub>	23 70 00
<b>QAC (Quaternary Ammonia Compounds)</b>	3/118	0; 2; 4; 6; 8; 10; 12; 15; 20 mg/l	0 - 20 mg/l	23 01 20
<b>QAC (Quaternary Ammonia Compounds)</b>	3/119	0; 20; 40; 60; 80; 100; 120; 150; 200 mg/l	0 - 200 mg/l	23 01 30
<b>Sodiumhypochlorite</b>	3/2 Hypo	2; 4; 6; 8; 10; 12; 14; 16 %	2 - 16 %	23 21 10

 also suitable for seawater, # including stirring rod

\* alternative reagent, used instead of DPD No.1 in case of turbidity in the water sample caused by high concentration of calcium and/or high conductivity

 Green Chemistry



Reagents	Quantity	Code	Accessories	Code
NITRATE No.1	100	51 31 10	13.5 mm cell, 10 ml	35 42 43
NITRATE No.2	100	51 31 20		
	250	51 31 21		
Combi pack#	each 100	51 76 41		
Nitrate No.1 / No.2	each 250	51 76 42		
DPD No.4	100	51 12 20 BT	13.5 mm cell, 10 ml	35 42 43
	250	51 12 21 BT		
DPD No.4	100	51 12 20 BT	40 mm cell W680/40	60 68 90
	250	51 12 21 BT		
OZONE-INDIGO	100	51 31 70 BT	40 mm cell W680/40	60 68 90
	250	51 31 71 BT		
BROMOCRESOL PURPLE	100	51 17 30	13.5 mm cell, 10 ml	35 42 43
	250	51 17 31		
PHENOL RED	100	51 17 50 BT	13.5 mm cell, 10 ml	35 42 43
	250	51 17 51 BT		
UNIVERSAL PH Indicator	25 ml	45 17 70	13.5 mm cell, 10 ml	35 42 43
	100 ml	45 17 71		
	250 ml	45 17 72		
	500 ml	45 17 73		
PHOSPHATE HR	100	51 19 80 BT	13.5 mm cell, 10 ml	35 42 43
PHOSPHATE HR	100	51 19 80 BT	13.5 mm cell, 10 ml	35 42 43
QAC LR	100	51 53 90 BT	40 mm cell W680/40	60 68 90
	250	51 53 91 BT		
ACIDIFYING GP	100	51 54 80 BT		
	250	51 54 81 BT		
QAC HR	100	51 54 00	13.5 mm cell, 10 ml	35 42 43
	250	51 54 01		
ACIDIFYING GP	100	51 54 80 BT		
	250	51 54 81 BT		
CHLORINE HR (KI)	100	51 30 00 BT	13.5 mm cell, 10 ml	35 42 43
	250	51 30 01 BT		
ACIDIFYING GP	100	51 54 80 BT		
	250	51 54 81 BT		
Combi pack#	each 100	51 77 21 BT		
CHLORINE HR (KI)/	each 250	51 77 22 BT		
ACIDIFYING GP				
Dilution set for sample preparation	1	41 44 70		

MSDS (Material Safety Data Sheets): [www.lovibond.com](http://www.lovibond.com)



# PHOTOMETRY



MD 100/110



MD 200



PM 600/620/630







# Photometry

## The History

Several decades have passed since the appearance of the first Lovibond® PC 100 photometer system. Since that time, Tintometer has become a world-famous name as the manufacturer of photometer systems sold under the brand name of Lovibond®. Our range of photometer systems extends from the **MD 100\*** and **MD 110\*** as hand-held model to the multi parameter photometer **MD 200\*** as benchtop model in different parameter variants. The multi-functional **PM 600, PM 620 & PM 630 photometers** provide the answer to all requirements relating to the analysis of water used in modern swimming pools and baths. They offer a wide variety of pre-programmed methods and are therefore suitable for the demands of modern water analysis.

All the parameters which can be measured with Lovibond® photometer systems are set out in the table. This table also explains which parameters can be measured with which photometer.

## Parameter

	MD 100* & MD 110*	MD 200*	PM 620 & PM 630	PM 600
Acid Capacity K <sub>54.3</sub>		■	■	
Alkalinity-M (total)	■	■	■	■
Aluminium			■	
Ammonia			■	
Bromine	■	■	■	■
Calcium Hardness	■	■	■	■
Chlorine	■	■	■	■
Chlorine Dioxide		■	■	
Copper		■	■	■
Cyanuric acid	■	■	■	■
Hydrogen Peroxide		■	■	
Iodine			■	

\* The MD 100 and MD 200 photometer series do not provide all parameters in a single instrument. The number and type of parameters depend on the variant (please refer to the relevant chapter).





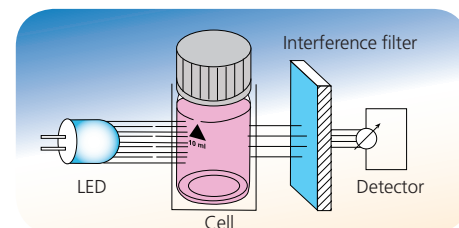
## Parameter

	MD 100* & MD 110*	MD 200*	PM 620 & PM 630	PM 600
Iron ( $\text{Fe}^{2+}$ , $\text{Fe}^{3+}$ ), soluble	■	■	■	■
Langelier Water Balance			■	■
Langelier-Saturation Index			■	■
Oxygen, active			■	
Ozone			■	■
pH value	■	■	■	■
PHMB (Biguanides)			■	
Phosphate			■	■
Sodium Hypochlorite			■	■
Sulphate			■	
Total Hardness			■	
Urea	■	■		

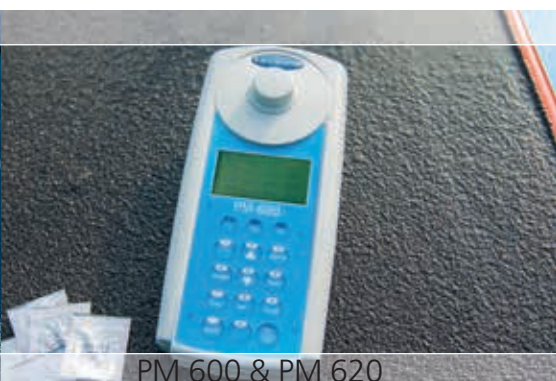
## The photometric principle

When specific reagents are added, the water sample takes on a degree of coloration that is proportional to the concentration of the parameter being measured. The photometer measures this coloration.

When a light beam passes through the coloured sample, energy with a specific wavelength is absorbed by the test substance. The photometer determines the coloration of the sample by measuring the transmission or absorption of light of this wavelength (in other words, monochromatic light). High-quality interference filters precisely limit the wavelength and are a prerequisite for obtaining high-precision measurement results. The use of such interference filters is one Lovibond® filter photometers to the quality standard. The photometer then uses a microprocessor to calculate the required concentration and displays the result.



Photometry



# MD 100 Photometer



*Compact & ergonomic,  
ideal for use in the field*

*Extremely robust,  
waterproof  
& floatable*

*Large, easy  
to read  
display*

*Optimal  
Parameter-  
combinations  
available*

The MD 100 uses high quality interference filters with long-life LEDs as a light source in a transparent sample chamber.

The units provide accurate, reproducible results very quickly. Other major advantages include ease of operation, ergonomic design, compact dimensions and safe handling.

Using an internal ring memory, the last 16 data sets are stored automatically with date, time, parameter and measurement value.

The tests are conducted using either Lovibond® tablet reagents, with long-term stability and a guaranteed minimum 5 or 10 year shelf life, VARIO powder reagents or liquid reagents.

## Scroll Memory

To avoid unnecessary scrolling for the required test method, the instrument memorizes the last method used before switching off the instrument. When the instrument is switched on again, the scroll list comes up with the last used test method first.

## Zero Setting (OTZ)


It is not necessary to zero the instrument each time. The zero setting is held in memory until the device is turned off (**One Time Zero - OTZ**). The zero setting can be confirmed whenever it is required.

## N.I.S.T. Traceability



The device is factory pre-adjusted to international standards. The user can set the instrument in "user calibration mode" with standards traceable to N.I.S.T. adjust.

(N.I.S.T. = National Institute of Standards and Technology)


## 2in1

Test	Code
<b>MD 100 Chlorine, pH</b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH	27 80 20
<b>MD 100 Chlorine, pH</b> , liquid reagent 0.02 - 4 mg/l Cl <sub>2</sub> / 6.5 - 8.4 pH	27 80 25
<b>MD 100 Chlorine, pH</b> powder reagents for chlorine 0.02 - 2.0 mg/l Cl <sub>2</sub> (ø 24 mm glass vial) 0.1 - 8.0 mg/l Cl <sub>2</sub> (ø 10 mm multi vial-2) 6.5 - 8.4 pH	27 80 30


## 3in1

Test	Code
<b>MD 100 Chlorine, pH</b>  <b>Cyanuric Acid</b> tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH ; 0 - 160 mg/l cyanuric acid	27 80 10
<b>MD 100 Chlorine, pH, Cyanuric Acid</b> liquid reagent for chlorine and pH 0.02 - 4 mg/l Cl <sub>2</sub> / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid	27 80 15
<b>MD 100 Chlorine, pH, Alkalinity-M (total)</b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH ; 5 - 200 mg/l CaCO <sub>3</sub> (TA)	27 80 60
<b>MD 100 Chlorine, pH, Alkalinity-M (total)</b> liquid reagent for chlorine and pH 0.02 - 4 mg/l Cl <sub>2</sub> / 6.5 - 8.4 pH 5 - 200 mg/l CaCO <sub>3</sub> (TA)	27 80 65

## 4in1


Test	Code
<b>MD 100 Chlorine, pH</b>  <b>Cyanuric Acid, Alkalinity-M (total)</b> tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH ; 0 - 160 mg/l cyanuric acid 5 - 200 mg/l CaCO <sub>3</sub> (TA)	27 80 70
<b>MD 100 Chlorine, pH, Cyanuric Acid, Alkalinity-M (total)</b> liquid reagent for chlorine and pH 0.02 - 4 mg/l Cl <sub>2</sub> / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid / 5 - 200 mg/l CaCO <sub>3</sub> (TA)	27 80 75

## 5in1

Test	Code
<b>MD 100 Chlorine, pH</b>  <b>Cyanuric Acid, Alkalinity-M (total), Calcium hardness</b> tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH ; 0 - 160 mg/l cyanuric acid 5 - 200 mg/l CaCO <sub>3</sub> (TA) ; 0 - 500 mg/l CaCO <sub>3</sub> (CaH)	27 80 80

<b>MD 100 Chlorine Duo, Chlorine HR, pH, Alkalinity-M, Calcium hardness</b> powder reagents and tablet reagents for Chlorine tablet reagents for pH, Alkalinity-M, Calcium hardness without reagents for Chlorine HR Chlorine T 0,01 - 6,0 mg/l Chlorine PP 0,02 - 3,5 mg/l Chlorine HR 5 - 200 mg/l pH 6,5 - 8,4 Alkalinity-M 5 - 200 mg/l Calcium hardness 20 - 500 mg/l	27 81 60
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## 6in1

Test	Code
<b>MD 100 Chlorine, Bromine, pH</b>  <b>Cyanuric Acid, Alkalinity-M (total), Calcium hardness</b> tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 0.05 - 13 mg/l Br ; 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid 5 - 200 mg/l CaCO <sub>3</sub> (TA) ; 0 - 500 mg/l CaCO <sub>3</sub> (CaH)	27 80 90

\* Delivery without reagents for measuring range 0.1 - 10 mg/l Cl<sub>2</sub>  Green Chemistry

 Please see pages 50 onwards for reagents (order codes)

## Data Transfer

The optional available IRI<sup>M</sup> (infrared interface module) uses infrared technology to transmit measurement data from the MD 100 photometer to one of 3 optional interfaces. These interfaces can be used to connect to a PC, a USB printer <sup>1)</sup> sup or alternatively a serial printer <sup>2)</sup>.

The unit is supplied complete with data logging software providing easy and rapid transfer of data to the PC. As an option, the data can be saved as an Excel sheet or a .txt file.

Measurement data can quickly be printed out, using a specified <sup>1)</sup> USB or alternatively a

printer with a serial plug-in connected to the IRI<sup>M</sup>. Applicable for the following operating systems: Windows® XP, Windows® Vista and Windows® 7/10.

<sup>1)</sup> USB-printer: HP Deskjet 6940 ; <sup>2)</sup> each ASCII printer Windows® is a registered trademark of Microsoft Corporation in the United States and other countries.







## Technical Data

<b>Optics</b>	LEDs, interference filters (IF) and photo sensor in transparent sample chamber. Depending on the version, up to 3 different interference filters are used. Wavelength specifications of interference filters: 430 nm $\Delta\lambda = 5$ nm 530 nm $\Delta\lambda = 5$ nm 560 nm $\Delta\lambda = 5$ nm 580 nm $\Delta\lambda = 5$ nm 610 nm $\Delta\lambda = 6$ nm 660 nm $\Delta\lambda = 5$ nm
<b>Wavelength Accuracy</b>	$\pm 1$ nm
<b>Photometric Accuracy<sup>4)</sup></b>	3 % FS (T = 20 °C – 25 °C)
<b>Photometric Resolution</b>	0.01 A
<b>Power Supply</b>	4 micro batteries (AAA), capacity approx. 17 hours or approx. 5000 tests in continuous operation with the display lighting switched off
<b>Auto - OFF</b>	automatic switch-off
<b>Display</b>	backlit LCD (on keypress)
<b>Storage</b>	internal ring memory for 16 data sets
<b>Interface</b>	infrared interface for test data transfer
<b>Additional feature</b>	real time clock and date
<b>Calibration</b>	factory calibration and user calibration. Reset to factory calibration possible
<b>Dimensions</b>	155 x 75 x 35 mm (L x W x H)
<b>Weight</b>	basic unit approx. 260 g
<b>Environmental conditions</b>	temperature: 5 – 40 °C rel. humidity: 30 – 90 % (non condensing)
<b>Approval</b>	CE

<sup>4)</sup> tested with standard solutions

## Accessories

Item	Code
Set of 12 round vials with lids Height 48 mm, Ø 24 mm	19 76 20
Set of 5 round vials with lids Height 48 mm, Ø 24 mm	19 76 29
Set of 12 plastic vials (PC), with lid "Multi" -Type 2, Ø 10 mm	19 76 00
Vial stand for 6 round vials Ø 24 mm, acrylic glass	41 89 51
Cleaning cloth for vials	19 76 35
Measuring beaker, volume 100 ml	38 48 01
Cleaning brush, 11 cm length	38 02 30
Plastic stirring rod, 13 cm length	36 41 00
Plastic stirring rod, 10 cm length	36 41 09
4 micro batteries (AAA)	19 50 026
Infrared data transfer module IRiM	21 40 50

## Delivery Content

- Instrument in carrying case
- 4 micro batteries (AAA)
- 3 round vials (glass) with lids
- 1 stirring rod & 1 brush
- Tablet reagents and/or liquid reagents or VARIO Powder reagent
- Warranty information
- Certificate (Certificate of Compliance)
- Instruction Manual



## Manufacturers Test Certificate M

Besides the "Certificate of Compliance" which is supplied with the MD 100, the manufacturer test certificate M is available at cost on request. Manufacturer test certificate M is individually supplied per instrument and per method.

The manufacturer test certificate M has to be ordered together with the new instrument and cannot be delivered at a later stage.

## Verification Standard Kit

The verification standard kit for the MD 100 is designed to assure the user of the accuracy and the reliability of the results related to the integrated wavelengths. The kit contains one zero standard, 6 different vials for checking 6 different wavelengths and allows for checking the complete range of MD 100 photometers. The shelf life of the verification standard kit is two years from the date of production, provided that storage and use are in accordance with the instructions provided. Measurements are taken in mAbs.

**Verification Standard Kit** 21 56 70

## Reference Standard Kits

The reference standards are designed to check the accuracy and the reliability of the results.

It is not possible to calibrate the photometer with the reference standards.

The shelf life of reference standards is two years from the date of production, provided that storage and use are in accordance with the instructions provided.

**Kit Chlorine** for instruments with tablet / liquid reagent 0.2\* and 1.0\* mg/l 27 56 50

**Kit Chlorine** for instruments with tablet / liquid reagent 0.5\* and 2.0\* mg/l 27 56 55

**Kit Chlorine** for instruments with tablet / liquid reagent 1.0\* and 4.0\* mg/l 27 56 56

**Kit Chlorine** for instruments with powder reagent (VARIO) 0.2\* and 1.0\* mg/l 27 56 60

**Kit pH** for instruments with tablet / liquid reagent 7,45\* pH 27 56 70



\* Approximate figure, actual figure specified in certificate of analysis enclosed

 Please see pages 50 onwards for reagents (order codes)

# MD 110 Photometer

Photometer with Bluetooth® Technology



## Delivery Content

- Instrument in carrying case
- 4 micro batteries (AAA)
- 3 round vials (glass) with lids
- 1 stirring rod & 1 brush
- Tablet reagents and/or liquid reagents or VARIO Powder reagents
- Warranty information
- Certificate (Certificate of Compliance)
- Instruction Manual

The **Bluetooth®** word mark is a registered trademark owned by Bluetooth SIG, Inc. and any use by Lovibond® Tintometer GmbH is under license. IOS® is a registered trademark of Cisco, Inc. and licensed to Apple, Inc. Android™ is a trademark of Google, Inc.

## Technical Data

<b>Optics</b>	LEDs, interference filters (IF) and photo sensor in transparent sample chamber. Depending on the version, up to 3 different interference filters are used. Wavelength specifications of interference filters: 430 nm $\Delta\lambda = 5$ nm 530 nm $\Delta\lambda = 5$ nm 560 nm $\Delta\lambda = 5$ nm 580 nm $\Delta\lambda = 5$ nm 610 nm $\Delta\lambda = 6$ nm 660 nm $\Delta\lambda = 5$ nm	<b>Photometric Resolution</b>	0.01 A	<b>Calibration</b>	factory calibration and user calibration. Reset to factory calibration possible
<b>Wavelength Accuracy</b>	$\pm 1$ nm	<b>Power Supply</b>	4 micro batteries (AAA), capacity approx. 17 hours or approx. 5000 tests in continuous operation with the display lighting switched off	<b>Dimensions</b>	155 x 75 x 35 mm (L x W x H)
<b>Photometric Accuracy<sup>4)</sup></b>	3 % FS (T = 20 °C – 25 °C)	<b>Auto - OFF</b>	automatic switch-off	<b>Weight</b>	basic unit approx. 260 g
		<b>Display</b>	backlit LCD (on keypress)	<b>Environmental conditions</b>	temperature: 5 – 40 °C rel. humidity: 30 – 90 % (non condensing)
		<b>Storage</b>	internal ring memory for 125 data sets	<b>Approval</b>	CE
		<b>Interface</b>	<b>Bluetooth®</b> interface for data transfer	<sup>4)</sup> tested with standard solutions	
		<b>Additional feature</b>	Real-Time-Clock and date		

### 3in1

Test	Code
<b>MD 110 Chlorine, pH, Cyanuric Acid</b> tablet reagents 0,01 - 6,0 mg/l Cl <sub>2</sub> / 0,1 - 10 mg/l Cl <sub>2</sub> * 6,5 - 8,4 pH / 0 - 160 mg/l cyanuric acid	29 80 102
<b>MD 110 Chlorine, pH, Cyanuric Acid</b> liquid reagent for chlorine and pH 0,02 - 4 mg/l Cl <sub>2</sub> / 6,5 - 8,4 pH 0 - 160 mg/l cyanuric acid	29 80 152

 Green Chemistry

### 4in1

Test	Code
<b>MD 110 Chlorine, pH, Cyanuric Acid, Alkalinity-M (total)</b> tablet reagents 0,01 - 6,0 mg/l Cl <sub>2</sub> / 0,1 - 10 mg/l Cl <sub>2</sub> * 6,5 - 8,4 pH / 0 - 160 mg/l cyanuric acid 5 - 200 mg/l CaCO <sub>3</sub> (TA)	29 80 702
<b>MD 110 Chlorine, pH, Cyanuric Acid, Alkalinity-M (total)</b> liquid reagent for chlorine and pH 0,02 - 4 mg/l Cl <sub>2</sub> / 6,5 - 8,4 pH 0 - 160 mg/l cyanuric acid / 5 - 200 mg/l CaCO <sub>3</sub> (TA)	29 80 752

### 6in1

Test	Code
<b>MD 110 Chlorine, Bromine, pH, Cyanursäure, Alkalinity-M (total), Calcium hardness</b> tablet reagents 0,01 - 6,0 mg/l Cl <sub>2</sub> / 0,1 - 10 mg/l Cl <sub>2</sub> * 0,05 - 13 mg/l Br / 6,5 - 8,4 pH 0 - 160 mg/l cyanuric acid / 5 - 200 mg/l CaCO <sub>3</sub> (TA) 0 - 500 mg/l CaCO <sub>3</sub> (CaH)	29 80 902

\* Delivery without reagents for measuring range 0.1 - 10 mg/l Cl<sub>2</sub>

 Please see pages 50 onwards for reagents (order codes)

## Data Transfer

The MD 110 photometers have a **Bluetooth®** feature. In order to get the best use out of this, Tintometer offers an app for mobile devices and PC software with a dongle.

Via the **Bluetooth®** interface, the measurement results are transmitted to external devices for prompt assessment and processing, so that all data can be evaluated and collated directly on site.

The free app **AquaLX®** is ideally designed for use in on-site measurements. Compatible with IOS®- and Android®-based smartphones and Tablets, it enables fuss-free data transfer. It maps all measured values as descriptive graphs with minimum and maximum limits and supports export of the data as an Excel®-compatible CSV file.

With the aid of the complimentary **Bluetooth®** dongle, the PC software makes it possible to import data directly from the photometer to the Windows-based PC. As a stationary solution, it facilitates the transfer of data through a fast established, permanent wireless connection. Further processing of the results can be effected both in the software itself and by exporting the data to Excel or as a CSV file.

The set of software and **Bluetooth®** dongle is offered as separate accessories under item no. 2444480.

For more information, see [www.bluetooth.lovibond.com](http://www.bluetooth.lovibond.com)



**Bluetooth®** is a wireless technology subject to regional approval. The use of the MD 110 with **Bluetooth®** is currently only permitted within Europe, the USA, and in Canada. The use of the MD 110 will also be possible in other regions in the future. For current regions and further information, visit: [www.bluetooth.lovibond.com](http://www.bluetooth.lovibond.com)  
Regions in which the MD 110 with **Bluetooth®** can currently be used (status: 01/2015): within Europe (according R&TTE Directive 1999/5/EC); USA (according to FCC part 15, comprised in FCC ID QOQBLE113); Canada (comprised in IC 5123A-BGTBLE113)




# MD 200 Photometer

Precise results using high-quality interference filters












## 2in1

Test	Code
<b>MD 200 Chlorine, pH</b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH	28 89 402
<b>MD 200 Chlorine, pH</b> liquid reagents 0.02 - 4 mg/l Cl <sub>2</sub> / 6.5 - 8.4 pH	28 89 412
<b>MD 200 Copper, pH</b> tablet reagents 0.05 - 5 mg/l Cu / 6.5 - 8.4 pH	28 72 102
<b>MD 200 Hydrogen peroxide, pH</b> (no OTZ) liquid reagents 1 - 50 mg/l H <sub>2</sub> O <sub>2</sub> / 40 - 500 mg/l H <sub>2</sub> O <sub>2</sub> 6.5 - 8.4 pH	28 88 102



## 3in1

Test	Code
<b>MD 200 Chlorine, pH, Bromine</b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH / 0.05 - 13 mg/l Br	28 61 802
<b>MD 200 Chlorine, pH, Cyanuric Acid</b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid	28 60 102
<b>MD 200 Chlorine, pH, Cyanuric acid</b> liquid reagents for chlorine and pH 0.02 - 4 mg/l Cl <sub>2</sub> / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid	28 82 002
<b>MD 200 Chlorine, pH, Acid capacity K<sub>S4.3</sub></b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH / 0.1 - 4 mmol/l	28 89 012
<b>MD 200 Chlorine, pH, Acid capacity K<sub>S4.3</sub></b> liquid reagents for chlorine and pH 0.02 - 4.0 mg/l Cl <sub>2</sub> / 6.5 - 8.4 pH 0.1 - 4 mmol/l	28 89 202
<b>MD 200 Chlorine, pH, Alkalinity-M</b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH / 5 - 200 mg/l CaCO <sub>3</sub> (TA)	28 89 002
<b>MD 200 Chlorine, pH, Alkalinity-M</b> liquid reagents for chlorine and pH 0.02 - 4 mg/l Cl <sub>2</sub> / 6.5 - 8.4 pH 5 - 200 mg/l CaCO <sub>3</sub> (TA)	28 89 302



## 4in1

Test	Code
<b>MD 200 Chlorine, pH, Cyanuric Acid, Acid capacity K<sub>S4.3</sub></b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 0.1 - 4 mmol/l	28 60 512
<b>MD 200 Chlorine, pH, Cyanuric Acid, Acid capacity K<sub>S4.3</sub></b> liquid reagents for chlorine and pH 0.02 - 4 mg/l Cl <sub>2</sub> / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid / 0.1 - 4 mmol/l	28 60 522
<b>MD 200 Chlorine, pH, Cyanuric Acid, Alkalinity-M</b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 5 - 200 mg/l CaCO <sub>3</sub> (TA)	28 60 502
<b>MD 200 Chlorine, pH, Cyanuric Acid, Alkalinity-M</b> liquid reagents for chlorine and pH 0.02 - 4 mg/l Cl <sub>2</sub> / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid / 5 - 200 mg/l CaCO <sub>3</sub> (TA)	28 60 542
<b>MD 200 Chlorine, pH, Urea, Acid capacity K<sub>S4.3</sub></b> tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 0.1 - 4 mmol/l / 0.1 - 2.5 mg/l Urea 0.2 - 5 mg/l Urea (diluted)	28 62 912
<b>MD 200 Chlorine, Chlorine dioxide, pH, Acid capacity K<sub>S4.3</sub></b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.02 - 11 mg/l ClO <sub>2</sub> 6.5 - 8.4 pH / 0.1 - 4 mmol/l	28 63 802

## 5in1

Test	Code
<b>MD 200 Chlorine, pH, Cyanuric Acid, Acid capacity K<sub>S4.3</sub>, Calcium hardness</b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 0.1 - 4 mmol/l / 0 - 500 mg/l CaCO <sub>3</sub> (CaH)	28 61 212
<b>MD 200 Chlorine, pH, Alkalinity-M, Cyanuric Acid, Calcium hardness</b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 5 - 200 mg/l CaCO <sub>3</sub> (TA) / 0 - 500 mg/l CaCO <sub>3</sub> (CaH)	28 61 202

## 6in1

Test	Code
<b>MD 200 Chlorine, Bromine, pH, Acid capacity K<sub>S4.3</sub>, Cyanuric Acid, Calcium hardness</b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 0.05 - 13 mg/l Br <sub>2</sub> / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid / 0.1 - 4 mmol/l 0 - 500 mg/l CaCO <sub>3</sub> (CaH)	28 61 912
<b>MD 200 Chlorine, Bromine, pH, Cyanuric Acid, Alkalinity-M, Calcium hardness</b>  tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 0.05 - 13 mg/l Br / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid / 5 - 200 mg/l CaCO <sub>3</sub> (TA) 0 - 500 mg/l CaCO <sub>3</sub> (CaH)	28 61 902
<b>MD 200 Chlorine, pH, Alkalinity-M, Copper, Iron, Cyanuric Acid,</b> tablet reagents 0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> * 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 5 - 200 mg/l CaCO <sub>3</sub> (TA) / 0.05 - 5 mg/l Cu 0.02 - 1 mg/l Fe <sup>2+/3+</sup>	28 62 102

\* Delivery without reagents for measuring range  
0.1 - 10 mg/l Cl<sub>2</sub>

# If differentiation is required, glycine tablets can be used.

 Green Chemistry

## Delivery Content

- Instrument in carrying case
- 4 batteries (AA)
- 3 round vials (glass) with lids
- 1 stirring rod & 1 brush
- Tablet reagents and/or liquid reagents
- Warranty information
- Certificate (Certificate of Compliance)
- Instruction Manual

# MD 200 Photometer

Designed to meet the latest technical requirements, the MD 200 photometer can be used in practically every area of water analysis.

The high-precision optics and top-quality interference filters use long-term stable LEDs as light-source. Because there are no moving parts, the entire measurement device requires absolutely no maintenance.

Precise and reproducible analysis results are obtained in a short time. The units impress with their user-friendliness, ergonomic design, compact dimensions and easy handling.

The tests are conducted using either Lovibond® tablet reagents with long-term stability and a guaranteed minimum 5 or 10 year shelf life or using liquid reagents.

## Scroll Memory (SM)

For multi-parameter instruments, the order of the various methods is pre set. To avoid unnecessary scrolling for the required test method, the instrument memorizes the last method used before switching off the instrument. When the instrument is switched on again, the scroll list comes up with the last used test method first. This allows for faster access to favoured methods.

## Zero Setting (OTZ)

It is not necessary to zero the instrument each time. The zero setting is held in memory until the device is turned off (**One Time Zero - OTZ**). The zero setting can be confirmed whenever it is required.

## N.I.S.T Traceability

The device is factory pre-adjusted to international standards. The user can set the instrument in "user calibration mode" with standards traceable to N.I.S.T. adjust.

(N.I.S.T. = National Institute of Standards and Technology)

### Technical Data

<b>Optics</b>	LEDs, interference filters (IF) and photo sensor in transparent sample chamber. Depending on the version, up to 3 different interference filters are used. Wavelength specifications of interference filters: 430 nm $\Delta\lambda = 5$ nm 530 nm $\Delta\lambda = 5$ nm 560 nm $\Delta\lambda = 5$ nm 610 nm $\Delta\lambda = 6$ nm
<b>Wavelength Accuracy</b>	$\pm 1$ nm
<b>Photometric Accuracy<sup>4)</sup></b>	3 % FS (T = 20 °C – 25 °C)
<b>Photometric Resolution</b>	0.01 A
<b>Power Supply</b>	4 batteries (AA), capacity approx. 53 hours or 15000 tests (continuous operation without display lighting)
<b>Auto - OFF</b>	automatic switch-off
<b>Display</b>	backlit LCD (on keypress)
<b>Storage</b>	internal ring memory for 16 data sets
<b>Interface</b>	infrared interface for test data transfer to IRIIM
<b>Additional feature</b>	real time clock and date
<b>Calibration</b>	factory calibration and user calibration. Reset to factory calibration possible
<b>Dimensions</b>	190 x 110 x 55 mm (L x W x H)
<b>Weight</b>	basic unit approx. 455 g (with batteries)
<b>Environmental conditions</b>	temperature: 5 – 40 °C rel. humidity: 30 – 90 % (non condensing)
<b>Approval</b>	CE

<sup>4)</sup> tested with standard solutions

### Accessories

Item	Code
Set of 12 round vials with lids Height 48 mm, Ø 24 mm	19 76 20
Set of 5 round vials with lids Height 48 mm, Ø 24 mm	19 76 29
Set of 10 round vials with lid Height 90 mm, Ø 16 mm	19 76 65
Adapter for round vials ø 16 mm	19 80 21 90
Vial stand for 6 round vials Ø 24 mm, acrylic glass	41 89 51
Vial stand for 10 vials (Ø 16 mm or □ 13,5 mm), acrylic glass	41 89 57
Cleaning cloth for vials	19 76 35
Measurement beaker, 100 ml	38 48 01
Plastic stirring rod, 13 cm length	36 41 00
Plastic stirring rod, 10 cm length	36 41 09
Battery lid	19 80 22 41
4 Batteries (AA)	19 50 025
Infrared data transfer module IRIIM	21 40 50



 Please see pages 52 onwards for reagents (order codes)



## Data Transfer

The optional available IRiM (infrared interface module) uses infrared technology to transmit measurement data from the MD 200 photometer to one of 3 optional interfaces. These interfaces can be used to connect to a PC, a USB printer<sup>1)</sup> or alternatively a serial printer<sup>2)</sup>.

The unit is supplied complete with data logging software providing easy and rapid transfer of data to the PC. As an option the data can be saved as an Excel sheet or a .txt file.

Measurement data can quickly be printed out, using a specified<sup>1)</sup> USB or alternatively a printer with a serial plug-in connected to the IRiM.

Applicable for the following operating systems: Windows® XP, Windows® Vista and Windows® 7/10.

<sup>1)</sup> USB printer: HP Deskjet 6940 ; <sup>2)</sup> each ASCII printer  
Windows® is a registered Trademark of Microsoft Corporation



## Manufacturers Test Certificate M

Besides the "Certificate of Compliance" which is supplied with the MD 200, manufacturer test certificate M is available at cost on request. Manufacturer test certificate M is individually supplied per instrument and per method.

The manufacturer test certificate M has to be ordered together with the new instrument and cannot be delivered at a later stage.

## Verification Standard Kit

The verification standard kit for the MD 200 is designed to assure the user of the accuracy and the reliability of the results related to the integrated wave lengths.

The kit contains one zero standard, 6 different vials for checking 6 different wave lengths and allows for checking the complete range of MD 200 photometers.

The shelf life of the verification standard kit is two years from the date of production, provided that storage and use are in accordance with the instructions provided.

Measurements are taken in mAbs.

**Verification Standard Kit** 21 56 70

## Reference Standard Kits

The reference standards are designed to check the accuracy and the reliability of the results.

It is not possible to calibrate the photometer with the reference standards.

The shelf life of reference standards is two years from the date of production, provided that storage and use are in accordance with the instructions provided.

**Kit Chlorine** for instruments with tablet / liquid reagent 0.2\* and 1.0\* mg/l 27 56 50

**Kit Chlorine** for instruments with tablet / liquid reagent 0.5\* and 2.0\* mg/l 27 56 55

**Kit Chlorine** for instruments with tablet / liquid reagent 1.0\* and 4.0\* mg/l 27 56 56

**Kit pH** for instruments with tablet / liquid reagent 7,45\* pH 27 56 70

\* Approximate figure, actual figure specified in certificate of analysis enclosed



➔ Please see pages 52 onwards for reagents (order codes)



# PM Photometer

All pool parameters on one device




*Back-lit display*

*Stores up to 1000 results*

*Intuitive operation*

*User guide in German, English, French, Spanish, Italian, Portuguese, Polish & Indonesian*

The **Bluetooth®** word mark is a registered trademark owned by Bluetooth SIG, Inc. and any use by Lovibond® Tintometer GmbH is under license.  
IOS® is a registered trademark of Cisco, Inc. and licensed to Apple, Inc. Android™ is a trademark of Google, Inc.

 **Assignment of parameters, see pages 36 and 37**



The Lovibond® PM 600 photometers simplifies the pool water analysis decisively considerably. The PM 600 and PM 620 photometer range brings pool testing to the next level for discerning pool operators. The ergonomic, portable, waterproof design enables users to select just one unit for accurate analysis of up to 34 parameters anytime and anyplace. The PM 630 introduces data management and **Bluetooth®** functionality to the highly proven PM 600 series of photometers.

The **PM 600** focusses on the main pool parameters required for balanced water including: Alkalinity, Bromine, Chlorine, Cyanuric Acid, Iron, Calcium Hardness, Copper, Sodium Hypochlorite, Ozone and pH-value.

The **PM 620** extends these capabilities to include up to 34 parameter variants from Acid Demand to Urea.

The **PM 630** already simplifying accurate water analysis with 34 pre-calibrated pool methods, the series has now been expanded to include **Bluetooth®** data transmission. Now, results can be quickly and easily transferred to smartphones and tablets.

**All units** offer a large, back-lit graphic display to aid analysis by providing on-screen method prompts, information regarding test measurement range and reagent type and automatic count-down timers for accurate reaction periods. The internal memory is capable of storing up to 1000 results with date, time and sample ID. These results can be reviewed at any time and can be downloaded.

## Data Transfer

**PM 600** and **PM 620** can transfer data via an optional infrared module (IRIM) to the PC. Code: 21 40 50

For the **PM 630**, a set of software and **Bluetooth®** dongle is available for data transfer to the PC. Code: 24 44 80

The system is further enhanced by the free Lovibond® App, **AquaLX®**, enabling the immediate review, process and evaluation of measured results directly on-site. Data trends can be monitored with easy-to-view graphical displays with set minimum and maximum values. Any fluctuation to expected results is immediately visible and instant action can be taken.



<b>Display</b>	Graphic-display
<b>Interfaces</b>	Infrared <sup>1</sup> (PM 600 / PM 620), Bluetooth® 4.0 (PM 630), RJ45 socket for Internet updates <sup>2</sup>
<b>Optics</b>	LEDs, interference filters (IF) and photo sensor in transparent sample chamber
<b>Wavelength Accuracy</b>	± 1 nm
<b>Photometric Accuracy*</b>	2 % FS (T = 20 °C – 25 °C)
<b>Photometric Resolution</b>	0.005 A
<b>Operation</b>	Acid and solvent resistant, touch-sensitive keypad with audible feedback via integrated beeper
<b>Power Supply</b>	4 batteries (Mignon AA/LR6); Operation time: approx. 26 h continuous operation or 3500 tests
<b>Auto-Off</b>	approx. 20 minutes after last keypress with audible signal
<b>Dimensions</b>	approx. 210 x 95 x 45 mm (unit) approx. 395 x 295 x 106 mm (case)
<b>Weight (unit)</b>	approx. 450 g
<b>Ambient Conditions</b>	5–40 °C at max. 30–90 % rel. humidity (non condensing)
<b>Language Selection</b>	German, English, French, Spanish, Italian, Portuguese, Polish, Indonesian ; additional languages via Internet update
<b>Memory Capacity</b>	approx. 500 data sets (PM 630) approx. 1000 data sets (PM 600, PM 620)
<b>Approval</b>	CE

<sup>1</sup> optional available: IRiM (Infrared Interface Modul)

<sup>2</sup> optional available: connection cable with integrated electronics (RS 232 / RJ-45 plug)

\* tested with standard solutions

Furthermore, additional personalized information, such as the name of the pool and the pool engineer can be recorded, providing a complete information record of the measurement.

AquaLX® compliments the Langelier Index App, **PoolM8**, which negates the need for complex calculations for Balanced Water. By simply entering the results of the parameters the App automatically determines and displays the results which can then be saved to create a history and, again, shared via email.

The reference standards are designed to check the accuracy and the reliability of the results.

It is not possible to calibrate the photometer with the reference standards.

The shelf life of reference standards is two years from the date of production, provided that storage and use are in accordance with the instructions provided.

**Reference Standard Kit Chlorine** 21 56 30  
0.2\* and 1.0\* mg/l  
for tablet and VARIO methods<sup>1)</sup>

**Reference Standard Kit Chlorine** 21 56 35  
0.5\* and 2.0\* mg/l  
for tablet methods only

**Reference Standard Kit Chlorine** 21 56 36  
1.0\* and 4.0\* mg/l  
for tablet methods only

**Reference Standard Kit pH** 21 56 65  
7.45\* pH

\* Approximate figure, actual figure specified in certificate of analysis enclosed

<sup>1)</sup> The standard values mentioned in kit 215630 for the VARIO method are for photometer PM 620 only, because this method is not available on the PM 600

## Verification Standard Kit

The verification standard kit for the PM 600 / 620 / 630 is designed to assure the user of the accuracy and the reliability of the results related to the integrated wave lengths. The shelf life of the verification standard kit is two years from the date of production, provided that storage and use are in accordance with the instructions provided. Measurements are taken in mAbs.

**Verification Standard Kit** 21 56 80

## Delivery Content

- Instrument in carrying case
- 4 batteries (AA)
- 3 round vials 24 mm ø
- 1 plastic beaker 100 ml
- 1 syringe, 1 brush, 1 stirring rod
- Reagents for  
Chlorine ( free, combined, total)  
pH value  
Calcium hardness  
Acid capacity <sub>KS 4.3</sub>
- Warranty information
- Certificate of Compliance
- Instruction Manual

**PM 600** (13 parameter, infrared)  
Order code: 21 40 60

**PM 620** (34 parameter, infrared)  
Order code: 21 40 65

**PM 630** (34 parameter, Bluetooth®)  
Order code: 21 40 70

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Please see pages 52 onwards for reagents (order codes)

**Bluetooth®** is a wireless technology subject to regional approval. The use of the PM 630 with **Bluetooth®** is currently only permitted within Europe, the USA and in Canada. The use of the PM 630 will also be possible in other regions in the future. For current regions and further information, visit: [www.bluetooth.lovibond.com](http://www.bluetooth.lovibond.com)  
Regions in which the PM 630 with **Bluetooth®** can currently be used (status: 01/2015): within Europe (according R&TTE Directive 1999/5/EC) ; USA (according to FCC part 15, comprised in FCC ID QOQBLE113) ; Canada (comprised in IC 5123A-BGTBLE113)

# Reagents

## Green chemistry

For decades, the Tintometer® Group has been known as a producer of reagents for water analysis, which are supplied under the brand name Lovibond®.

The wide range of applications requires different types of reagents.

Also, users tend to have personal preferences as to which dosage system to use.

Our broad product range covers blistered tablet reagents, powder reagents packed in aluminium foil and precise dosing liquid reagents in dropper bottles.

With all our reagents, we strive to keep the formulations as environmentally friendly as possible. Hazardous substances are – whenever possible – replaced by harmless and functionally identical substitutes.

Where the required chemistry of the detection method makes the use of these substances absolutely necessary, the concentration levels are lowered to the minimum rate, without compromising the accuracy of the analysis results.

For example, our reagents for Pool & Spa water testing are free from boric acid, which is still frequently being used as an additive in the industry. The European Union (EU) has classified boric acid as a dangerous substance.

The Lovibond® DPD No. 1 tablets are not only 100% free from boric acid, they also guarantee compliance with the buffering effect required by the standard. This characteristic makes the tablet a leader in its field.



## Tablets

The test tablets are manufactured in Germany under tightly controlled conditions on the latest machinery.

Maintaining the highest quality standards permits Tintometer to guarantee our tablet reagents for a minimum of 5 years, and some for as long as 10 years.

We can make this promise because each tablet is hermetically sealed, protecting against challenging environmental conditions. This packaging keeps each tablet in perfect condition, right up until the time it is needed by the user.

Test tablets remain the most consistent and reliable reagent format available, consistently outperforming other reagent formats, and delivering maximum accuracy for the user.

The aluminium foil blister packaging brings added convenience to the tradition of protection achieved in the Lovibond® long established tablet production technology.

With the blister strip, the user just pushes the tablet through the protective foil, straight into the sample. Simple, time-saving and practical.

This type of packaging, long established in pharmaceutical applications, combines all the advantages of protective foil, with convenience for the user.

Each tablet is contained within an individually formed foil cup, lined with the latest aluminium composite material, and guaranteeing product performance.

There are no safety risks if the tablets are used in line with the instructions supplied. Safety data sheets are available for all reagents.

## Specification and Certificate of Analysis

To express the high quality standard of Lovibond® tablet reagents, specifications for each type of tablet as well as a "Certificate of Analysis" for each lot is available in the down-load area at [www.lovibond.com](http://www.lovibond.com).

## Liquids

As a rule, liquid reagents do not consist of a single preparation but comprise several components that need to be added to the sample in a certain order. As both the size and the number of drops have a decisive effect on the resultant colour complex, the reagents need to be added with a high degree of precision.

The useful life of liquid reagents is reduced by temporary contact with oxygen in the air when the bottle is opened as well as by unsuitable storage environments (presence of sunlight or high temperatures). If storage conditions are met, the durability of the Lovibond® DPD and Phenolred solutions will be up to two years from the date of manufacture.

## VARIO Powder Packs

The fast and easy use of VARIO Powder Packs has made them extremely popular for water testing applications in many countries throughout the world.

The Lovibond® Powder Pack programme provides users with a real alternative to existing measurement systems.

The Vario Powder Packs are produced to the same high quality standards that have made Tintometer's tablet reagents so successful for several decades.

Parameters from aluminium and chlorine through to sulphate are just some of the well-known tests that are included in the VARIO Powder Pack range.





## Determination of Chlorine, Chlorine Dioxide, Bromine and Ozone with Lovibond® Tablet Reagents

<b>Free Chlorine</b>	➔ DPD No.1-Tablet (direct reading of the value)
<b>Combined Chlorine</b>	➔ DPD No.1-Tablet (free Chlorine = A) + DPD No.3-Tablet (total Chlorine = B) Difference between B and A = <b>Combined Chlorine</b>
<b>Total Chlorine</b>	➔ DPD No.4-Tablet (direct reading of the value) or DPD-Tablets No.1 and No.3 together
<b>Chlorine Dioxide and Chlorine Dioxide in presence of Residual Chlorine</b>	➔ DPD No.1-Tablet DPD No.1-Tablet and DPD No.3-Tablet Glycine-Tablet
<b>Bromine</b>	➔ DPD No.1-Tablet
<b>Ozone</b>	➔ DPD No.4-Tablet
<b>Ozone in presence of Chlorine</b>	➔ DPD No.4-Tablet Glycine-Tablet

## Membrane filter set

For use when preparing samples for photometric measurements, e.g. for water analysis in natural swimming ponds.

### Advantage

- removes turbid materials from samples
- 0.45 µm mesh meets the requirements of the official German unitary procedure for water testing

To prevent the effects of light scatter, it must be ensured that all turbid materials are removed from the sample before photometric measurements are carried out. This can be achieved with the Lovibond® membrane filter set.





**Order code:** 36 61 50

(includes 25 x 0.45 µm membrane filters and two 20 ml syringes)



# Reagents

Wavelength  $\lambda$  / nm

Test	Range	Wavelength $\lambda$ / nm				Method	Cuvette
		MD 100 & MD 110	MD 200	PM 600	PM 620 & PM 630		
<b>Acid capacity K<sub>S4.3</sub></b> Tablets	 0.1 - 4 mmol/l	-	610	-	610	Acid/Indicator <sup>1, 2</sup>	24 mm ø
<b>Alkalinity-M</b> (total) Tablets	 5 - 200 mg/l	610	610	610	610	Acid/Indicator <sup>1, 2, 5</sup>	24 mm ø
<b>Alkalinity-M HR</b> Tablets	5 - 500 mg/l	-	-	610	610	Acid/Indicator <sup>1, 2, 5</sup>	24 mm ø
<b>Aluminium</b> Powder reagent	0.01 - 0.25 mg/l	-	-	-	530	Eriochrome cyanine R <sup>2</sup>	24 mm ø
<b>Aluminium</b> Tablets	0.01 - 0.3 mg/l	-	-	-	530	Eriochrome cyanine R <sup>2</sup>	24 mm ø
<b>Ammonia</b> Tablets	0.02 - 1 mg/l	-	-	-	610	Indophenole blue <sup>2, 3</sup>	24 mm ø
<b>Ammonia VARIO</b> Powder reagent	0.01 - 0.8 mg/l	660	-	-	-	Salicylate <sup>2</sup>	24 mm ø
<b>Biguanide</b> (see PHMB)							
<b>Bromine</b> Tablets	 0.05 - 13 mg/l	530	530	530	530	DPD <sup>5</sup>	24 mm ø
<b>Chlorine</b> <sup>a)</sup> Tablets	 0.01 - 6 mg/l	530	530	530	530	DPD <sup>1, 2</sup>	24 mm ø
<b>Chlorine HR (DPD)</b> <sup>a)</sup> Tablets	0.1 - 10 mg/l	530	530	530	530	DPD <sup>1, 2</sup>	24 mm ø
<b>Chlorine</b> <sup>a)</sup> Liquid reagent	0.02 - 4 mg/l	530	530	-	530	DPD <sup>1, 2</sup>	24 mm ø

MSDS (Material Safety Data Sheets): [www.lovibond.com](http://www.lovibond.com)

For other reagent quantities please see our current price list.

Legend

<sup>1</sup> Deutsche Einheitsverfahren zur Wasser-, Abwasser- und Schlamm- Untersuchung

<sup>2</sup> Standard Methods for the Examination of Water and Wastewater, 18th Edition; 1992

<sup>3</sup> Photometrische Analysenverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart; 1989

<sup>4</sup> Photometrische Analyse, Lange/Vejdelek, Verlag Chemie; 1980

<sup>5</sup> Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond®

 Green Chemistry



Display	Reagent	Form of reagent/Quantity	Order code
	ALKA-M-PHOTOMETER	Tablet / 100	51 32 10 BT
CaCO <sub>3</sub>	ALKA-M-PHOTOMETER	Tablet / 100	51 32 10 BT
CaCO <sub>3</sub>	ALKA-M-HR-PHOTOMETER	Tablet / 100	51 32 40 BT
Al	VARIO Aluminum ECR/F20 VARIO Aluminum Hexamine/F20 VARIO Aluminum ECR Masking Reagent	Powder Pack / 100 Powder Pack / 100 Liquid reagent / 25 ml <b>Set</b>	53 50 00
Al	ALUMINIUM No. 1 ALUMINIUM No. 2 Combi pack# ALUMINIUM No.1 / No.2 Combi pack# ALUMINIUM No.1 / No.2	Tablet / 100 Tablet / 100 each 100 each 250	51 54 60 BT 51 54 70 BT 51 76 01 BT 51 76 02 BT
N	AMMONIA No. 1 AMMONIA No. 2 Combi pack# AMMONIA No.1 / No.2 Combi pack# AMMONIA No.1 / No.2 Ammonia conditioning powder (for seawater)	Tablet / 100 Tablet / 100 each 100 each 250 Powder / 15 g / 50 Tests	51 25 80 BT 51 25 90 BT 51 76 11 BT 51 76 12 BT 46 01 70
N	VARIO Ammonia Salicylate F10 VARIO Ammonia Cyanurate F10	Powder Pack / 100 Powder Pack / 100 <b>Set</b>	53 55 00
Br	DPD No. 1 DPD No. 1 HIGH CALCIUM <sup>e)</sup> GLYCINE <sup>f)</sup>	Tablet / 100 Tablet / 100 Tablet / 100	51 10 50 BT 51 57 40 BT 51 21 70 BT
Cl <sub>2</sub>	DPD No. 1 DPD No. 3 Combi pack# DPD No.1 / No.3 Combi pack# DPD No.1 / No.3 DPD No. 1 HIGH CALCIUM <sup>e)</sup> DPD No. 3 HIGH CALCIUM <sup>e)</sup> Combi pack# DPD No.1 / No.3 HIGH CALCIUM <sup>e)</sup> Combi pack# DPD No.1 / No.3 HIGH CALCIUM <sup>e)</sup>	Tablet / 100 Tablet / 100 each 100 each 250 Tablet / 100 Tablet / 100 each 100 each 250	51 10 50 BT 51 10 80 BT 51 77 11 BT 51 77 12 BT 51 57 40 BT 51 57 30 BT 51 77 81 BT 51 77 82 BT
Cl <sub>2</sub>	DPD No. 1 HR DPD No. 3 HR	Tablet / 100 Tablet / 100	51 15 00 BT 51 15 90 BT
Cl <sub>2</sub>	DPD 1 Buffer solution DPD 1 Reagent solution DPD 3 Solution	Liquid reagent / 15 ml Liquid reagent / 15 ml Liquid reagent / 15 ml <b>Set</b> for approx 150 Tests: 3x15ml DPD 1 Buffer solution 1x15ml DPD 1 Reagent solution 2x15ml DPD 3 Solution	47 10 10 47 10 20 47 10 30 47 10 56

<sup>a)</sup> determination of free, combined and total

<sup>e)</sup> alternative reagent, used instead of DPD No.1 / DPD No.3 in case of turbidity in the water sample caused by high concentration of calcium and/or high conductivity

<sup>f)</sup> additionally required for determination of bromine, chlorine dioxide and ozone in the presence of chlorine

<sup>g)</sup> Reagent recovers most insoluble iron oxides without digestion

<sup>h)</sup> additionally required for samples with hardness values above 300 mg/l CaCO<sub>3</sub>

<sup>i)</sup> high range by dilution

<sup>#</sup> including stirring rod

# Reagents

Wavelength  $\lambda$  / nm

Test	Range	Wavelength $\lambda$ / nm				Method	Cuvette
		MD 100 & MD 110	MD 200	PM 600	PM 620 & PM 630		
<b>Chlorine</b> <sup>a)</sup> Powder reagent	0.02 - 2 mg/l 0.1 - 8 mg/l	530 530	- -	- -	530 530	DPD <sup>1,2</sup>	24 mm ø 24 mm ø multy vial
<b>Chlorine dioxide</b> Tablets	 0.02 - 11 mg/l	-	530	-	530	DPD/Glycine <sup>1,2</sup>	24 mm ø
<b>Chlorine Powder MR</b>	0,02 - 3,5 mg/l	530	-	-	530 -	DPD <sup>1,2</sup>	24 mm ø
<b>Chlorine Powder</b> <sup>a)</sup>	0.02 - 2 mg/l 0.1 - 8 mg/l	530 530	- -	- -	530 530 -	DPD <sup>1,2</sup>	24 mm ø 24 mm ø multy vial
<b>Copper</b> <sup>a)</sup> Tablets	0.05 - 5 mg/l	-	560	560	560	Biquinoline <sup>4</sup>	24 mm ø
<b>Copper, free VARIO</b> Powder reagent	0,05 - 5 mg/l	-	-	-	560	Bicinchoninate	24 mm ø
<b>Cyanuric acid</b> Tablets	 0 - 160 mg/l <sup>1)</sup>	530	530	530	530	Melamine	24 mm ø
<b>Hardness, calcium</b> Tablets	 0 - 500 mg/l	560	560	560	560	Murexid <sup>4</sup>	24 mm ø
<b>Hardness, total</b> Tablets	2 - 50 mg/l 20 - 500 mg/l <sup>1)</sup>	- -	- -	-	560 560	Metallphthalein <sup>3</sup>	24 mm ø
<b>Hydrogen peroxide</b> Liquid reagent	1 - 50 mg/l 40 - 500 mg/l <sup>1)</sup>	- -	430 530	- -	- 530	Peroxotitanium acid	24 mm ø
<b>Iodine</b> Tablets	 0.05 - 3.6 mg/l	-	-	-	530	DPD <sup>5</sup>	24 mm ø
<b>Iron (II, III)</b> Tablets	0.02 - 1 mg/l	-	560	560	560	PPST <sup>3</sup>	24 mm ø
<b>Oxygen, activ</b> Tablets	 0.1 - 10 mg/l	-	-	-	530	DPD	

MSDS (Material Safety Data Sheets): [www.lovibond.com](http://www.lovibond.com)

For other reagent quantities please see our current price list.

Legend

<sup>1</sup> Deutsche Einheitsverfahren zur Wasser-, Abwasser- und Schlamm- Untersuchung

<sup>2</sup> Standard Methods for the Examination of Water and Wastewater, 18th Edition; 1992

<sup>3</sup> Photometrische Analysenverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart; 1989

<sup>4</sup> Photometrische Analyse, Lange/Vejdelek, Verlag Chemie; 1980

<sup>5</sup> Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond®

Display	Reagent	Form of reagent/Quantity	Order code
Cl <sub>2</sub>	VARIO Chlorine FREE-DPD/F10 VARIO Chlorine TOTAL-DPD/F10	Powder Pack / 100 Powder Pack / 100	53 01 00 53 01 20
ClO <sub>2</sub>	DPD No. 1 DPD No. 3 Combi pack# DPD No.1 / No.3 Combi pack# DPD No.1 / No.3 GLYCINE <sup>f)</sup> Combi pack# DPD No.1 / GLYCINE Combi pack# DPD No.1 / GLYCINE DPD No.1 High Calcium <sup>e)</sup>	Tablet / 100 Tablet / 100 each 100 each 250 Tablet / 100 each 100 each 250 Tablet / 100	51 10 50 BT 51 10 80 BT 51 77 11 BT 51 77 12 BT 51 21 70 BT 51 77 31 BT 51 77 32 BT 51 57 40 BT
Cl <sub>2</sub>	VARIO Chlorine FREE-DPD/F10 VARIO Chlorine TOTAL-DPD/F10	Powder Pack / 100 Powder Pack / 100	53 01 80 53 01 90
Cl <sub>2</sub>	VARIO Chlorine FREE-DPD/F10 VARIO Chlorine TOTAL-DPD/F10	Powder Pack / 100 Powder Pack / 100	53 01 00 53 01 20
Cu	COPPER No. 1 COPPER No. 2 Combi pack# COPPER No.1 / No.2 Combi pack# COPPER No.1 / No.2	Tablet / 100 Tablet / 100 each 100 each 250	51 35 50 BT 51 35 60 BT 51 76 91 BT 51 76 92 BT
Cu	Vario Cu 1 F10	Powder Pack / 100	53 03 00
CyA	CyA-TEST	Tablet / 100	51 13 70 BT
CaCO <sub>3</sub>	Combi pack# CALCIO H No.1 / No.2 Combi pack# CALCIO H No.1 / No.2	each 100 each 250	51 77 61 BT 51 77 62 BT
CaCO <sub>3</sub>	HARDCHECK P	Tablet / 100 Tablet / 250	51 56 60 BT 51 56 61 BT
H <sub>2</sub> O <sub>2</sub>	H <sub>2</sub> O <sub>2</sub> reagent solution	Liquid reagent / 15 ml	42 49 91
I	DPD No. 1	Tablet / 100	51 10 50 BT
Fe	IRON LR (Fe <sup>2+</sup> and Fe <sup>3+</sup> ) IRON (II) LR (Fe <sup>2+</sup> )	Tablet / 100 Tablet / 100	51 53 70 BT 51 54 20 BT
O <sub>2</sub>	DPD No. 4	Tablet / 100	51 12 20 BT

<sup>a)</sup> determination of free, combined and total

<sup>e)</sup> alternative reagent, used instead of DPD No.1 / DPD No.3 in case of turbidity in the water sample caused by high concentration of calcium and/or high conductivity

<sup>f)</sup> additionally required for determination of bromine, chlorine dioxide and ozone in the presence of chlorine

<sup>g)</sup> Reagent recovers most insoluble iron oxides without digestion



<sup>h)</sup> additionally required for samples with hardness values above 300 mg/l CaCO<sub>3</sub>

<sup>i)</sup> high range by dilution

<sup>#</sup> including stirring rod

# Reagents

Wavelength  $\lambda$  / nm

Test	Range	<div>MD 100 &amp; MD 110</div> <div>MD 200</div> <div>PM 600</div> <div>PM 620 &amp; PM 630</div>				Method	Cuvette
<b>Ozone</b> Tablets	 0.02 - 2 mg/l	-	-	530	530	DPD/Glycine <sup>5</sup>	24 mm ø
<b>PHMB</b> (Biguanide) Tablets	2 - 60 mg/l	-	-	-	560	Buffer/Indicator	24 mm ø
<b>Phosphate LR</b> , ortho Tablets	0.05 - 4 mg/l	-	-	-	610	Phosphomolybdic acid/ Ascorbic acid <sup>2</sup>	24 mm ø
<b>pH value</b> Tablets	5.2 - 6.8	-	-	-	560	Bromcresol purple <sup>5</sup>	24 mm ø
<b>pH value</b> Tablets	 6.5 - 8.4	560	560	560	560	Phenol red <sup>5</sup>	24 mm ø
<b>pH value</b> Tablets	6.5 - 8.4	560	560	-	560	Phenol red <sup>5</sup>	24 mm ø
<b>pH value</b> Tablets	8.0 - 9.6	-	-	-	560	Thymol blue <sup>5</sup>	24 mm ø
<b>Sodiumhypochlorite</b> Tablets	0.2 - 16 %	-	-	530	530	Potassium iodide <sup>5</sup>	24 mm ø
<b>Sulphate VARIO</b> Powder reagent	5 - 100 mg/l	-	-	-	530	Bariumsulphate Turbidity <sup>2</sup>	24 mm ø
<b>Sulphate</b> Tablets	5 - 100 mg/l	-	-	-	530	Bariumsulphate Turbidity <sup>2</sup>	24 mm ø
<b>Urea</b> Tablets / Liquid reagent	0.1 - 2.5 mg/l 0.2 - 5 mg/l <sup>1)</sup>	-	610 610	-	610 -	Urease / Indophenol	24 mm ø

MSDS (Material Safety Data Sheets): [www.lovibond.com](http://www.lovibond.com)

For other reagent quantities please see our current price list.

Legend

<sup>1</sup> Deutsche Einheitsverfahren zur Wasser-, Abwasser- und Schlamm- Untersuchung

<sup>2</sup> Standard Methods for the Examination of Water and Wastewater, 18th Edition; 1992

<sup>3</sup> Photometrische Analysenverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart; 1989

<sup>4</sup> Photometrische Analyse, Lange/Vejdelek, Verlag Chemie; 1980

<sup>5</sup> Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond®





Display	Reagent	Form of reagent/Quantity	Order code
O <sub>3</sub>	DPD No. 1	Tablet / 100	51 10 50 BT
	DPD No. 3	Tablet / 100	51 10 80 BT
	Combi pack <sup>#</sup> DPD No.1 / No.3	each 100	51 77 11 BT
	Combi pack <sup>#</sup> DPD No.1 / No.3	each 250	51 77 12 BT
	GLYCINE <sup>f)</sup>	Tablet / 100	51 21 70 BT
	Combi pack <sup>#</sup> DPD No.1 / GLYCINE	each 100	51 77 31 BT
	Combi pack <sup>#</sup> DPD No.1 / GLYCINE	each 250	51 77 32 BT
PHMB	PHMB PHOTOMETER	Tablet / 100	51 61 00 BT
PO <sub>4</sub>	PHOSPHATE No. 1 LR	Tablet / 100	51 30 40 BT
	PHOSPHATE No. 2 LR	Tablet / 100	51 30 50 BT
	Combi pack <sup>#</sup> PHOSPHATE No.1 LR / No.2 LR	each 100	51 76 51 BT
pH	BROMOCRESOLPURPLE/PHOTOMETER	Tablet / 100	51 57 00 BT
pH	PHENOL RED / PHOTOMETER	Tablet / 100	51 17 70 BT
pH	PHENOL RED Solution	Liquid reagent / 15 ml	47 10 40
pH	THYMOLBLUE / PHOTOMETER	Tablet / 100	51 57 10
NaOCl	ACIDIFYING GP	Tablet / 100	51 54 80 BT
	CHLORINE HR (KI)	Tablet / 100	51 30 00
	Combi pack <sup>#</sup> CHLORINE HR (KI)/ACIDIFYING GP	each 100	51 77 21 BT
	Combi pack <sup>#</sup> CHLORINE HR (KI)/ACIDIFYING GP	each 250	51 77 22 BT
	Sample dilution Kit		41 44 70
SO <sub>4</sub>	VARIO Sulpha 4 / F10	Powder Pack / 100	53 21 60
SO <sub>4</sub>	SULFATE T	Tablet / 100	51 54 50 BT
CH <sub>4</sub> N <sub>2</sub> O	UREA Reagent 1	Liquid reagent / 15 ml	45 93 00
	UREA Reagent 2	Liquid reagent / 10 ml	45 94 00
	AMMONIA No. 1	Tablet / 100	51 25 80 BT
	AMMONIA No. 2	Tablet / 100	51 25 90 BT
	Combi pack <sup>#</sup> AMMONIA No.1 / No.2	each 100	51 76 11 BT
	Combi pack <sup>#</sup> AMMONIA No.1 / No.2	each 250	51 76 12 BT
	UREA PRETREAT	Tablet / 100	51 61 10 BT
	(compensates for the interference of free Chlorine up to 2 mg/l)		
	UREA Reagent Set, contains:	<b>Set</b>	51 78 00 BT
	UREA Reagent 1/2, AMMONIA No.1/2, UREA PRETREAT		

<sup>a)</sup> determination of free, combined and total

<sup>e)</sup> alternative reagent, used instead of DPD No.1 / DPD No.3 in case of turbidity in the water sample caused by high concentration of calcium and/or high conductivity

<sup>f)</sup> additionally required for determination of bromine, chlorine dioxide and ozone in the presence of chlorine

<sup>g)</sup> Reagent recovers most insoluble iron oxides without digestion

<sup>h)</sup> additionally required for samples with hardness values above 300 mg/l CaCO<sub>3</sub>

<sup>i)</sup> high range by dilution

<sup>#</sup> including stirring rod



*Waterproof (IP67) & floatable*

*Compact & Robust*

*Hand-held instruments*

*Storage Function*

## SD-Hand-held instruments

### Technical Data

### SD 50 pH

### SD 60 ORP/Redox

Range / Resolution	0,00 ... 14,00 pH	1000,0 ... +1000,0 mV -1800 ... +1800 mV
Accuracy	± 0,05 pH	± 2 mV
Calibration	1-, 2- or 3-points calibration (automatically)	1-points calibration (custom)
Standards for automatic detection	USA: 4,01 / 7,00 / 10,01 pH NIST: 4,01 / 6,86 / 9,18 pH	-
Temperature: Range/ Resolution	0,0 ... 60,0 °C / 32,0 ... 140 °F	
Temperature: Accuracy	± 1 °C / ± 1,8 °F	
Auto switch off	8 minutes non-use	20 minutes non-use
Temperature compensation	automatically	
Battery life	> 350 hours (backlight OFF)	
Display	22 x 22 mm LCD, backlight	
Memory	25 sets of data storage with time and date	
Data-Hold-Function	Yes	
Operating conditions	0 ... 60 °C / 0 ... 80 % rel. humidity (non condensing)	
Power supply	2 x 1,5 V Batteries, AAA	
Dimensions, Weight	205 x 44 x 33 mm, ca. 155 g with Batteries	
Protection class	IP 67	
Approval	CE	
Order-Info		
Device and accessories in a stable plastic box	194800-16	194801-16
Device and accessories in case	194800-30	-
Spare electrode	194820	194821

The Lovibond® SD series comprises a range of compact, easy-to-use, hand-held instruments for the accurate measurement of pH, ORP, Con, TDS or Salt. With robust housing and fully waterproof (IP67) casing, these testers are the ideal solution for in-situ testing in environmental, industrial or pool & spa applications.

The intuitive scroll-bar functionality and backlit display enable the easy measurement and simultaneous display of Result, Temperature, Date/Time and other Parameters.

With 25 sets of data storage, each with date and time stamp, the units also enable the easy recalling of data for record keeping requirements.

Designed and manufactured according to Lovibond® quality standards, the instruments are equipped with replaceable electrodes to ensure long-life functionality in the field.

#### Delivery Content

- Meter in a robust plastic case with hanging tab
- 2 x 1,5 V Batteries, AAA
- Lanyard
- Instruction Manual
- pH 4, 7 and 10 Buffer tablets 3 x 10 pc. (only SD 50 pH)
- pH 4,01 und 7,00 Calibration buffer and 2 x 100 mL Measuring cup (only SD 50 pH in case)

#### Conversion table

1 mS/cm	=	1000 µS/cm
1 ppt	=	1000 ppm
1 %	=	0,1 ppt
1 ppt	≈	1 g/L
1 ppm	≈	1 mg/L
ppt	-	Parts per thousand
ppm	-	Parts per million



SD 50 in case, Code: 194830-16



SD 70 Con	SD 80 TDS	SD 90 Salt
0 ... 1999 µS/cm 2,00 ... 20,00 mS/cm	0 ... 999 ppm 1,00 ... 10,00 ppt	0 ... 1999 ppm 2,00 ... 20,00 ppt 0,00 ... 2,00 %
± 3 % of range		
1- or 2-points calibration (automatically or custom)	1- or 2-points calibration (custom)	
1413 µS/cm und 12,88 mS/cm	-	-
0,0 ... 60,0 °C / 32,0 ... 140 °F		
± 1 °C / ± 1,8 °F		
8 minutes non-use		
automatically, 2 % / °C		
> 100 hours (backlight OFF)		
22 x 22 mm LCD, backlight		
25 sets of data storage with time and date		
Yes		
0 ... 60 °C / 0 ... 80 % rel. humidity (non condensing)		
2 x 1,5 V Batteries, AAA		
205 x 44 x 33 mm, ca. 155 g with Batteries		
IP 67		
CE		
194802-16	194803-16	194804-16
-	-	-
194822		



# SensoDirect 110



## Focus on the essentials

High-quality, battery-operated handheld instrument for the determination of pH, salt and conductivity.

Variable in use and user-friendly in operation



- Delivery Content**
- Basic unit
  - Battery
  - pH-electrode
  - Warranty information
  - Instruction manual

Technical data	SensoDirect 110 pH	SensoDirect 110 Con	SensoDirect 110 Salt
Range / Resolution	0,00 ... 14,00 pH	0,000 ... 1,999 mS/cm 0,01 ... 19,99 mS/cm	0,01 ... 10,00 % Salt
Accuracy	± 0,07 pH	± 3 % Full Scale	± 0,5 % Full Scale
Temperature compensation	-	automatically, 2 % / °C	
Calibration	custom (manually via set screws)		
Display	52 x 37 mm LCD		
Data-Hold-Function	Yes		
Ambient conditions	0...50 °C, 0...80 % rel. humidity (non condensing)		
Battery	9 V-Block		
Weight	ca. 380 g (with battery and protective armor)		
Dimensions	208 x 110 x 34 mm (with protective armor)		
Protection classification	IP 51		
Approval	CE		
Order-Info			
Device, Sensor and Accessories in stable plastic box	721300	722300	723300
Device and Sensor	721310	722310	-

➔ Accessories (Sensores, Standards, etc.) on Page 64/65

# SensoDirect 150



Multi-parameter handheld instrument for the determination of dissolved oxygen (O<sub>2</sub>), O<sub>2</sub> concentration, conductivity, TDS, pH and ORP.

All measured values can be conveniently read on the large LCD display.

## Technical data SD 150

Parameter	pH	ORP	Oxygen	Conductivity	TDS	Temperature
Range / Resolution	0,00 ... 14,00 pH	-1999 ... 1999 mV	dissolved O <sub>2</sub> : 0,0 ... 20,0 mg/L Air O <sub>2</sub> : 0,0 ... 100,0 %	0,0 ... 200,0 µS/cm 0,200 ... 2,000 mS/cm 2,00 ... 200,00 mS/cm 200,0 ... 2.000,0 mS/cm	0,0 ... 200,0 ppm 200 ... 2000 ppm 2.000 ... 20.000 ppm 20.000 ... 200.000 ppm	0,0 ... 60,0 °C 32,0 ... 140,0 °F
Accuracy	± 0,02 pH	± 2 mV	dissolved O <sub>2</sub> : ± 0,4 mg/L Air O <sub>2</sub> : ± 0,7 %	± 0,8 °C ± 1,5 °F		± 0,8 °C ± 1,5 °F
Temperature-compensation	automatically (with temperature-sensor) and custom	-	automatically	adjustable: 0... 5,0 % / °C		-
Calibration	1-, 2- or 3-points calibration (automatically or custom)	1-points calibration (custom, only standards> +100 mV)	1-points calibration (automatically)	1- or 2- points calibration, custom		-
Standards for automatic detection	USA: 4,01 / 7,00 / 10,01 pH	-	Oxygen content air	-		
Salinity correction	-		0 ... 39 %, custom	-		
Air pressure compensation	-		0 ... 8900 m, custom	-		
Display	58 x 34 mm LCD					
Data-Hold-Function	Yes					
Automatic switch off	after 10 min, optional					
Ambient conditions	0 ... 50 °C, 0 ... 80 % rel. humidity (non condensing)					
Battery	4 x 1,5 V Batteries AA or DC 9V power adapter					
Weight	ca. 620 g (with batteries and protective armor)					
Dimensions	203 x 76 x 38 mm (with protective armor)					
Protection classification	IP 51					
Approval	CE					

Order-Info Sets:	Code	Article	Code	Article
	724200	Set 1: pH/Con/TDS/dissolved O <sub>2</sub> /Temp.	724220	Set 3: pH/dissolved O <sub>2</sub> /Temp
	724210	Set 2: pH/Con/TDS/Temp	724230	Set 4: pH/Redox/Temp

### Delivery Content

#### All Sets include:

- Stable plastic case
- Measuring device with protective armor
- 4 x 1,5 V Batteries AA
- pH electrode type 226
- Temperature probe Pt1000
- pH 4,01 und 7,00 calibration buffer (2 x 90 mL)
- Instruction manual

#### SensoDirect 150 Set 1

- pH / Con / TDS / dissolved O<sub>2</sub> / Temp.
- Conductivity probe type 110/150
- Oxygen sensor type 150
- electrolyte and membrane heads (2 pc.)

#### SensoDirect 150 Set 2

- pH / Con / TDS / Temp.
- Conductivity probe type 110/150

#### SensoDirect 150 Set 3

- pH / dissolved O<sub>2</sub> / Temp.
- Oxygen sensor type 150
- Electrolyte and membrane heads (2 pc.)

#### SensoDirect 150 Set 4

- pH / Redox / Temp.
- Redox Elektrode type 242

 Accessories (Sensores, Standards, etc.) on Page 64/65



		SD 50 pH	SD 60 Redox	SD 70 Con	SD 80 TDS	SD 90 Salt
Sensors	Article					
	pH electrode type 226, plastic/gel, universal use even at low conductivities					
	pH electrode type 330, plastic/gel, universal use					
	pH electrode type 235, glass/gel, for laboratory applications					
	SD 50 pH spare electrode with temperature probe, universal use	•				
	Redox electrode type 240, plastic/gel, universal use					
	Redox electrode type 242, plastic/gel, universal use					
	SD 60 Redox spare electrode, universal use	•				
	Conductivity probe type 110/150 (K=1,0), 2-pole graphite, universal use					
	Conductivity probe type 110/150 (K=0,1), 2-pole platin, low conductivities					
	Probe for salt type 110 (K=1,0), 2-pole graphite, universal use					
	SD 70/80/90 spare electrode, (K=1,0), 2-pole graphite, universal use		•	•	•	
	Oxygen sensor type 150, galvanic, universal use					
	Temperature probe Pt1000					
Standards	pH 4,01 calibration buffer (traceable to N.I.S.T), 90 ml	•				
	pH 7,00 calibration buffer (traceable to N.I.S.T), 90 ml	•				
	pH 10,01 calibration buffer (traceable to N.I.S.T), 90 ml	•				
	pH 4,01 / 7,00 / 10,01 calibration buffer-Set (traceable to N.I.S.T), 3 x 90 ml	•				
	pH 4,01 calibration buffer (traceable to N.I.S.T), 1 l	•				
	pH 7,00 calibration buffer (traceable to N.I.S.T), 1 l	•				
	pH 10,01 calibration buffer (traceable to N.I.S.T), 1 l	•				
	pH 4 buffer tablets, 100 pc.	•				
	pH 4 buffer tablets, 250 pc.	•				
	pH 7 buffer tablets, 100 pc.	•				
	pH 7 buffer tablets, 250 pc.	•				
	pH 10 buffer tablets, 100 pc.	•				
	pH 10 buffer tablets, 250 pc.	•				
	470 mV Redox calibration solution, 100 ml	•				
	1413 µS/cm conductivity-calibration solution (traceable to N.I.S.T), 500 ml		•			
	988 ppm TDS-calibration solution, 100 ml			•		
	9,02 ppt TDS-calibration solution, 100 ml			•		
	0,1 % salt-calibration solution (NaCl), 100 ml				•	
	0,5 % salt-calibration solution (NaCl), 100 ml				•	
	Spare membrane oxygen probe type 150, 1 pc.					
Others	Spare electrolyte oxygen probe type 150, 30 ml					
	DC 9V power adapter					
	Storage solution pH/ORP-electrodes, KCL, 100 ml	•	•			
	Fully desalinated water (VE), 100 ml	•	•	•	•	•
	Measuring cup made of polypropylene, transparent, 100 ml	•	•	•	•	•
	9-V-Block Batterie, 1 pc.					
	1,5 V Batterie AA, 2 pc.					
	1,5 V Batterie AAA, 4 pc.	•	•	•	•	•

	SensoDirect 110 pH	SensoDirect 110 Con	SensoDirect 110 Salt	Code
•			•	721226
•			•	721330
•			•	721235BNC
				194820
			•	721240BNC
			•	721242
				194821
	•		•	724400
	•		•	
		•		724430
				194822
			•	724410
			•	724420
•			•	721247
•			•	721248
•			•	721249
•			•	721250
•			•	721252
•			•	721254
•			•	721256
•			•	515620BT
•			•	515621BT
•			•	515610BT
•			•	515611BT
•			•	515600BT
•			•	515601BT
			•	195070
	•		•	722250
			•	467642
			•	467643
				467631
				467621
			•	724460
			•	724470
			•	724540
•			•	2418609
•	•	•	•	461275
•	•	•	•	384801
•	•	•		1950012
			•	1950010
				1950026

# Turbidity Measurement

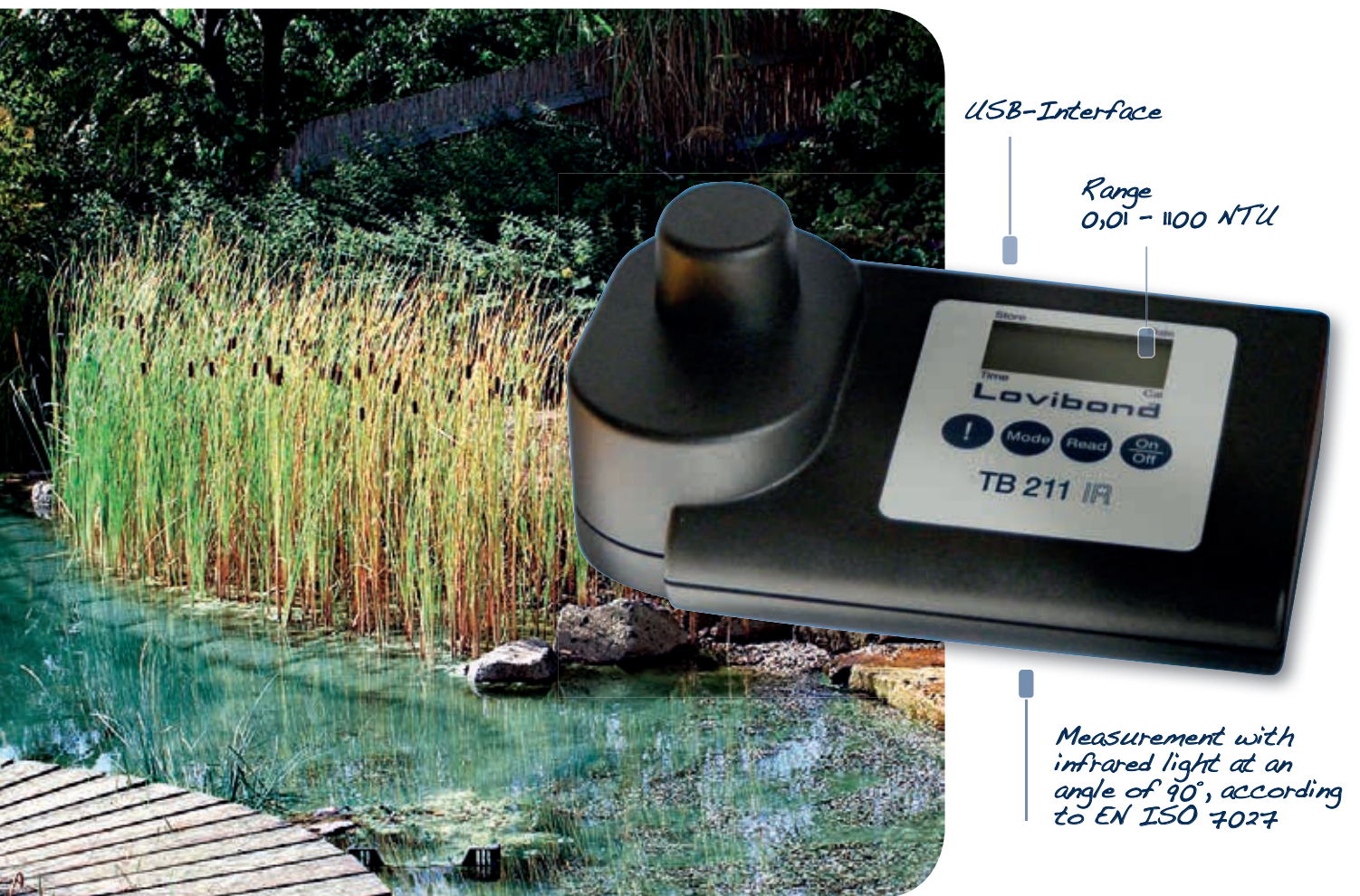


Photo: Grafinger, [www.naturerlebnisbad.de](http://www.naturerlebnisbad.de)

The term "turbidity" is used to describe the cloudiness or milkiness of water.

In physical terms, turbidity is due to particles of varying sizes scattering or absorbing light, giving the water in question a cloudy appearance.

This turbidity is caused by suspended particles such as sludge, limestone, yeast or microorganisms.

The phenomenon of turbidity is measured using optoelectronic meters. An artificial light source emits a known intensity of light through a sample. The suspended particles scatter or absorb the light. The scattered light is then recorded on a photodetector.

Scattered light is generally measured at an angle of 90°. This measurement principle is known as nephelometry.

The results are expressed in terms of FNU (Formazin Nephelometric Units) - identical with NTU (Nephelometric Turbidity Units) and TE/F (Turbidity Units Formazin).



# TB 211 IR with USB-Interface & TB 210 IR both with infrared light source (EN ISO 7027)



The compact Lovibond® infrared turbimeters TB 211 IR and TB 210 IR are designed to allow fast, precise on site testing. The unit measures the scattered light at an angle of 90°, as stipulated in EN ISO 7027.

The wide measuring range from 0.01-1100 TE/F = NTU = FNU makes the instrument suitable for various applications, ranging from drinking water to waste water.

Since the measurements are made by means of infrared light, both colored and colorless water samples can be measured. A direct transfer of the measurement results to a PC is through the USB interface TB 211 IR easy to set up. The necessary USB cable is already part of the delivery.

## Technical data TB 211 IR

<b>Measurement cycle</b>	approx. 8 seconds
<b>Display</b>	backlit LCD (on keypress)
<b>Optics</b>	temperature-compensated LED ( $\lambda = 860 \text{ nm}$ ) and photosensor amplifier in water proof sample chamber, infrared light
<b>Keypad</b>	Conditionally acidic and solvent resistant polycarbonate film
<b>Power supply</b>	9 V power pack battery
<b>Auto - OFF</b>	automatic switch-off
<b>Interface</b>	Micro-USB
<b>Storage</b>	internal ring memory for 125 data sets
<b>Additional feature</b>	real time clock and date
<b>Range (Auto-range)</b>	0,01 - 1100 NTU
<b>Resolution</b>	0.01 - 9.99 NTU = 0.01 NTU 10.0 - 99.9 NTU = 0.1 NTU 100 - 1100 NTU = 1 NTU

<b>Accuracy</b>	$\pm 2.5 \%$ of reading or $\pm 0.01 \text{ NTU}$ whichever is bigger 500 - 1100 NTU: $\pm 5 \%$ of reading
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<b>Housing</b>	ABS
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<b>Dimensions</b> (L x W x H)	190 x 110 x 55 mm
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<b>Weight</b> (base unit)	approx. 0.4 kg
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<b>Ambient conditions</b>	Temperature: 5 – 40 °C rel. humidity: 30 – 90 %
---------------------------	--

<b>Test equipment fitness</b>	Software-supported user adjustment under use from T-CAL standards
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## CE-Conformity

## Accessories

Article	Code
Turbidity standard set T-CAL (< 0.1, 20, 200, 800 NTU)	19 41 50
Set empty vials, 24 mm $\varnothing$ (12 pc.)	19 76 55
Cleaning cloth for vials	19 76 35
Sample chamber lid	19 80 11 00
Battery, 9 V	19 50 012
Formazin Stock Solution (4000 NTU), 125 ml	19 41 41
Formazin Stock Solution (4000 NTU), 250 ml	19 41 42
USB-Cable 1,5 m (only for TB 211 IR)	19 80 25 09

## Technical data TB 210 IR

as TB 211 IR but with the following differences

<b>Storage</b>	internal ring memory for 16 data sets
<b>Interface</b>	none

## Delivery Content

### TB 211 IR

- Instrument in carrying case
- 4 turbidity standards (< 0.1, 20, 200 and 800 NTU)
- 9 V battery
- 2 vials ( $\varnothing$  24 mm) with lids
- Warranty information
- Certificate of Compliance
- Instruction Manual
- USB cable 1,5 m

Order code: 26 6030

### TB 210 IR

as TB 211 IR but without USB cable

Order code: 26 60 20



# Natural Swimming Ponds

A natural swimming pond looks like a natural garden pond, but is specifically designed to swim in clean, pure water with no chemicals in it.

The difference between a swimming pond and a swimming pool is that a swimming pool uses chemicals such as chlorine to kill bacteria, whereas a swimming pond cleanses the water naturally. It uses the purifying properties of plants, a filter to extract surface debris such as leaves, and a pump to keep the water circulating through the planting area.

Nevertheless, the water quality has to be checked regularly to make sure that the bathers are safe under all circumstances, e.g. microorganism and other biological, chemical and physical components.

## Chemical Requirements for fresh water - possibly after preconditioning\*

Ammonia	≤ 0,5 mg/l
Iron	≤ 0,2 mg/l
Total Phosphorus [P <sub>total</sub> ]	≤ 0,03 mg/l
Hardness (Total alkaline earths) match Total Hardness	≥ 1,0 mmol/l ≥ 5,6 dH°
Conductivity	≤ 1000 µS/cm at 20 °C
Manganese	≤ 0,05 mg/l
Nitrate	≤ 50,0 mg/l
ortho Phosphate (Specified as P)	≤ 0,01 mg/l
pH value	6,0 - 9,0
Acid capacity K <sub>S4.3</sub> match Carbonate hardness	≥ 2,0 mmol/l ≥ 5,6 dH°

## Chemical guide values for the usage area

Parameter	Guide Value
Ammonia	≤ 0,3 mg/l
Total Phosphorus [P <sub>total</sub> ]	≤ 0,03 mg/l (Type I - III) ≤ 0,01 mg/l (Type IV, V)
Hardness (Total alkaline earths) match Total Hardness	≥ 1,0 mmol/l ≥ 5,6 dH°
Conductivity	≤ 1000 µS/cm at 20 °C
Nitrate	≤ 30,0 mg/l
Nitrite	≤ 0,01 mg/l
ortho Phosphate (Specified as P)	≤ 0,03 mg/l (Type I - III) ≤ 0,01 mg/l (Type IV, V)
pH value	7,0 - 9,0
Acid capacity K <sub>S4.3</sub> match Carbonate hardness	≥ 2,0 mmol/l ≥ 5,6 dH°



Photo: Grafinger, [www.naturerlebnisbad.de](http://www.naturerlebnisbad.de)

\* Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau e.V. (FLL). Richtlinien für Planung, Bau, Instandhaltung von privaten Schwimm- und Badeteichen, Ausgabe 2017.

# Bathing Water

This applies to any water where the authorities expect a large number of people to bathe and has not imposed a permanent bathing prohibition, or issued advice against bathing. It is the responsibility of the authorities to identify and assess causes of pollution that might affect bathing waters and impair bathers' health during the bathing season.

The basis for the control of all public used natural swimming ponds is the European Directive "2006/7/EG of the European Parliament, dated 15th February 2006. The Directive has been valid since 24th March 2006.

## Microbiology

- *Escherichia coli*
- *Enterococci*
- *Pseudomonas aeruginosa*
- *Legionella pneumophila*
- Cyanobacteria

## Parasites

- e.g. *Cryptosporidian*



## Chemical and physical characteristics

### Dissolved Oxygen

Dissolved oxygen is probably the most critical quality variable in the water. Oxygen levels in pond systems depend on water temperatures, the water salinity, and the amount of aquatic vegetation and animals.

### pH-value

The pH-value is the determination of the hydrogen ion (H<sup>+</sup>) concentration in water. The pH scale ranges from 0-14 with a pH of 7 being neutral. A pH below 7 is acidic and a pH of above 7 is basic. An optimal pH range is between 6.5 and 8.5, however it should not be lower than pH5 or above pH9.

pH will vary depending on a number of factors. The pH may rise during the day as phytoplankton and other aquatic plants remove CO<sub>2</sub> from the water during photosynthesis. The pH decreases at night because of respiration and production of CO<sub>2</sub> by organisms. The fluctuation of pH levels will depend on algae levels as well.

### Temperature

Temperature will affect all chemical and biological processes. Temperature therefore has a direct effect on important factors such as growth and oxygen demand. The higher the temperature, the greater the requirement for oxygen and the faster the growth rate of the plants.

### Ammonia

Ammonia is produced from the decomposition of organic wastes resulting in the breakdown of decaying organic matter such as algae and plants. Ammonia levels will depend on the temperature of the water and its pH. For example at a higher temperature and pH, a greater number of ammonium ions are converted into ammonia gas thus causing an increase in toxic ammonia levels within the freshwater.

### Nutrient levels

Nutrient levels refer to the amount of phosphorus and nitrogen that are present in the water. Increased levels of nutrients may be harmful. It can cause excessive plankton growth, potential blue-green algae and oxygen depletion. See Lovibond® General Catalogue, no.: 938020. Order your free copy! See page 70

### Turbidity

page 66

Test methods for a.m. parameter see index page 72 and 73.

➔ **Membrane filter set**  
for sample preparation, see page 51

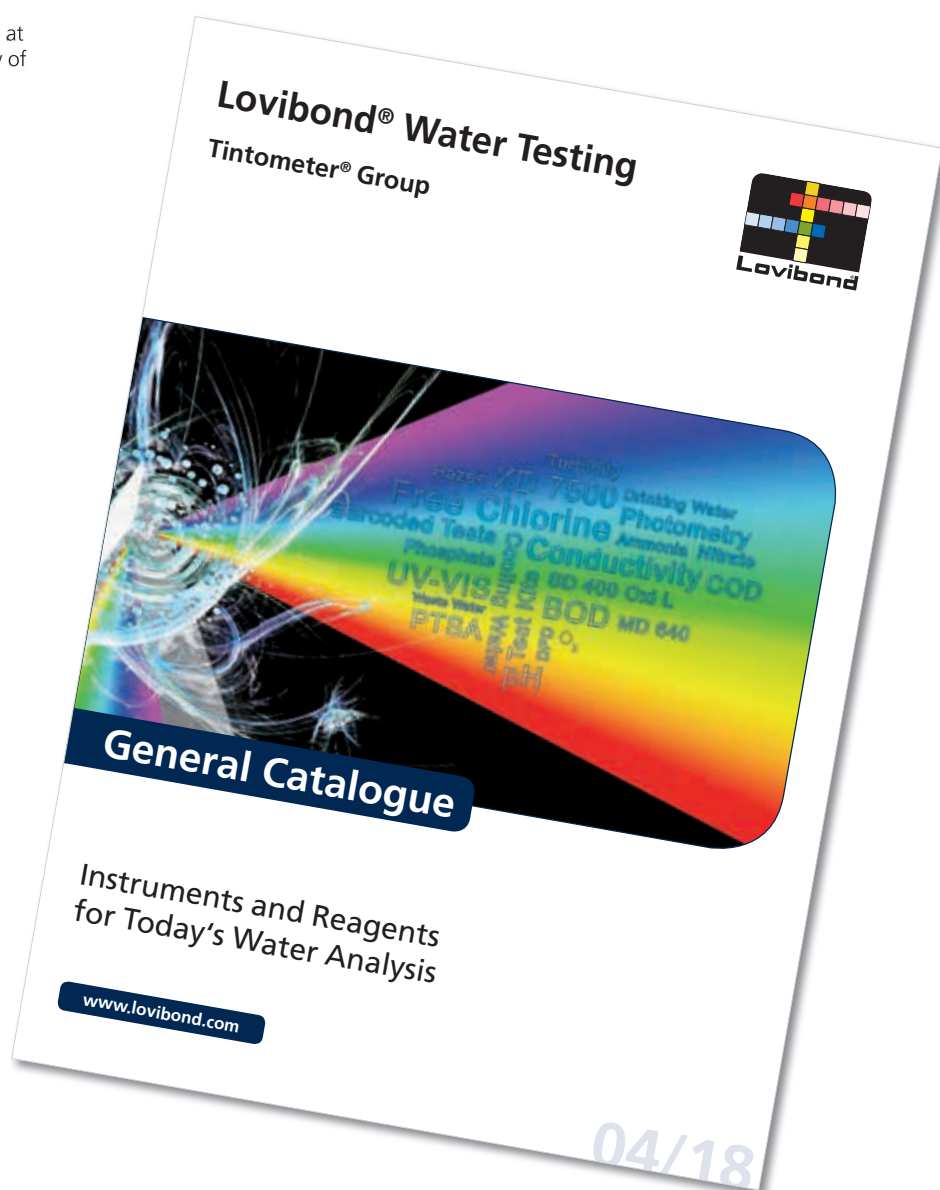
# Environmental Water Analysis

## Lovibond® General Catalogue

The general catalogue includes detailed information on topics relating to water analysis. National and international standards and regulations are also covered.

**General Catalogue, order code: 93 80 20**

Visit the download area on our website at [www.lovibond.com](http://www.lovibond.com), to obtain a copy of the catalogue.





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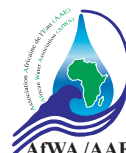
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