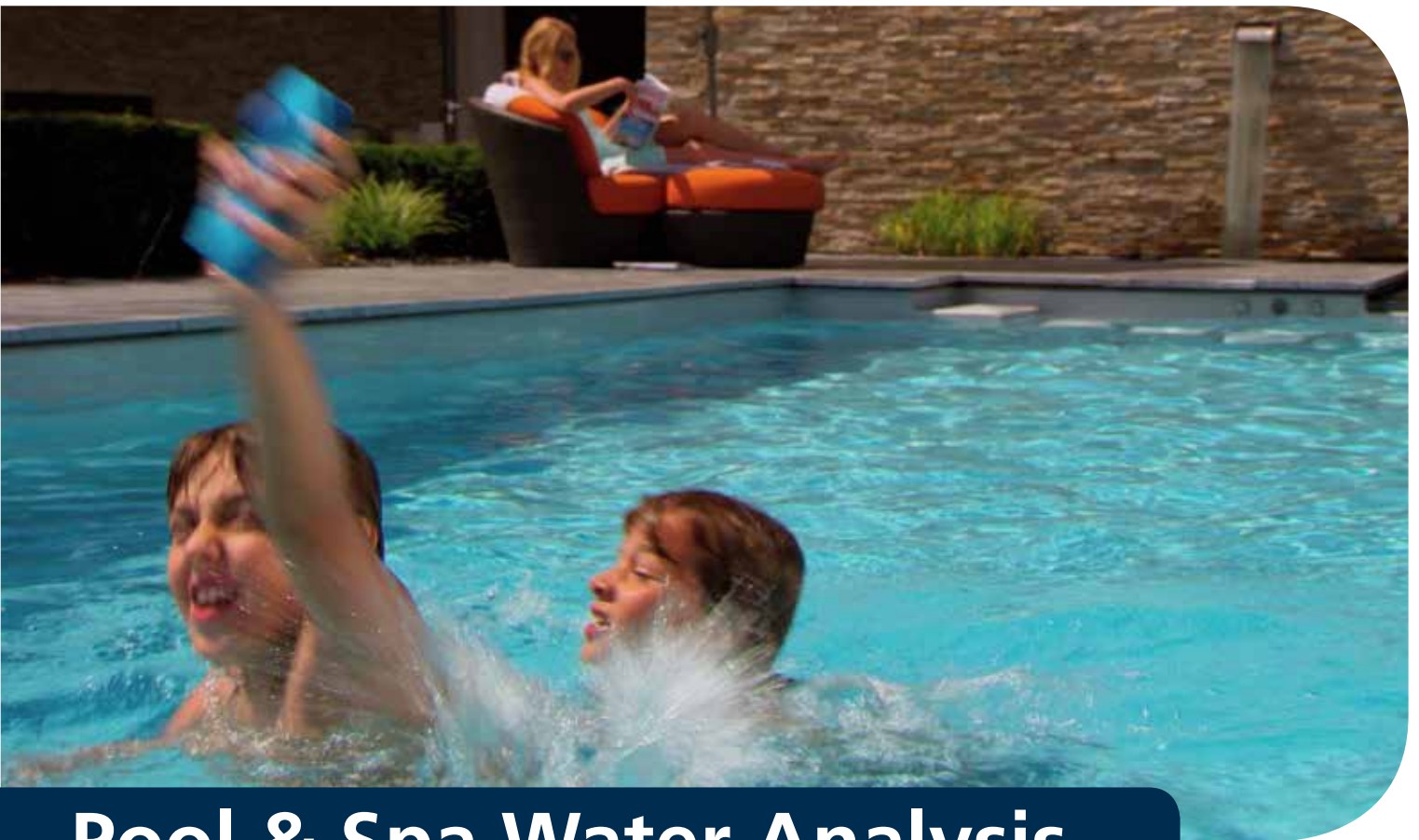
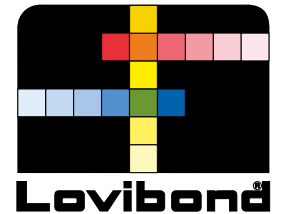


Lovibond® Water Testing

Tintometer® Group



Pool & Spa Water Analysis

Instruments and Reagents

www.lovibond.com

Lovibond®-Handbook

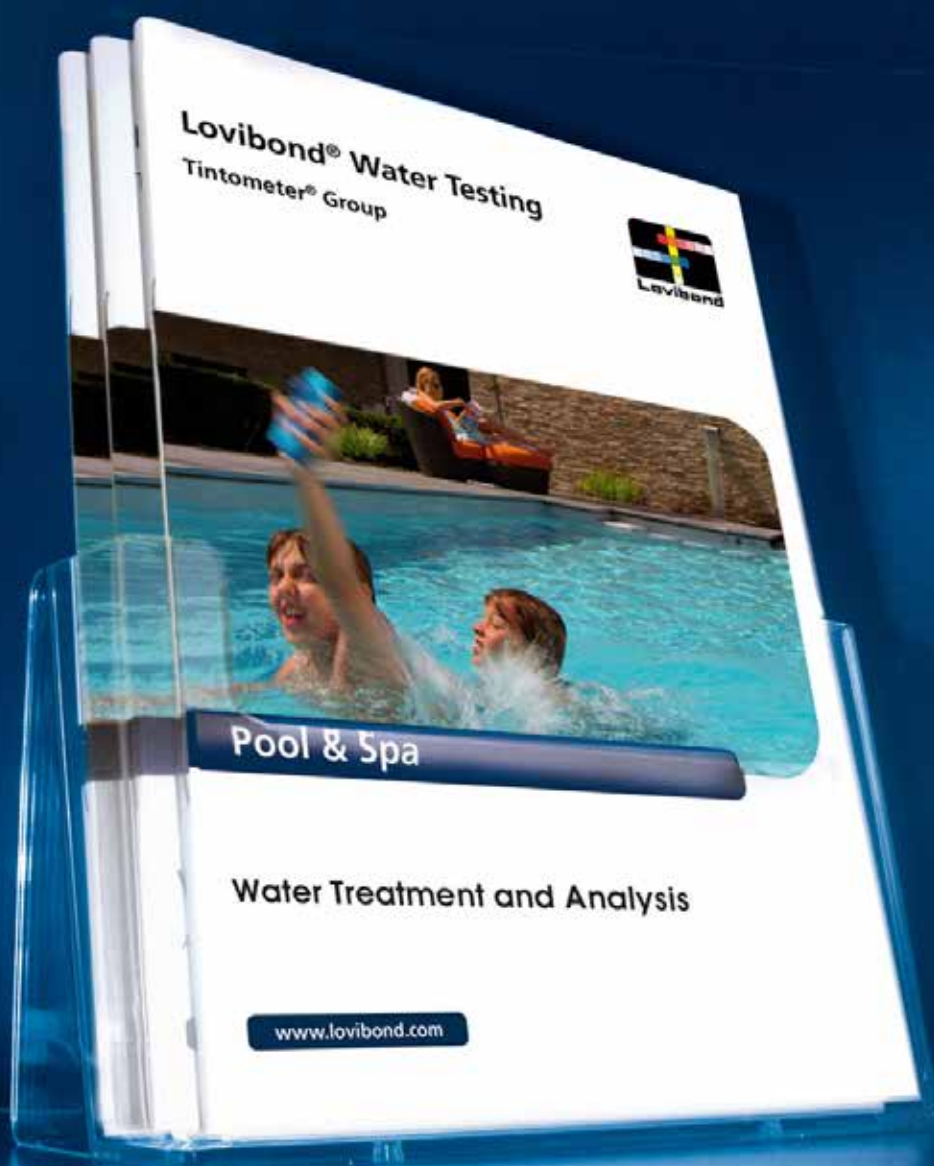
Pool & Spa

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.

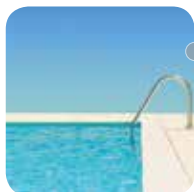
Handbook order code: 93 81 01

Visit the support area on our website at www.lovibond.com, to obtain a copy of the handbook.



Content

Pool & Spa



Basic information
from page 4

Natural Swimming Ponds



Basic information
Hygiene parameters
from page 58

Rapid Tests



Three-Chamber-Tester
Pooltester
Multi Pooltester
from page 8

Photometry



MD 100 (Infrared)
MD 110 (Bluetooth®)
from page 38

Electro Analytical Meters



SD Series 50 - 90
from page 60

MINIKIT



MINIKIT
from page 12



MD 200 (Infrared)
from page 44



Sensodirect Series
110 & 150
from page 62

SCUBA II



Electronic
Pooltester
from page 14



PM 600 & PM 620 (Infrared)
PM 630 (Bluetooth®)
from page 48



TB 210 IR
from page 66

Turbidity Meter

CHECKIT®Comparator



Colorimeter
from page 16



Tablet Reagents
from page 50



Poolsoftware
from page 68

Comparator System 2000+



Colorimetric
System 2000+
from page 24



Liquid Reagents
from page 50

Environmental Analysis
from page 70

Public Relations
from page 71

Index

from page 72

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-ii.lovibond.com>



CHECKIT®
Comparator

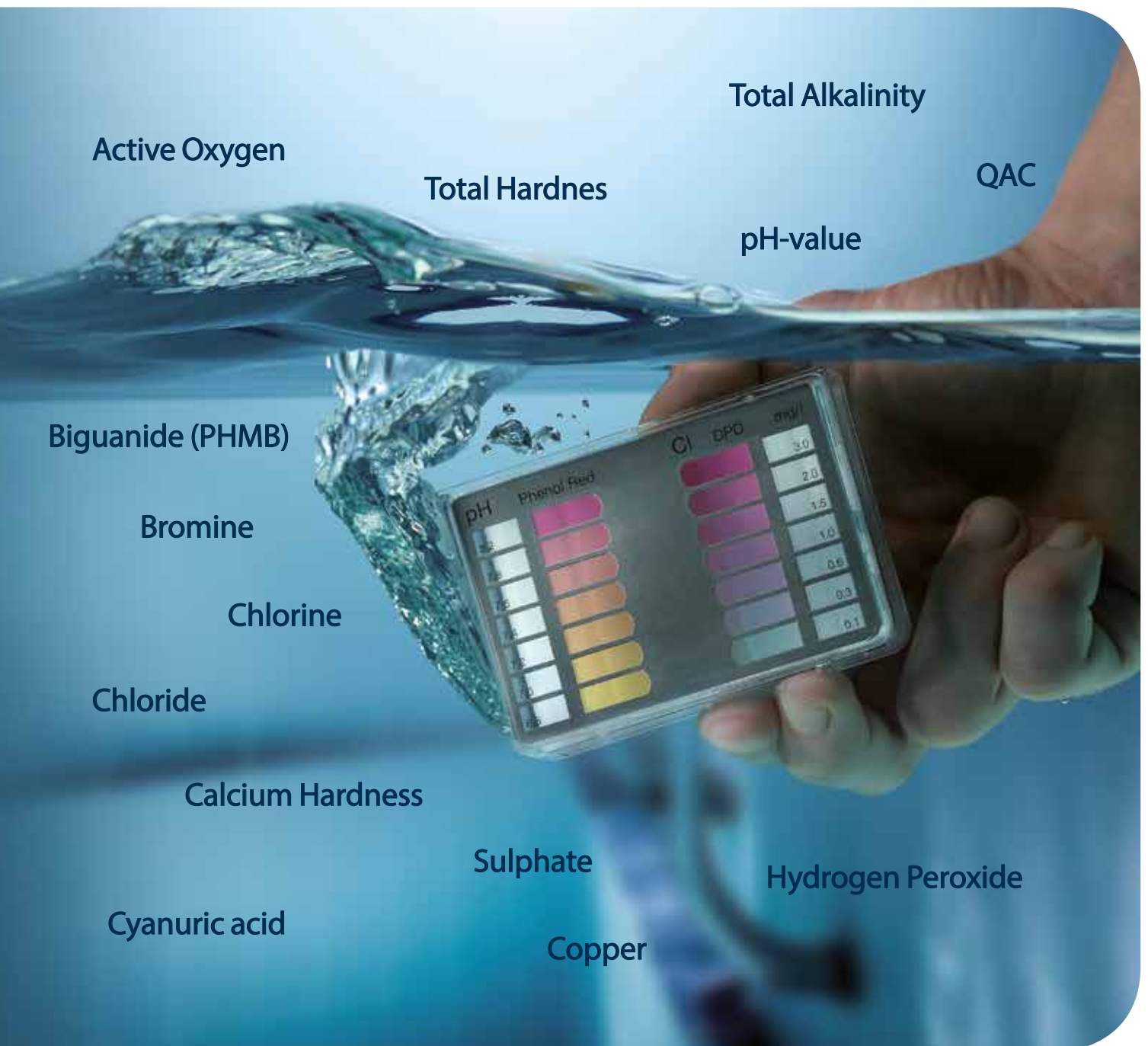


Comparator
2000+



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.



Highlights

- Easy to use
- Futuristic design
- RAPID tablets fast dissolving
- Highest accuracy



Three-Chamber-Tester

Item	Code
Chlorine-Bromine-pH LR, in mini case¹⁾	15 77 00
Bromine 0,2-6,8 mg/l	
Chlorine 0,1-3,0 mg/l / pH-Wert 6,8 – 8,2	
Chlorine-Bromine-pH LR, in blister²⁾	15 75 20
Bromine 0,2-6,8 mg/l	
Chlorine 0,1-3,0 mg/l / pH-Wert 6,8-8,2	
Chlor-Brom-pH HR, in blister²⁾	15 80 10
Bromine 0,2-6,8 mg/l	
Chlorine 0,5-6,0 mg/l / pH-Wert 6,8-8,2	
Active Oxygen-pH, in blister²⁾	15 76 10
Aktivsauerstoff 0 - 10 mg/l / pH-Wert 6,8-8,2	
Biguanide (PHMB)-pH, in blister²⁾	15 61 50
Biguanide (PHMB) 10-100 mg/l	
pH-Wert 6,8-8,2	
4 in 1, in plastic case	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	
Phosphate Test Kit³⁾	15 78 00
0-1000 ppb (0-1mg/l PO ₄)	

¹⁾ Pack unit 10 pc

²⁾ Pack unit 6 pc

³⁾ Pack unit 24 pc

Delivery content

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



Pooltester

Item	Code
Chlorine-pH LR⁴⁾	15 16 00
Chlorine 0,1–3,0 mg/l / pH value 6,8–8,2	
Chlorine-pH HR⁴⁾	15 16 01
Chlorine 0,5–6,0 mg/l / pH value 6,8–8,2	
Bromine-pH⁴⁾	15 16 04
Bromine 1,0–8,0 mg/l / pH value 6,8–8,2	
Active Oxygen-pH⁴⁾	15 16 05
O ₂ 0–10 mg/l / pH value 6,8–8,2	
Copper LR/HR-pH⁴⁾	15 51 90
Copper LR 0,1–1,0 mg/l & HR 0,5–5,0 mg/l	
pH value 6,8–8,2	
Active Oxygen-Copper-pH⁴⁾	15 52 35
O ₂ 0–10 mg/l / Copper 0,1–1,0 mg/l	
pH value 6,8–8,2	
Biguanide (PHMB)-Hydrogen Peroxide (H₂O₂)-pH⁴⁾	15 61 00
PHMB 10–100 mg/l / H ₂ O ₂ 5–50 mg/l	
pH value 6,8–8,2	

⁴⁾ Pack unit 6 pc

Delivery content

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



Multi Pooltester

Item	Code
5 in 1 Multi-Pooltester⁵⁾	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	

⁵⁾ Pack unit 5 pc

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, Phenolred Rapid
- 10 tablet reagents each CyA-Test, Alk-Test, CAL-Test
- Instruction manual
- Statements (phrases-H and P)

Refill Packs

Item	Code
Chlorine/pH* 30 DPD No.1/RAPID-tablets and 30 PHENOL RED / RAPID-tablets	51 58 84
Bromine/pH* 30 DPD No.1/RAPID-tablets and 30 PHENOL RED / RAPID-tablets	51 58 68
Active Oxygen - pH* 30 DPD No.4/RAPID-tablets and 30 PHENOL RED / RAPID-tablets	51 59 34
Active Oxygen - Copper- pH* 20 DPD No.4/RAPID-tablets 20 COPPER No.1-tablets and 20 PHENOL RED / RAPID-tablets	51 58 65
PHMB/H₂O₂- pH 20 PHMB-, 20 H ₂ O ₂ -, 20 ACIDIFYING PT- and 20 PHENOL RED / RAPID-tablets	51 58 70
PHMB - pH* 30 PHMB-tablets and 30 PHENOL RED / RAPID-tablets	51 61 55
Copper - pH* 30 COPPER No.1-tablets and 30 PHENOL RED / RAPID-tablets	51 57 78
Combi pack for Three-Chamber-Tester 4 in 1 20 DPD No.1/ RAPID-, 20 PHENOL RED / RAPID-, 20 CyA-TEST- 20 ALK LR-Tabletten	51 59 35
Combi pack for Multipooltester 5 in 1 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
Acidifying GP	100 pc.	51 54 80BT
	250 pc.	51 54 81BT
Acidifying PT	100 pc.	51 54 90
	250 pc.	51 54 91
ALK LR	100 pc.	51 60 40BT
ALK TEST	100 pc.	51 55 70BT
CAL TEST	100 pc.	51 55 80BT
Copper No.1	100 pc.	51 35 50BT
	250 pc.	51 35 51BT
Cyanuric Acid CyA-TEST	100 pc.	51 13 70BT
	250 pc.	51 13 71BT
DPD No.1/ RAPID	100 pc.	51 13 10BT
	250 pc.	51 13 11BT
	500 pc.	51 13 12BT

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

★ also suitable for seawater

Rapid Tests



Highlights

- 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



MINIKIT



Photo: Elsebad, Schwerte, www.elsebad.de

Analysis	Type	Range	Methods				Code
			Tablet Count	Speed Test	Yes/No Test	Turbidity	
Alkalinity, Total-M	AF 413	10 - 500 mg/l $\text{CaCO}_3 \cong 0.2 - 10 \text{ mmol/l}$	■				41 41 30
Alkalinity, Total-M	AF 444	20 - 800 mg/l $\text{CaCO}_3 \cong 0.4 - 16 \text{ mmol/l}$		■			41 44 40
Alkalinity-P	AF 414	20 - 500 mg/l $\text{CaCO}_3 \cong 0.2 - 5 \text{ mmol/l}$	■				41 41 40
Calcium Hardness	AF 446	20 - 800 mg/l $\text{CaCO}_3 \cong 0.4 - 16 \text{ mmol/l}$		■			41 44 60
Calcium Hardness	AF 416	10 - 500 mg/l $\text{CaCO}_3 \cong 0.1 - 5 \text{ mmol/l}$	■				41 41 60
Chloride ★	AF 418	5 - 5000 mg/l Cl	■				41 41 80
Cyanuric Acid	AF 422	20 - 200 mg/l Cyanuric Acid				■	41 42 20
QAC (Quaternary Ammonium Comp.)	AF 417	0 - 500 mg/l active QAC Limit 200 mg/l (Yes/No)	■		■		41 41 70
Sulphate ★	AF 431	40 - 200 mg/l SO_4 (40 - 4000 mg/l by dilution)				■	41 43 10
Total Hardness	AF 424	5 - 500 mg/l $\text{CaCO}_3 \cong 0.05 - 5 \text{ mmol/l}$		■			41 42 40
Total Hardness	AF 445	20 - 800 mg/l $\text{CaCO}_3 \cong 0.4 - 16 \text{ mmol/l}$	■				41 44 50

★ also suitable for seawater



Photo: Elsebad, Schwerte, www.elsebad.de

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.

Highlights

- Easy operation
- Exact reagent dosing
- Measurement accuracy
- Tablet reagents with a guaranteed shelf life of 5 years

Delivery content

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

Tablet Reagents	Code	Quantity
ALKALINITY-M	51 53 21 BT	250
ALK-TEST	51 55 70 BT	100
ALKALINITY-P	51 51 01	250
CAL-TEST	51 55 80 BT	100
CALCIUM HARDNESS	51 51 90	100
CHLORIDE	51 51 31	250
CyA-TEST	51 13 70 BT	100
QAC-Test	51 54 10 51 54 11	100 250
SULFATE	51 54 51 BT	250
TOTAL HARDNESS	51 51 61 BT	250
T HARDNESS-TEST	51 55 90 BT	100

Scuba II Electronic Pooltester



Test equipment for the responsible private swimming pool and whirlpool operator

Scuba II

Technical Data

Every pool owner should check the most important parameters in his pool at regular intervals. This is the only way to ensure that water quality is maintained at a 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 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 a little effort.

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

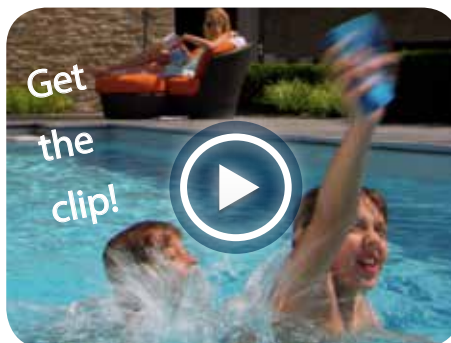


Scuba II

Refill pack

Article	Code
Refill pack for Scuba II	52 56 00
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



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

Highlights

- Modern, ergonomic design
- User friendly handling
- Watertight housing*
- Large display

* as defined in IP 68, 1 hour at 0.1 meter

Lieferumfang

- 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

Determination	Range	Resolution	Accuracy
Chlorine, free	0,1 - 6 mg/l 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 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 CaCO_3	1,0 mg/l	$\pm 50 \text{ mg/l}$
Bromine	0,2 - 13,5 mg/l 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 $\pm 1,1 \text{ mg/l}$

CHECKIT[®]Comparator

with continuous colour scales





Front view of the CHECKIT®Comparator with cells



Test Kit in carrying case, ready to use



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



Tablet reagents in blister



CHECKIT®Discs with continuous and stable scales



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

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

Highlights

- Easy operation
- Exact reagent dosing
- Tablet reagents with a guaranteed shelf life of 5/10 years
- Measurement accuracy
- Continuous colour scales

CHECKIT® Comparator

Colorimeter for regular testing in Pools and Spas

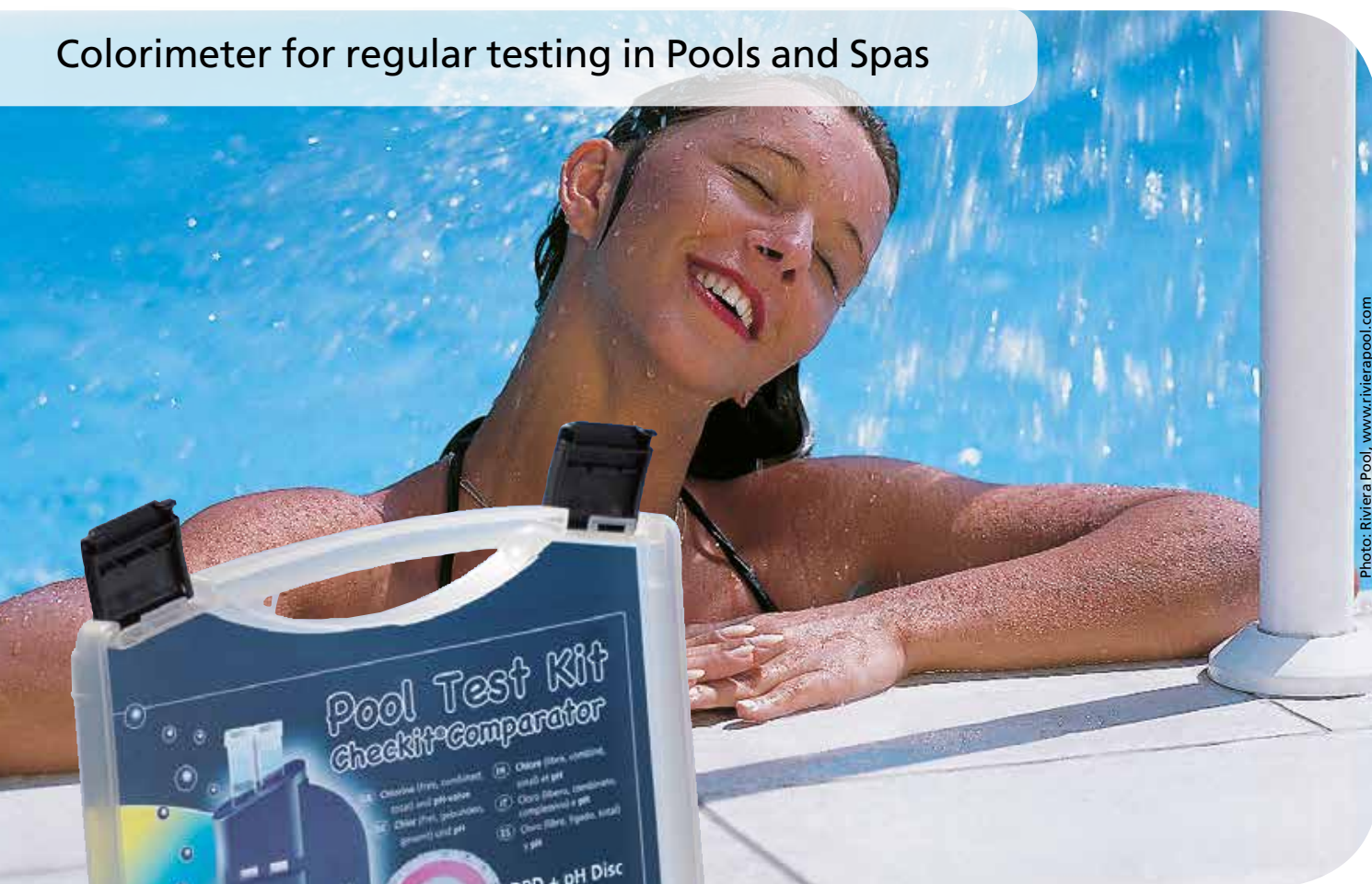


Photo: Riviera Pool, www.rivierapool.com

Test Kits 2 in 1

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

Delivery content

- CHECKIT®Comparator in a sturdy plastic case
- CHECKIT®Disc(s)
- 3 cells & 1 stirring rod
- Tablet reagents for 30 tests each
- Warranty information
- Instruction manual

Test Kit 5 in 1

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

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

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

Single Parameter Test Kits

Test Kit	Range* (± 5 % Full Scale)	Reagent	Code
Aluminium	0 - 0.3 mg/l Al	Tablets	14 72 00
Ammonia ★	0 - 1 mg/l N	Tablets	14 72 10
Bromine	0 - 5 mg/l Br	Tablets	14 72 80
Chlorine (DPD), free, comb., total ★	0 - 1 mg/l Cl ₂	Tablets	14 70 10
Chlorine (DPD), free, comb., total ★	0 - 2 mg/l Cl ₂	Tablets	14 70 40
Chlorine (DPD), free, comb., total ★	0 - 4 mg/l Cl ₂	Tablets	14 70 20
Chlorine (DPD) free+total ★	0 - 3.5 mg/l Cl ₂	Powder Reagents	14 70 52
Copper , free	0 - 1 mg/l Cu	Tablets	14 72 30
Copper , free + total ★	0 - 5 mg/l Cu	Tablets	14 74 30
Iron ★	1 - 10 mg/l Fe	Tablets	14 73 20
Iron ★	0.05 - 1 mg/l Fe	Tablets	14 72 20
Ozone (DPD)	0 - 1.0 mg/l O ₃	Tablets	14 72 75
Ozone (in presence of chlorine)	0 - 1.0 mg/l O ₃	Tablets	14 72 70
pH value (Phenol red)	6.5 - 8.4 pH	Tablets	14 71 00
pH value (Bromocresol purple)	5.2 - 6.8 pH	Tablets	14 71 10
pH value (Universal)	4 - 10 pH	Tablets	14 71 30
Phosphate	0 - 4 mg/l PO ₄	Tablets	14 72 40
Phosphate ★	0 - 80 mg/l PO ₄	Tablets	14 72 50
Sodiumhypochlorite	2 - 18 % NaOCl	Tablets	14 74 90
Total Alkalinity	20 - 240 mg/l CaCO ₃	Tablets	14 74 50

* Disc readings see following pages

★ also suitable for seawater

Delivery content

- CHECKIT®Disc
- 2 cells & 1 stirring rod
- Tablet reagents for 30 tests
- Instruction manual

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.



Plastic cells in pack, available:

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

CHECKIT[®]Comparator

Tests, Test Kits, Testpaks, Discs, Reagents

Test	Range	Readings (Accuracy ± 5 % Fullscale)	Test Kit	Testpak
Aluminium 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
Ammonia ★ 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
Bromine 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
Chlorine ★ free, combined, total Tablets	0 - 1 mg/l Cl ₂	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
Chlorine ★ free, combined, total Tablets	0 - 2 mg/l Cl ₂	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
Chlorine ★ free, combined, total Tablets	0 - 4 mg/l Cl ₂	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
Chlorine ★ free, combined, total Powder Reagent	0 - 3.5 mg/l Cl ₂	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
Copper , free (Cu ²⁺) 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
Copper HR 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

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#	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#	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#	each 100	51 76 91 BT
	COPPER No.1 / No.2	each 250	51 76 92 BT



CHECKIT[®]Comparator

Tests, Test Kits, Testpaks, Discs, Reagents

Test	Range	Readings (Accuracy ± 5 % Fullscale)	Test Kit	Testpak
Iron LR ★ 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
Iron HR ★ 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
Ozone (DPD) Tablets	0 - 1.0 mg/l O ₃	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
Ozone (DPD) in the presence of chlorine	0 - 1.0 mg/l O ₃	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
pH 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
pH 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
Phosphate HR ★ Tablets	0 - 80 mg/l PO ₄	0 / 5 / 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50 / 55 / 60 / 65 / 70 / 75 / 80	14 72 50	14 77 50
Phosphate LR Tablets	0 - 4 mg/l PO ₄	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
Sodiumhypochlorite 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
Total Alkalinity Tablets	20 - 240 mg/l CaCO ₃	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

Disc	Reagents	Quantity	Code
14 62 20	IRON LR (Fe ²⁺ and Fe ³⁺)	100	51 53 70 BT
		250	51 53 71 BT
	IRON (II) LR (Fe ²⁺)	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 [#]	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 [#]	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

Material Safety Data Sheets: www.lovibond.com



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 precision and reproducibility of results.

Lightning 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

Highlights

- Accurate and reproducible results
- Colour-stable, fade-free glass standards
- In accordance with ISO 7393/2 "Determination of free chlorine and total chlorine"
- Integrated prism



Lighting unit, battery operated



Comparator 2000+



Disc

Test Kits 2000+



Photo: Riviera Pool, www.rivierapool.com

Type*	Test Kits	Code
AF 112 A	Chlorine 0.1 – 1.0 mg/l, Type 3/40 A**	41 11 20
AF 112 B	Chlorine 0.2 – 4.0 mg/l, Type 3/40 B**	41 11 30
AF 112 J/J	Chlorine 0.1 – 2.0 mg/l, Type 3/40 J** pH value 6.8 – 8.4, Type 2/1 J	41 72 46
AF 116 A	Chlorine 0.1 – 1.0 mg/l, Type 3/40 A** pH value 6.8 – 8.4, Type 2/1 J	41 11 40
AF 116 B	Chlorine 0.2 – 4.0 mg/l, Type 3/40 B** pH value 6.8 – 8.4, Type 2/1 J	41 11 60
AF 118 S	Chlorine 0.1 – 1.0 mg/l, Type 3/40 A**	41 11 81

* Disc readings see following pages

Type*	Test Kits	Code
	Chlorine 1.0 – 4.0 mg/l, Type 3/40 S** pH value 5.2 – 6.8, Type 2/1 G pH value 6.8 – 8.4, Type 2/1 J	
AF 129	Water Balance Chlorine 0.2 – 4.0 mg/l, Type 3/40 B** pH value 6.8 – 8.4, Type 2/1 J Total Alkalinity-M*** 0 – 500 mg/l CaCO ₃ Tablet Count Method Calcium Hardness*** 0 – 1000 mg/l CaCO ₃ Tablet Count Method	41 12 90
AF 405 M	Municipal Kit Chlorine	41 40 51

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

Type*	Test Kits	Code
	0.2 – 4.0 mg/l, Type 3/40 B** pH value 6.8 – 8.4, Type 2/1 J Cyanuric Acid*** 20 – 200 mg/l Cyanuric Acid Turbidity Method Total Alkalinity-M*** 20 – 800 mg/l CaCO ₃ Speed-Test Calcium Hardness*** 20 – 800 mg/l CaCO ₃ Speed-Test	

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

Comparator 2000+ and Accessories

Type	Item	Code
TK 100	Comparator 2000+	14 20 00
TK 102	Portable lighting unit, battery operated	14 20 50
	Daylight Unit, mains operated	17 10 10
AF 631	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
DB424/S	5 glass cells with lid, volume 10 ml, calibrated 2 - 12 ml, path length 13,5 mm	35 42 43
W680/40	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

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



Daylight unit, mains operated



Comparator 2000+



Test Kit



Plastic cells

Comparator 2000+

Tests, Discs, Reagents, Cells

Test	Disc	Disc Readings	Range	Code
Aluminium	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
Ammonia ★	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 ₄	23 00 60
Ammonia	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
Bromine ★	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
Bromine ★	3/53B	1; 2; 3; 4; 5; 6; 7; 8; 10 mg/l	1.0 - 10 mg/l	23 53 20
Bromine ★	3/53C	0.5; 1; 1.5; 2; 2.5; 3; 4; 5; 6 mg/l	0.5 - 6 mg/l	23 53 30
Chlorine ★ 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
Chlorine ★ 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
Chlorine ★ 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

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 [#]	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 [#]	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
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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
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DPD No.1			13.5 mm cell, 10 ml	35 42 43
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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 [#]	each 100	51 77 11 BT		
DPD No.1 / No.3	each 250	51 77 12 BT		
Combi pack [#]	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
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DPD No.1/2/3/4			13.5 mm cell, 10 ml	35 42 43
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MSDS (Material Safety Data Sheets): www.lovibond.com

Comparator 2000+

Tests, Discs, Reagents, Cells

Test	Disc	Disc Readings	Range	Code
Chlorine ★ 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
Chlorine ★ 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
Chlorine ★ 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
Chlorine ★ free, combined, total	3/40HN	2; 3; 4; 5; 6; 7; 8; 9; 10 mg/l	2.0 - 10 mg/l	23 40 81
Copper	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
Copper	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
Hydrogen Peroxide	3/114	2; 4; 6; 8; 10; 12; 14; 16; 20 mg/l	2 - 20 mg/l	23 00 80
Hydrogen Peroxide	3/115	10; 20; 30; 40; 50; 60; 70; 80; 100 mg/l	10 - 100 mg/l	23 00 90
Iron , ★ 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
Iron , total	3/117	1; 2; 3; 4; 5; 6; 7; 8; 10 mg/l	1.0 - 10 mg/l	23 01 10
Manganese	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 ²⁺ and Fe ³⁺)	100 250	51 53 70 BT 51 53 71 BT	13.5 mm cell, 10 ml	35 42 43
IRON (II) LR (Fe ²⁺)	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
Nitrate	3/142	10; 20; 30; 40; 50; 60; 70; 80; 100 mg/l	10 - 100 mg/l NO ₃	23 03 60
Ozone (DPD)	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
Ozone (DPD)	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
Ozone (Indigo)	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
pH	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
pH	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
pH	2/1P	4; 5; 6; 7; 8; 9; 9.4; 10; 11	4.0 - 11 pH	22 12 20
Phosphate	3/136	0; 5; 10; 15; 20; 25; 30; 35; 40 mg/l	0 - 40 mg/l PO ₄	23 03 10
Phosphate	3/70	0; 10; 20; 30; 40; 50; 60; 70; 80; 100 mg/l	0 - 100 mg/l PO ₄	23 70 00
QAC (Quaternary Ammonia Compounds)	3/118	0; 2; 4; 6; 8; 10; 12; 15; 20 mg/l	0 - 20 mg/l	23 01 20
QAC (Quaternary Ammonia Compounds)	3/119	0; 20; 40; 60; 80; 100; 120; 150; 200 mg/l	0 - 200 mg/l	23 01 30
Sodiumhypochlorite	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

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



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 over 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 what parameters can be measured with which photometer.

Parameter	MD 100* & MD 110*	MD 200*	PM 620 & PM 630	PM 600
Acid Capacity K _{54.3}		■	■	
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).



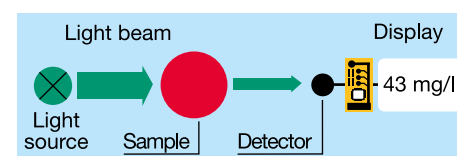
Parameter

	MD 100* & MD 110*	MD 200*	PM 620 & PM 630	PM 600
Iron (Fe^{2+} , Fe^{3+}), soluble	■	■	■	■
Langelier Water Balance		■	■	
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). The photometer then uses a microprocessor to calculate the required concentration and displays the result.



MD 600



TB 210 IR



PM 630

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

The units supply 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 using 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.

MD 100 Photometer

Precise Water Analysis in Ergonomic Design



Highlights

- Scroll memory
- Automatic switch-off
- Real-Time-Clock and date
- Calibration mode indicator
- Backlit display
- Storage function
- One Time Zero (OTZ)
- infrared interface module
- Waterproof^{*)}

^{*)} as defined in IP 68, 1 hour at 0.1 meter

2in1

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

3in1

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

4in1

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

5in1

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

6in1

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

* Delivery without reagents for measuring range 0.1 - 10 mg/l Cl₂

 Please see pages 50 onwards for reagents (order codes)

Data Transfer

The optional available IRIIM (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 1) or alternatively a serial printer 2).

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 1) USB or alternatively a printer with a serial plug-in connected to the IRIIM. Applicable for the following operating systems: Windows® XP, Windows® Vista and Windows® 7/10.

¹⁾ USB-printer: HP Deskjet 6940 ; ²⁾ each ASCII Drucker





Technical Data

Optics	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
Wavelength Accuracy	± 1 nm
Photometric Accuracy⁴⁾	3 % FS (T = 20 °C – 25 °C)
Photometric Resolution	0.01 A
Power Supply	4 micro batteries (AAA), capacity approx. 17 hours or approx. 5000 tests in continuous operation with the display lighting switched off
Auto - OFF	automatic switch-off
Display	backlit LCD (on keypress)
Storage	internal ring memory for 16 data sets
Interface	infrared interface for test data transfer
Additional feature	real time clock and date
Calibration	factory calibration and user calibration. Reset to factory calibration possible
Dimensions	155 x 75 x 35 mm (L x W x H)
Weight	basic unit approx. 260 g
Environmental conditions	temperature: 5 – 40 °C rel. humidity: 30 – 90 % (non condensing)
Approval	CE

⁴⁾ 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, manufacturers test certificates M are available at cost on request. Manufacturers test certificates M are individually supplied per instrument and per method.

The manufacturers 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 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 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



Highlights

- Scroll Memory
- Automatic switch-off
- Real-Time- Clock and date
- Calibration mode indicator
- backlit display
- Storage function
- One Time Zero (OTZ)
- Bluetooth®- Interface
- Waterproof*)

*) as defined in IP 68, 1 hour at 0,1 meter

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

Technical Data

Optics	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	Power Supply	4 micro batteries (AAA), capacity approx. 17 hours or approx. 5000 tests In continuous operation with the display lighting switched off	Weight	basic unit approx. 260 g
Wavelength Accuracy	± 1 nm	Auto - OFF	automatic switch-off	Environmental conditions	temperature: 5–40 °C rel. humidity: 30–90 % (non condensing)
Photometric Accuracy⁴⁾	3 % FS (T = 20 °C – 25 °C)	Display	backlit LCD (on keypress)	Approval	CE
Photometric Resolution	0.01 A	Storage	internal ring memory for 16 data sets	⁴⁾ tested with standard solutions	
		Interface	Bluetooth® interface for test data transfer		
		Additional feature	real time clock and date		
		Calibration	factory calibration and user calibration. Reset to factory calibration possible		
		Dimensions	155 x 75 x 35 mm (L x W x H)		

3in1

Test	Code
MD 110 Chlorine, pH, Cyanuric Acid tablet reagents 0,01 - 6,0 mg/l Cl_2 / 0,1 - 10 mg/l Cl_2^* 6,5 - 8,4 pH / 0 - 160 mg/l cyanuric acid	29 80 102
MD 110 Chlorine, pH, Cyanuric Acid liquid reagent for chlorine and pH 0,02 - 4 mg/l Cl_2 / 6,5 - 8,4 pH 0 - 160 mg/l cyanuric acid	29 80 152

4in1

Test	Code
MD 110 Chlorine, pH, Cyanuric Acid, Alkalinity-M (total) tablet reagents 0,01 - 6,0 mg/l Cl_2 / 0,1 - 10 mg/l Cl_2^* 6,5 - 8,4 pH / 0 - 160 mg/l cyanuric acid 5 - 200 mg/l CaCO_3 (TA)	29 80 702
MD 110 Chlorine, pH, Cyanuric Acid, Alkalinity-M (total) liquid reagent for chlorine and pH 0,02 - 4 mg/l Cl_2 / 6,5 - 8,4 pH 0 - 160 mg/l cyanuric acid / 5 - 200 mg/l CaCO_3 (TA)	29 80 752

6in1

Test	Code
MD 110 Chlorine, Bromine, pH, Cyanursäure, Alkalinity-M (total), Calcium hardness tablet reagents 0,01 - 6,0 mg/l Cl_2 / 0,1 - 10 mg/l Cl_2^* 0,05 - 13 mg/l Br / 6,5 - 8,4 pH 0 - 160 mg/l cyanuric acid / 5 - 200 mg/l CaCO_3 (TA) 0 - 500 mg/l CaCO_3 (CaH)	29 80 902

* Delivery without reagents for measuring range 0.1 - 10 mg/l Cl_2

➔ Please see pages 50 onwards for reagents (order codes)

Data Transfer

The photometer MD 110 has integrated Bluetooth® functionality. The app AqualX® is the ideal supplement to the Lovibond® photometer. Measurement results are transmitted via the Bluetooth® interface for fast evaluation or admini-

stration on smartphones or tablets. All data can be handled and allocated immediately, on-site. The app displays all results in a clear graphic with min. and max. values and supports the export of the data as an Excel® compatible CSV file.

For further information, please refer to www.lovibond.com/bluetooth



MD 200 Photometer

Precise results using
high-quality interference filters



Highlights

- Scroll memory
- Automatic switch-off
- Real-Time-Clock and date
- Calibration mode indicator
- Backlit display
- Storage function
- One Time Zero (OTZ)
- Infrared interface module
- Waterproof^{*)}

^{*)} as defined in IP 68, 1 hour at 0.1 meter, buoyant

2in1

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

3in1

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

4in1

Test	Code
MD 200 Chlorine, pH, Cyanuric Acid, Acid capacity K_{s4.3} tablet reagents 0.01 - 6.0 mg/l Cl ₂ / 0.1 - 10 mg/l Cl ₂ * 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 0.1 - 4 mmol/l	28 60 512
MD 200 Chlorine, pH, Cyanuric Acid, Acid capacity K_{s4.3} liquid reagents for chlorine and pH 0.02 - 4 mg/l Cl ₂ / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid / 0.1 - 4 mmol/l	28 60 522
MD 200 Chlorine, pH, Cyanuric Acid, Alkalinity-M tablet reagents 0.01 - 6.0 mg/l Cl ₂ / 0.1 - 10 mg/l Cl ₂ * 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 5 - 200 mg/l CaCO ₃ (TA)	28 60 502
MD 200 Chlorine, pH, Cyanuric Acid, Alkalinity-M liquid reagents for chlorine and pH 0.02 - 4 mg/l Cl ₂ / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid / 5 - 200 mg/l CaCO ₃ (TA)	28 60 542
MD 200 Chlorine, pH, Urea, Acid capacity K_{s4.3} tablet reagents 0.01 - 6.0 mg/l Cl ₂ / 0.1 - 10 mg/l Cl ₂ * 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
MD 200 Chlorine, Chlorine dioxide, pH, Acid capacity K_{s4.3} tablet reagents 0.01 - 6.0 mg/l Cl ₂ / 0.02 - 11 mg/l ClO ₂ 6.5 - 8.4 pH / 0.1 - 4 mmol/l	28 63 802

5in1

Test	Code
MD 200 Chlorine, pH, Cyanuric Acid, Acid capacity K_{s4.3}, Calcium hardness tablet reagents 0.01 - 6.0 mg/l Cl ₂ / 0.1 - 10 mg/l Cl ₂ * 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 0.1 - 4 mmol/l / 0 - 500 mg/l CaCO ₃ (CaH)	28 61 212
MD 200 Chlorine, pH, Alkalinity-M, Cyanuric Acid, Calcium hardness tablet reagents 0.01 - 6.0 mg/l Cl ₂ / 0.1 - 10 mg/l Cl ₂ * 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 5 - 200 mg/l CaCO ₃ (TA) / 0 - 500 mg/l CaCO ₃ (CaH)	28 61 202

6in1

Test	Code
MD 200 Chlorine, Bromine, pH, Acid capacity K_{s4.3}, Cyanuric Acid, Calcium hardness tablet reagents 0.01 - 6.0 mg/l Cl ₂ / 0.1 - 10 mg/l Cl ₂ * 0.05 - 13 mg/l Br ₂ / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid / 0.1 - 4 mmol/l 0 - 500 mg/l CaCO ₃ (CaH)	28 61 912
MD 200 Chlorine, Bromine, pH, Cyanuric Acid, Alkalinity-M, Calcium hardness tablet reagents 0.01 - 6.0 mg/l Cl ₂ / 0.1 - 10 mg/l Cl ₂ * 0.05 - 13 mg/l Br / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid / 5 - 200 mg/l CaCO ₃ (TA) 0 - 500 mg/l CaCO ₃ (CaH)	28 61 902
MD 200 Chlorine, pH, Alkalinity-M, Copper, Iron, Cyanuric Acid tablet reagents 0.01 - 6.0 mg/l Cl ₂ / 0.1 - 10 mg/l Cl ₂ * 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 5 - 200 mg/l CaCO ₃ (TA) / 0.05 - 5 mg/l Cu 0.02 - 1 mg/l Fe ^{2+/3+}	28 62 102

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

* Delivery without reagents for measuring range 0.1 - 10 mg/l Cl₂

If differentiation is required, glycine tablets can be used.

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 determined. 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.

Technical Data

Optics	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
Wavelength Accuracy	± 1 nm
Photometric Accuracy⁴⁾	3 % FS (T = 20 °C – 25 °C)
Photometric Resolution	0.01 A
Power Supply	4 batteries (AA), capacity approx. 53 hours or 15000 tests (continuous operation without display lighting)
Auto - OFF	automatic switch-off
Display	backlit LCD (on keypress)
Storage	internal ring memory for 16 data sets
Interface	infrared interface for test data transfer to IRIIM
Additional feature	real time clock and date
Calibration	factory calibration and user calibration. Reset to factory calibration possible
Dimensions	190 x 110 x 55 mm (L x W x H)
Weight	basic unit approx. 455 g (with batteries)
Environmental conditions	temperature: 5–40 °C rel. humidity: 30–90 % (non condensing)
Approval	CE

⁴⁾ 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 printer¹⁾ or alternatively a serial printer²⁾.

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 specified¹⁾ 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.

¹⁾ USB printer: HP Deskjet 6940 ; ²⁾ 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, manufacturers test certificates M are available at cost on request. Manufacturers test certificates M are individually supplied per instrument and per method.

The manufacturers 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

Data transfer via **Bluetooth®** or Infrared



The ultimate range
in Pool Photometers

For reliable pool relevant
water analysis

Highlights

- Intuitive operation
- Back-lit display
- User guide in German, English, French, Spanish, Italian, Portuguese, Polish & Indonesian
- Stores up to 1000 results
- One Time Zero (OTZ)
- Bluetooth® data transfer (PM 630)
- Infrared interface (PM 600 / PM 620) for IRiM data transfer
- Waterproof*)

*) as defined in IP 68, 1 hour at 0.1 meter

Active oxygen
Alkalinity-M (total)
Aluminium
Ammonia
Bromine
Chlorine
Chlorine dioxide
Copper
Cyanuric acid
Hardness, total
Hardness, calcium
Hydrogen peroxide

Iron
Iodine
Langelier Index
Ozone
pH
PHMB (Biguanide)
Phosphate
Sulphate
Sodium Hypochlorite
Urea
Water Balance

 Assignment of parameters,
see pages 36 and 37

Photometer PM 600 / PM 620

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 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. Compatible with the tried and trusted Lovibond® Tablet reagents, it is designed to be robust, reliable yet easy-to-use for any pool operator.

The **PM 620** extends these capabilities to include up to 34 parameter variants from Acid Demand to Urea. Its unique design enables compatibility with Lovibond® Tablet, Liquid and Powder reagents, making it one of the most flexible and complete pool photometers available today.

Both 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 to a PC via an additional Infra-Red module (IRiM)*.

Supplied in a durable, portable case complete with accessories and space for additional reagents, both photometers provide immediate access to the accurate water analysis expected of the Lovibond® brand, clearly the best choice for water analysis.

* available as an option : IRiM (infrared interface Modul)

Photometer PM 630

The PM 630 introduces data management and **Bluetooth®** functionality to the highly proven PM 600 series of photometers. 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.

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.

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.

Records can be transferred at the touch of a

Technische Daten

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

¹ optional available: IRiM (Infrared Interface Modul)

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

* tested with standard solutions

button by email either as a graphic or database record, simplifying the transfer, management and sharing of results.

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 (pH; Total Alkalinity; Calcium Hardness; Total Dissolved Solid; Temperature.), the App automatically determines and displays the results which can then be saved to create a history and, again, shared via email.

Both Lovibond® Apps are available for Android™ and iOS®.

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

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.

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

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

¹⁾ The standard values mentioned in kit 215630 for the VARIO method are for photometer PM 620 only, because this method is not available in 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 syringe, 1 brush, 1 stirring rod
- 1 plastic beaker 100 ml
- Warranty information
- Certificate of Compliance
- Instruction Manual

PM 600 (13 parameter, infrared)

- 100 tablet reagents each for chlorine (free, combined, total), pH value, calcium hardness, alkalinity-M
- Order code: 21 40 60**

PM 620 (34 parameter, infrared)

- 100 tablet reagents each for chlorine (free, combined, total), pH value, cyanuric acid, alkalinity-M
- Order code: 21 40 65**

PM 630 (34 parameter, Bluetooth®)

- 100 tablet reagents each for chlorine (free, combined, total), pH value, cyanuric acid, alkalinity-M
- Order code: 21 40 70**

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, specification 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.

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). Provided that the bottles are stored within the temperature range +6°C to +10°C, the Lovibond® DPD and Phenol Red solutions can be used for a period of two years from the production date.

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

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

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



Reagents

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

MSDS (Material Safety Data Sheets): www.lovibond.com

For other reagent quantities please see our current price list.

Legend

¹ Deutsche Einheitsverfahren zur Wasser-, Abwasser- und Schlamm- Untersuchung

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

³ Photometrische Analysenverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart; 1989

⁴ Photometrische Analyse, Lange/Vejdelek, Verlag Chemie; 1980

⁵ Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond®

Display	Reagent	Form of reagent/Quantity	Order code
	ALKA-M-PHOTOMETER	Tablet / 100	51 32 10 BT
CaCO ₃	ALKA-M-PHOTOMETER	Tablet / 100	51 32 10 BT
CaCO ₃	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 Set	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 Set	53 55 00
Br	DPD No. 1 DPD No. 1 HIGH CALCIUM ^{e)} GLYCINE ^{f)}	Tablet / 100 Tablet / 100 Tablet / 100	51 10 50 BT 51 57 40 BT 51 21 70 BT
Cl ₂	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 ^{e)} DPD No. 3 HIGH CALCIUM ^{e)} Combi pack# DPD No.1 / No.3 HIGH CALCIUM ^{e)} Combi pack# DPD No.1 / No.3 HIGH CALCIUM ^{e)}	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 ₂	DPD No. 1 HR DPD No. 3 HR	Tablet / 100 Tablet / 100	51 15 00 BT 51 15 90 BT
Cl ₂	DPD 1 Buffer solution DPD 1 Reagent solution DPD 3 Solution	Liquid reagent / 15 ml Liquid reagent / 15 ml Liquid reagent / 15 ml Set	47 10 10 47 10 20 47 10 30 47 10 56

^{a)} determination of free, combined and total

^{e)} 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

^{f)} additionally required for determination of bromine, chlorine dioxide and ozone in the presence of chlorine

^{g)} Reagent recovers most insoluble iron oxides without digestion

^{h)} additionally required for samples with hardness values above 300 mg/l CaCO₃

ⁱ⁾ high range by dilution

including stirring rod

Reagents

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

MSDS (Material Safety Data Sheets): www.lovibond.com

For other reagent quantities please see our current price list.

Legend

¹ Deutsche Einheitsverfahren zur Wasser-, Abwasser- und Schlamm- Untersuchung

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

³ Photometrische Analysenverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart; 1989

⁴ Photometrische Analyse, Lange/Vejdelek, Verlag Chemie; 1980

⁵ Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond®

Display	Reagent	Form of reagent/Quantity	Order code
Cl ₂	VARIO Chlorine FREE-DPD/F10 VARIO Chlorine TOTAL-DPD/F10	Powder Pack / 100 Powder Pack / 100	53 01 00 53 01 20
ClO ₂	DPD No. 1 DPD No. 3 Combi pack [#] DPD No.1 / No.3 Combi pack [#] DPD No.1 / No.3 GLYCINE ^{f)} Combi pack [#] DPD No.1 / GLYCINE Combi pack [#] DPD No.1 / GLYCINE DPD No.1 High Calcium ^{e)}	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
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 ₃	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 ₃	HARDCHECK P	Tablet / 100 Tablet / 250	51 56 60 BT 51 56 61 BT
H ₂ O ₂	H ₂ O ₂ reagent solution	Liquid reagent / 15 ml	42 49 91
I	DPD No. 1	Tablet / 100	51 10 50 BT
Fe	IRON LR (Fe ²⁺ and Fe ³⁺) IRON (II) LR (Fe ²⁺)	Tablet / 100 Tablet / 100	51 53 70 BT 51 54 20 BT
O ₂	DPD No. 4	Tablet / 100	51 12 20 BT
O ₃	DPD No. 1 DPD No. 3 Combi pack [#] DPD No.1 / No.3 Combi pack [#] DPD No.1 / No.3 GLYCINE ^{f)} Combi pack [#] DPD No.1 / GLYCINE Combi pack [#] DPD No.1 / GLYCINE	Tablet / 100 Tablet / 100 each 100 each 250 Tablet / 100 each 100 each 250	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

^{a)} determination of free, combined and total

^{e)} 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

^{f)} additionally required for determination of bromine, chlorine dioxide and ozone in the presence of chlorine

^{g)} Reagent recovers most insoluble iron oxides without digestion

^{h)} additionally required for samples with hardness values above 300 mg/l CaCO₃

ⁱ⁾ high range by dilution

[#] including stirring rod

Reagents

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

MSDS (Material Safety Data Sheets): www.lovibond.com

For other reagent quantities please see our current price list.

Legend

¹ Deutsche Einheitsverfahren zur Wasser-, Abwasser- und Schlamm- Untersuchung

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³ Photometrische Analysenverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart; 1989

⁴ Photometrische Analyse, Lange/Vejdelek, Verlag Chemie; 1980

⁵ Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond®

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

^{a)} determination of free, combined and total

^{e)} 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

^{f)} additionally required for determination of bromine, chlorine dioxide and ozone in the presence of chlorine

^{g)} Reagent recovers most insoluble iron oxides without digestion

^{h)} additionally required for samples with hardness values above 300 mg/l CaCO₃

ⁱ⁾ high range by dilution

[#] including stirring rod

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*

Parameter	Guide Value
Alkalinity-m	$\geq 100 \text{ mg/l CaCO}_3$
Ammonia	$\leq 0.5 \text{ mg/l}$
Conductivity	$\leq 1000 \text{ }\mu\text{S/cm at } 20^\circ\text{C}$
Hardness	$\geq 1.0 \text{ mmol/l}$
Iron	$\leq 0.2 \text{ mg/l}$
Manganese	$\leq 0.05 \text{ mg/l}$
Nitrate	$\leq 50.0 \text{ mg/l}$
pH value	6.0 - 9.0
Total Phosphate	$\leq 0.01 \text{ mg/l}$

Chemical and physical guide values for basin water*

Parameter	Guide Value
Alkalinity-m	$\geq 100 \text{ mg/l CaCO}_3$
Ammonia	$\leq 0.3 \text{ mg/l}$
Conductivity	20 - 1000 $\mu\text{S/cm at } 25^\circ\text{C}$
Hardness	$\geq 1.0 \text{ mmol/l}$
Nitrate	$\leq 30.0 \text{ mg/l}$
Oxygen saturation	80 - 120 %
pH value	6.0 - 8.5 (Exception to pH 9.0)
Total Phosphate	$\leq 0.01 \text{ mg/l}$
Visibility depth	to the ground or min. 1.80 m
Water temperature	$\leq 25^\circ\text{C}$, up to 5 days max. 28°C

* Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau e.V. (FLL). Richtlinien für Planung, Bau, Instandhaltung und Betrieb von Freibädern mit biologischer Wasseraufbereitung (Schwimm- und Badeteiche), Ausgabe 2011.



Photo: swimming-teich.com

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 is valid since 24th March 2006.

Microbiology

- Escherichia coli
- Enterococci
- Pseudomonas aeruginosa
- Legionella pneumophila
- Cyano bacteria

Parasites

- e.g. Cryptosporidian



Photo: Grafinger, www.naturerlebnisbad.de

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^+) 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_2 from the water during photosynthesis. The pH decreases at night because of respiration and production of CO_2 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

SD-Series (IP 67 waterproof)



The new 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

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 devices are equipped with replaceable electrodes to ensure long-life functionality in the field.

Dimensions device:

205 x 44 x 33 mm (L x W x H)

Dimensions plastic-box:

232 x 65 x 47 mm (L x W x H)

Highlights

- Scroll-Through Functionality
- Compact & Robust
- Storage Function
- Backlit Display
- Waterproof (IP67)

Delivery Content

- Meter in a robust plastic case with hanger
- 2 Batteries AAA
- Lanyard
- Instruction Manual
- additionally: pH 4, 7, 10 buffer tablets
1 strip of 10 tablets each (SD 50 pH)



Technical Specifications SD Hand-Held Meter

SD 50 pH

Range	0 - 60 °C, 0 - 14 pH
Resolution	0.01 pH
Accuracy	± 0.05 pH
Resolution temperature	0.1 °C; Accuracy: ± 1 °C, selectable °C / °F system
Selectable buffer system	pH 7.00 or pH 6.86
Calibration	1, 2, or 3 points calibration with auto-recognition (NIST / IUPAC)
Temperature compensation	Automatic
Memory	Time and date display / stamp with 25 sets of data storage (non-volatile)
Display	22 x 22 mm LCD screen, with yellow/green backlight
Power supply	2 x AAA batteries
Battery life	> 350 hours (continuous use, backlight OFF), low battery indicator on LCD screen
Auto-off	8 minutes non-use
Approval	CE
Order code	19 48 00-16 19 48 30-16 in case with batteries, incl. pH buffer set 4.00 / 7.00 and measurement beaker
Spare electrode	19 48 20

SD 80 TDS

Range	0 - 60 °C, < 10.00 ppt ²⁾
Resolution	1 ppm (<= 999 ppm) 0.01 ppt (1.0 - 10.00 ppt)
Accuracy	± 3 % FS
Resolution temperature	0.1 °C; Accuracy: ± 1 °C, selectable °C / °F system
Auto switch over ppm and ppt	ppm: 0 - 999 ppt: 1.00 - 10.00
Calibration	up to 2 points calibration manual mode ± 50 % adjustable value
Temperature compensation	Automatic
Memory	Time and date display / stamp with 25 sets of data storage (non-volatile)
Display	22 x 22 mm LCD screen, with yellow/green backlight
Power supply	2 x AAA batteries
Battery life	> 100 hours (continuous use, backlight OFF), low battery indicator on LCD screen
Auto-off	8 minutes non-use
Approval	CE
Order code	19 48 03-16
Spare electrode	19 48 22

SD 60 ORP/Redox

Range	0 - 60 °C, -1800 ~ 1800mV
Resolution	0.1 mV (within ± 1000 mV) 1 mV (outside ± 1000 mV)
Accuracy	± 20 mV
Resolution temperature	0.1 °C; Accuracy: ± 1 °C, selectable °C / °F system
Calibration	1 point calibration with ± 150 mV adjustable ORP value
Temperature compensation	Automatic
Memory	Time and date display / stamp with 25 sets of data storage (non-volatile)
Display	22 x 22 mm LCD screen, with yellow/green backlight
Power supply	2 x AAA batteries
Battery life	> 350 hours (continuous use, backlight OFF), low battery indicator on LCD screen
Auto-off	20 minutes non-use
Approval	CE
Order code	19 48 01-16
Spare electrode	19 48 21

SD 90 Salt

Range	0 - 60 °C, < 20.00 ppt ± 2.00 % ³⁾
Resolution	0.01 % (when set to "P" % unit) 1 ppm (< 2000 ppm) 0.01 ppt (2.0 - 20.00 ppt)
Accuracy	± 3 % FS
Resolution temperature	0.1 °C; Accuracy: ± 1 °C, selectable °C / °F system
Auto switch over ppm and ppt	ppm: 0 - 1999 ppt: 2.00 - 20.00
Calibration	up to 2 points calibration manual mode ± 50 % adjustable value
Selectable unit system	"P" % or ppt / ppm
Temperature compensation	Automatic
Memory	Time and date display / stamp with 25 sets of data storage (non-volatile)
Display	22 x 22 mm LCD screen, with yellow/green backlight
Power supply	2 x AAA batteries
Battery life	> 100 hours (continuous use, backlight OFF), low battery indicator on LCD screen
Auto-off	8 minutes non-use
Approval	CE
Order code	19 48 04-16
Spare electrode	19 48 22

SD 70 Con

Range	0 - 60 °C, < 20.00 mS ¹⁾
Resolution	1 µS (<= 1999 µS) 0.01 mS (2.0 - 20.00 mS)
Accuracy	± 3 % FS
Resolution temperature	0.1 °C; Accuracy: ± 1 °C, selectable °C / °F system
Auto switch over µS and mS	µS: 1 - 1999 mS: 2.00 - 20.00
Calibration	1 or 2 points calibration for auto mode Standard: 1413 µS or Standard: 12.88 mS up to 2 points calibration for manual mode ± 50 % adjustable value
Temperature compensation	Automatic
Memory	Time and date display / stamp with 25 sets of data storage (non-volatile)
Display	22 x 22 mm LCD screen, with yellow/green backlight
Power supply	2 x AAA batteries
Battery life	> 100 hours (continuous use, backlight OFF), low battery indicator on LCD screen
Auto-off	8 minutes non-use
Approval	CE
Order code	19 48 02-16
Spare electrode	19 48 22

Conversion table

- ¹⁾ 0 - 20.00 mS/cm = 0 - 20,000 µS/cm
²⁾ 0 - 10.00 ppt TDS = 0 - 10,000 ppm TDS
³⁾ 0 - 20.00 ppt NaCl = 0 - 20,000 ppm NaCl
 0 - 20.00 ppt NaCl = 0 - 2 % NaCl
 0 - 20.00 ppt NaCl = 0 - 20 g/l NaCl
 ppm = Parts per Million = mg/l
 ppt = Parts per Thousand = g/l



SensoDirect 110

Determination of:
pH (0-14)
Conductivity (mS/cm)
Salinity (%)



pH110

The SensoDirect pH110 is a high quality, portable, battery operated pH meter. The instrument is equipped as standard with protective casing and built-in electrode holder.

The gel electrode of the SensoDirect pH110 is temperature resistant over the range 0 - 80 °C. It is fitted with a BNC connector as standard.

Technical data pH110

Range	0 - 14 pH
Resolution	0.01 pH
Accuracy	± 0.07 pH (pH5-pH9) ± 0.1 pH (pH4-pH10) ± 0.2 pH (pH1-pH3.9) ± 0.2 pH (pH10,1-pH13) 23 ± 5 °C, after calibration
Ambient conditions	0 - 50 °C 0 - 80 % rel. humidity (non condensing)
Battery	9 V block
Dimensions	208 x 110 x 34 mm (L x W x H)
Weight	approx. 380 g
Approval	CE
Order Code	72 13 00



Accessories SensoDirect pH110

Code	Article
721330	pH-electrode plastic/gel, type pH110
721247	pH-buffer, 4.00 (25°C), 90 ml
721248	pH-buffer, 7.00 (25°C), 90 ml
721249	pH-buffer, 10.00 (25°C), 90 ml

Delivery Content

- SensoDirect pH110 in a sturdy plastic case
- Battery
- pH-buffer (4.00/7.00)
- pH-plastic electrode-type 110
- Warranty information
- Instruction manual

Con110

The SensoDirect Con110 is a compact and versatile meter. The unit is extremely easy to use and is equipped as standard with a protective casing and built-in electrode holder.

It is equipped with a LC display showing two or three decimal places and a measuring range either of 0.001 – 1.999 or 0.01 – 19.99 mS/cm.

As conductivity measurement also depends on temperature, the SensoDirect Con110 includes an automatic temperature compensation feature.

The SensoDirect Con110 can be calibrated and adjusted using a potentiometer.



Technical data Con110

Range	0.001 - 1.999 mS/cm 0.01 - 19.99 mS/cm
Resolution	0.001 / 0.01 mS/cm
Temperature compensation	0 - 100 °C automatically 2 %/K, 25 °C
Accuracy	± 3 % Full Scale ± 1 Digit (23 ± 5 °C)
Ambient conditions	0 - 50 °C 0 - 80 % rel. humidity (non condensing)
Battery	9 V-Block
Dimensions	208 x 110 x 34 mm (L x W x H)
Weight	approx. 380 g
Approval	CE
Order code	72 23 00

Accessories SensoDirect Con110

Code	Article
724400	Conductivity sensor
722250	Conductivity calibration solution, 1413 µS/cm, 500 ml

Delivery Content

- SensoDirect Con110 in a sturdy plastic case
- Battery
- Conductivity sensor
- Warranty information
- Instruction manual

Salt110



The SensoDirect Salt110 provides fast, accurate readings and the convenience of a remote probe separately.

The measuring range of this salt tester is 0 to 10 % salt (% weight).

The SensoDirect Salt110 includes an automatic temperature compensation feature.

The unit is extremely easy to use and is equipped as standard with a protective casing and built-in electrode holder.

Technical data Salt110

Range	0 - 10 % Salt
Resolution	0,01 % Salt
Temperature compensation	0 - 50 °C, automatically
Accuracy	± 0,5 % Full Scale (23 ± 5 °C)
Ambient conditions	0 - 50 °C 0 - 80 % rel. humidity (non condensing)
Battery	9 V-Block
Dimensions	208 x 110 x 34 mm (L x W x H)
Weight	approx. 380 g
Approval	CE
Order code	72 33 00

Delivery Content

- SensoDirect Salt110 in a sturdy plastic case
- Battery
- Sensor
- Warranty information
- Instruction manual

SensoDirect 150

pH- value

TDS

Oxygen (dissolved)

Conductivity

Redox

Temperatur (°C / °F)



All in one Hand-held Meter

The SensoDirect 150 combines the features of several hand-held meters. It is designed for multi purpose operation and measures pH/Redox, dissolved oxygen and conductivity/TDS.

The SensoDirect 150 incorporates an intuitive user interface, large, easy to read display and is supplied with a sturdy handy case with electrodes, buffer solution and accessories.

SensoDirect 150

Conductivity/TDS/Temperature

Display	Large LCD display with contrast adjustment
Parameter	pH: 0 to 14.00 pH ORP: ± 1999 mV Conductivity: 200 μ S / 2 mS / 20 mS / 200 mS TDS (Total Dissolved Solids): Dissolved Oxygen: 0 to 20.0 mg/l
Data Logger	Real time data logger
Data Memory	Auto or manual data memory, 16000 data sets
Data Hold	Max, Min
Interface	USB, RS232
Probes	pH, ORP, Conductivity/TDS, Dissolved Oxygen and Temperature
Power off	Auto shut off or manual off
Data Output	RS 232 PC serial interface
Power Supply	DC 1.5 V battery (UM3, AA) x 4 PCs or DC 9V adapter in
Software	Data acquisition software Data logger software
Dimensions	220 x 120 x 40 mm (L x B x H)
Weight	approx. 625 g (Instrument with batteries)
Approval	CE

pH/Redox/Temperature

Range	pH 0 to 14 pH mV -1999 mV to 1999 mV
Resolution	0 - 14 pH, 0.01 pH 0 - 1999 mV, 1 mV
Accuracy	0 - 14 pH, ± 0.02 pH + 2 digits 0 - 1999 mV, ± 0.5 % + 2 digits
Temperature Compensation	manual 0 - 100 °C automatic (ATC)
pH Calibration	pH 7, pH 4, and pH10, 3 points calibration

Dissolved Oxygen/Temperature

Range	Dissolved Oxygen 0 to 20.0 mg/l Oxygen in Air 0 to 100.0 % Temperature 0 to 50 °C
Resolution	Dissolved Oxygen 0.1 mg/l 0.1 % O ₂ Temperature 0.1 °C
Accuracy (23 $\pm$ 5 °C)	Dissolved Oxygen ± 0.4 mg/l Oxygen in Air ± 0.7 % O ₂ Temperature ± 0.8 °C / 1.5 °F
Salinity Correction	0 to 39 % Salt
Air Pressure Compensation	0 to 8900 meter

Range/Resolution	Conductivity (μ S, mS) 0 - 200.0 μ S / 0.1 μ S 0.2 - 2.000 mS / 0.001 mS 2 - 20.00 mS / 0.01 mS 20 - 200.00 mS / 0.1 mS TDS (Total Dissolved Solids) 0 - 132 ppm / 0.1 ppm 132 - 1,320 ppm / 1 ppm 1,320 - 13,200 ppm / 10 ppm 13,200 - 132,000 ppm / 100 ppm Temperature 0 - 60 °C / 0.1 °C 32 - 140 °F / 0.1 °F
Accuracy	± 2 % F.S. + 1 digit ± 0.8 °C / ± 1.5 °F
Function	Conductivity (μ S, mS) TDS (Total Dissolved Solids, PPM) Temperature (°C, °F)

Accessories

Code	Article
721330	Spare electrode plastic/gel type BNC-plug
721250	pH buffer set 4.00/7.00/10.00 (25 °C)
721247	pH buffer, 4.00 (25 °C), 90 ml
721248	pH buffer, 7.00 (25 °C), 90 ml
721249	pH buffer, 10.00 (25 °C), 90 ml
721252	pH buffer 4.00 (25 °C) 1 litre
721254	pH buffer 7.00 (25 °C) 1 litre
721256	pH buffer 10.00 (25 °C) 1 litre
721242	Redox electrode plastic/gel type BNC-plug
195070	Redox calibration solution, 470 mV, 100 ml
724400	Conductivity probe (Con / TDS) (approx. 1.2 m cable)
722250	Calibration solution 1413 μ S/cm
724410	Oxygen sensor, (approx. 4 m cable)
724460	Spare membrane for oxygen sensor
724470	Spare electrolyte for oxygen sensor
724420	Temperature probe PT1000 (approx. 1.5 m cable)
724500	RS232 cable for connection to a PC
724510	USB cable for connection to a PC
724540	Power supply
725050	Case incl. foam
724520	Data Retrieve Software Software which enables the user to transmit data stored on the instrument to a computer
724530	Data Logger / Acquisition Software Software which enables the user to monitor and log data on a computer (online measurement)

Delivery Content

Order code: 724200

SensoDirect 150 Set pH/Con/TDS/Oxi
instrument, batteries, pH electrode,
temperature probe, conductivity probe,
oxygen sensor, pH buffer set 4.00 / 7.00,
electrolyte, membrane heads,
instruction manual,
warranty information, in case

Order code: 724210

SensoDirect 150 Set pH / Con / TDS
instrument, batteries, pH electrode,
temperature probe, conductivity probe,
pH buffer set 4.00 / 7.00,
instruction manual,
warranty information, in case

Order code: 724220

SensoDirect 150 Set pH / Oxi
instrument, batteries, pH electrode,
temperature probe, oxygen sensor,
pH buffer set 4.00 / 7.00, electrolyte,
membrane heads, instruction manual,
warranty information, in case

Order code: 724230

SensoDirect 150 Set pH / Redox
instrument, batteries, pH electrode,
temperature probe, redox electrode,
pH buffer set 4.00 / 7.00,
instruction manual,
warranty information, in case

Highlights

- pH/Redox
Conductivity/TDS
Dissolved Oxygen
Temperature °C/°F
- Real time data logger
- Protective casing
- RS 232 / USB

Turbidity Measurement



Photo: Schwimmbad & Sauna, www.schwimmbad.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 210 IR with infrared light source (EN ISO 7027)

The compact Lovibond® infrared turbidimeter TB 210 IR is designed to allow fast, precise onsite 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.

As infrared light is used for measurement purposes, the unit can be used to test both coloured and colourless liquids.

Technical data

Measurement cycle	approx. 8 seconds
Display	backlit LCD (on keypress)
Optics	LED ($\lambda = 860 \text{ nm}$) and photosensor amplifier in water proof sample chamber, infrared light
Keypad	polycarbonate membrane, splash proof
Power supply	9 V power pack battery
Auto - OFF	automatic switch-off
Storage	internal ring memory for 16 data sets
Additional feature	real time clock and date
Range (Auto-range)	0,01 - 1100 NTU
Resolution	0.01 - 9.99 NTU = 0.01 NTU 10.0 - 99.9 NTU = 0.1 NTU 100 - 1100 NTU = 1 NTU
Accuracy	$\pm 2,5 \%$ of reading or $\pm 0.01 \text{ NTU}$ (0 - 500 NTU) $\pm 5 \%$ (500 - 1100 NTU)
Housing	ABS
Dimensions (L x W x H)	190 x 110 x 55 mm
Weight (base unit)	approx. 0.4 kg
Ambient conditions	Temperature: 0 – 40 °C rel. humidity: 30 – 90 %
Reference instrument	Software based user calibration using T-CAL-Standards (see accessories)
Approval	CE
Order code	26 60 20

Accessories

Turbidity standard set
T-CAL (< 0.1, 20, 200, 800 NTU)
Order code: 19 41 50

Set of 12 empty sample vials, 24 mm ø
Order code: 19 76 555



Delivery Content

- TB 210 IR in a sturdy plastic case
- 4 turbidity standards (< 0.1, 20, 200 and 800 NTU)
- Battery
- 3 vials (ø 24 mm) with lids
- Warranty information
- Certificate of Compliance
- Instruction manual

Pool Software



Photo: Elsebad, Schwerte, www.elsebad.de

Highlights

- Analyses water balance
- Set parameter boundaries specific to your customer
- Customizable for up to 9,999 customers, 99 pools per customer
- Recommends chemical dosing
- Suitable for domestic and public pools
- Can be used independently of PM 600/620 with manual readings

The Lovibond® pool software is an ideal tool for commercial pool operators to measure pool parameters, analyse the results and propose the recommended treatments. Customizable for up to 9,999 customers and 99 pools per customer, the pool software provides a self-contained unit for operators 'on-the-road'.

Designed to enhance the functionality of the Lovibond® PM 600/620 photometers, the pool software analyses all the essential pool parameters required for Balanced Water. Once the analysis has been made, the software then automatically tries to 'restore' the water's balance; recommending the required chemical dosing

to bring the water as close as possible to zero on the Langelier Saturation Index.

Operators can rest assured their customers are accurately informed and the right amount of chemicals are administered.

Order code: 97 50 00

The pool software can either be used as an integrated software tool with the Lovibond® PM photometers or as a stand-alone application to analyse the Balanced Water parameters of swimming pools.

Designed originally to enhance the functionality of the PM photometers, AquaMATE downloads the measured parameter information via an infrared modem, stores the data to a PC and builds a series of tests which are then allocated to a specific swimming pool of a particular customer. This data, together with the swimming pool configuration data, can then be used to interpret the water quality and analyse which parameter corrections are required and what chemical dosing is recommended.

When used independently of the PM photometers, the operator can either enter the values via the built-in tools or manually enter the measurement results.

The pool software has been designed as a modular application so multi user interfaces may be displayed on screen at any one time by selecting the icons as depicted below:



General configuration

The General Configuration Module enables the user to:

Select the User Interface language:

English, German, French, Italian, Spanish.

Enter customer data as it should appear on the header of printed documents. Preview capability is available.

Set the parameter boundaries for Chlorine and Bromine treated swimming pools respectively per category.

The categories are:

- Private Pools
- Residential Pools
- Hotels, Schools, Camps, Vacation Resort Pools
- Public Pools

The parameter boundaries for selection are:

Free or Available Chlorine, Combined Chlorine, Total Bromine, pH and Cyanuric Acid.



Customer file

In the Customer File, the user can store, modify or delete Customer and Pool data. It can contain up to 9,999 customers and 99 pools per customer.



Product configuration

The Product configuration module allows the user to add and remove chemical products that might be required to correct the water balance. These are acids and bases needed to lower or raise the pH and/or Total Alkalinity, chemicals used to raise the Calcium Hardness and Cyanuric Acid required for protecting chlorine from UV depletion.



Data transfer from photometer

This module allows the user to import test data from the PM photometers to the PC.

If a Photometer is not available or additional test results have to be added (such as Temperature or TDS), it is possible to do this manually.



Water balance

The Water Balance module enables the user to interpret the pool water quality through a given set of parameters and modify a certain number of water parameters in manual or automatic mode.

In manual mode, after setting the start parameters, the user can raise or lower the pH or Total Alkalinity (TA), the Calcium Hardness (CH) and/or increase the Cyanuric Acid (CA) concentration. Scrollbars and textboxes can be used to alter parameter values.

Provided that all necessary parameter values are available, the Langelier Saturation Index (SI) is calculated continuously when changes in one of the values occur.

In automatic mode, the software tries to restore the water balance by trying to equalise the SI to zero or a value as close as possible to zero. It takes into account the parameter boundaries set in the "General Configuration" module and the possible choice of products (chemicals) and

their availability. Once the start parameters have been set, clicking on the "Restore water balance" button opens a new window with dosage instructions or information about the failure to improve the water balance.



Handy tools

Chlorine dosage

Enables the user to calculate the amount of a selected Chlorine donor needed to raise the free or available free Chlorine concentration to the desired level.

Acid demand

Enables the user to calculate the quantity of acid needed to reduce the pH of the pool water to a certain value using the commonly named "acid demand" method.

Phosphate removal

Calculates the quantity of Phosphate remover (Lanthanum compounds) needed to either reach zero Phosphate or the desired low level.

Salt chlorination

Analyses the amount of salt to be added to the pool water in order to restore the ideal concentration of salt according to the salt chlorination equipment producer's specifications.

System requirements

Processor	minimum: 4 MHz, recommended: 1 GHz
RAM	minimum: 96 MB, recommended: 512 MB
Screen resolution	minimum: 1024 x 768, (screen depending)
Operating system	Windows® XP, Windows® Vista, Windows® 7
Disc space	approx. 10 MB

The software has been developed using the .NET framework 2.0 that primarily runs on Microsoft® Windows® platforms. It may be necessary

to update the application soon in order to make it fully compatible with Windows® Vista and Windows® 7, using .NET framework 3.5 or 4.0.

The .NET Framework Client Profile is not supported on IA-64-based (Itanium)

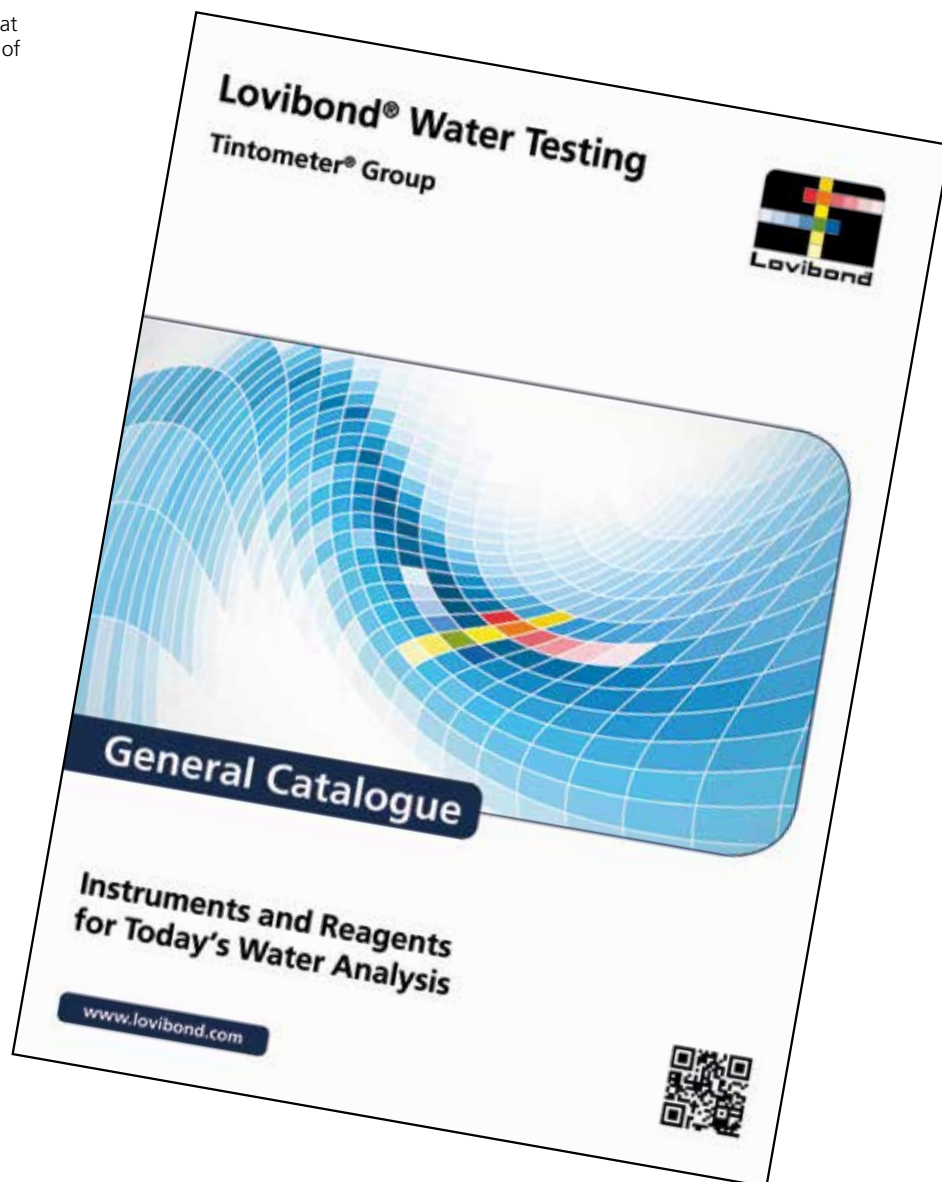
Environmental Water Analysis

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**, to obtain a copy of the catalogue.



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Bundesverband der Hygieneinspektoren
e. V.
Hohenstaufenstr. 62
10781 Berlin
Deutschland
www.bundesverband-hygieneinspektoren.de



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der Schwimmbad- und Saunawirtschaft
Wiedner Hauptstraße 63
1045 Wien
Österreich
www.oevs-verband.at



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3001 Bern
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Verband zur Fortbildung im Bereich des
Gesundheits- und Infektionsschutzes e.V.
Geschäftsstelle Wolfsburg
Grashof 1
38448 Wolfsburg
Deutschland
www.vfgi.de

Index

A

Acid Capacity KS4.3

CHECKIT®Comperator 16
MD 200 44
MINIKIT 12
PM 620 48

Active Oxygen

PM 620 48
POOLTESTER 10
Rapid Tests 8
Three-Chamber-Tester 10

Alkalinity-M

5in1 Multipooltester 10
CHECKIT®Comperator 16
Comparator 2000+ 24
MD 100 38
MD 110 42
MD 200 44
MINIKIT 12
PM 600 49
PM 620 & PM 630 48
Rapid Tests 8
Scuba II 14
Three-Chamber-Tester 10

Alkalinity-P

MINIKIT 12

Aluminium

CHECKIT® Comperator 16
Comparator 2000+ 24
PM 620 & PM 630 48

Ammonia

CHECKIT® Comperator 16
Comperator 2000+ 24
PM 620 & PM 630 48

B

Biguanides (PHMB)

PM 620 & PM 630 48
Pooltester 10
Rapid Tests 8
Three-Chamber-Tester 10

Bromine

CHECKIT® Comperator 16
Comparator 2000+ 24
MD 100 38
MD 110 42
MD 200 44
PM 600 49
PM 620 & PM 630 48
POOLTESTER 10
Rapid Tests 8

C

Calcium Hardness

5in1 Multipooltester 10
Comparator 2000+ 24
MD 100 38
MD 110 42
MD 200 44
MINIKIT 12
PM 600 49
PM 620 & PM 630 48
Rapid Tests 8

CHECKIT® Comperator 16

Chloride

MINIKIT 12

Chlorine

5in1 Multipooltester 10
CHECKIT® Comperator 16
Comparator 2000+ 24
MD 100 38
MD 110 42
MD 200 44
PM 600 49
PM 620 & PM 630 48
POOLTESTER 10
Rapid Tests 8
Scuba II 14
Three-Chamber-Tester 10

Chlorine Dioxide

MD 200 44
PM 620 & PM 630 48

Comparator 2000+ 24

Conductivity

SD 70 Con 61
SensoDirect 110 62
SensoDirect 150 64

Copper

CHECKIT® Comperator 16
Comperator 2000+ 24
MD 200 44
PM 600 49
PM 620 & PM 630 48
POOLTESTER 10
Rapid Tests 8

Cyanuric acid

5in1 Multi Pooltester 10
Comparator 2000+ 24
MD 100 38
MD 110 42
MD 200 44
MINIKIT 12
PM 600 49
PM 620 & PM 630 48
Rapid Tests 8
Scuba II 14
Three-Chamber-Tester 10

H

Hand-held Meters 60

SD-Series 60
SensoDirect 110 62
SensoDirect 150 64

Hydrogen Peroxide

Comparator 2000+ 24
MD 200 44
PM 620 48
POOLTESTER 10
Rapid Tests 8

I

Iodine

PM 620 & PM 630 48

Iron

CHECKIT® Comperator 16
Comperator 2000+ 24
MD 200 44
PM 600 49
PM 620 & PM 630 48

L

Liquid Reagents 50

Lovibond®-Brochure 2

M

Manganese

Comparator 2000+ 24

MD 100 38

MD 110 42

MD 200 44

Membrane Filter Set 51

MINIKIT 12

N

Nitrate

Comparator 2000+ 24

O

ORP

SD 60 ORP/Redox 60

Oxygen, active

PM 620 48
POOLTESTER 10
Rapid Tests 8
Three-Chamber-Tester 10

Oxygen, dissolved

SensoDirect 150 64

Ozone

CHECKIT® Comperator 16
Comparator 2000+ 24
PM 600 49
PM 620 & PM 630 48

P

pH

5in1 Multipooltester 10
CHECKIT® Comperator 16
Comparator 2000+ 24
MD 100 38
MD 110 42
MD 200 44
PM 600 49
PM 620 & PM 630 48
POOLTESTER 10
Rapid Tests 8
Scuba II 14
SD 50 pH 60
SensoDirect 110 62
SensoDirect 150 64
Three-Chamber-Tester 10

PHMB (Biguanide)

PM 620 & PM 630 48
POOLTESTER 10
Rapid Tests 8
Three-Chamber-Tester 10

Phosphate

CHECKIT® Comperator 16
Comparator 2000+ 24
PM 600 49
PM 620 & PM 630 48

Photometers

MD 100 38
MD 110 42
MD 200 44
PM 600, PM 620 & PM 630 48

Photometry 36

PM 600, PM 620 & PM 630 49

Pool Software 68

Powder Pack 50

Q

QAC

Comparator 2000+ 24
MINIKIT 12
POOLTESTER 10
Rapid Tests 8

R

Rapid Tests 8

Redox

SD 60 ORP/Redox 60
SensoDirect 150 64

Reference Standard Kits

MD 100 41
MD 200 47
PM 600 & PM 620 49

S

Salinity

SD 90 Salt 60
SensoDirect 110 62

Sample Preparation 51

Scuba II 14

SD 50 pH 60

SD 60 ORP/Redox 60

SD 70 Con 60

SD 80 TDS 60

SD 90 Salt 60

SD-Series 60

SensoDirect 110 62

SensoDirect 150 64

Sodium hypochlorite

PM 620 & PM 630 48

Speed test 13

Sulphate

PM 620 48
Rapid Tests 8

T

Tablet count method 13

TB 210 IR 67

TDS

SD 80 TDS 60
SensoDirect 150 64

Temperature

SensoDirect 150 64

Three-Chamber-Tester 10

Stabilizer 10

Total Hardness

MINIKIT 12
PM 620 & PM 630 48
Rapid Tests 8

Turbidimeter

TB 210 IR 67

Turbidity 66

Turbidity method 13

V

VARIO Powder Packs 50

Verification Standard Kit

MD100 41
MD 200 47
PM 600 & PM 620 49

Y

Yes/No test 13

Tintometer GmbH

Lovibond® Water Testing
Schleefstraße 8-12
44287 Dortmund
Tel.: +49 (0)231/94510-0
Fax: +49 (0)231/94510-30
verkauf@tintometer.de
www.lovibond.com
Germany

The Tintometer Limited

Lovibond House
Sun Rise Way
Amesbury, SP4 7GR
Tel.: +44 (0)1980 664800
Fax: +44 (0)1980 625412
water.sales@tintometer.com
www.lovibond.com
UK

Tintometer AG

Hauptstraße 2
5212 Hausen AG
Tel.: +41 (0)56/4422829
Fax: +41 (0)56/4424121
info@tintometer.ch
www.tintometer.ch
Switzerland

Tintometer China

Room 1001, China Life Tower
16 Chaoyangmenwai Avenue,
Beijing, 100020
Tel.: +86 10 85251111 App. 330
Fax: +86 10 85251001
China

Tintometer South East Asia

Unit B-3-12, BBT One Boulevard,
Lebuh Nilam 2, Bandar Bukit Tinggi,
Klang, 41200, Selangor D.E
Tel.: +60 (0)3 3325 2285/6
Fax: +60 (0)3 3325 2287
lovibond.asia@tintometer.com
www.lovibond.com
Malaysia

Tintometer Brazil

Caixa Postal: 271
CEP: 13201-970
Jundiaí – SP
Tel.: +55 (11) 3230-6410
sales@tintometer.com.br
www.lovibond.com.br
Brazil

Tintometer Inc.

6456 Parkland Drive
Sarasota, FL 34243
Tel: 941.756.6410
Fax: 941.727.9654
sales@tintometer.us
www.lovibond.com
USA

Tintometer Indien Pvt. Ltd.

B-91, A.P.I.E. Sanath Nagar,
Hyderabad, 500018
Tel: +91 (0) 40 4647 9911
Toll Free: 1 800 102 3891
indiaoffice@tintometer.com
www.lovibondwater.in
India

Tintometer Spain

Postbox: 24047
08080 Barcelona
Tel.: +34 661 606 770
www.lovibond.com
Spain

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