Lovibond® Water Testing

Lovibond
since 1885

Pool & Spa Water Analysis

Instruments and Reagents

www.lovibond.com

Content

new!

Pool & Spa

Pool Analysis

Rapid Tests

Comparators

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Natural Swimming Ponds

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 & 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.

Pool Analysis

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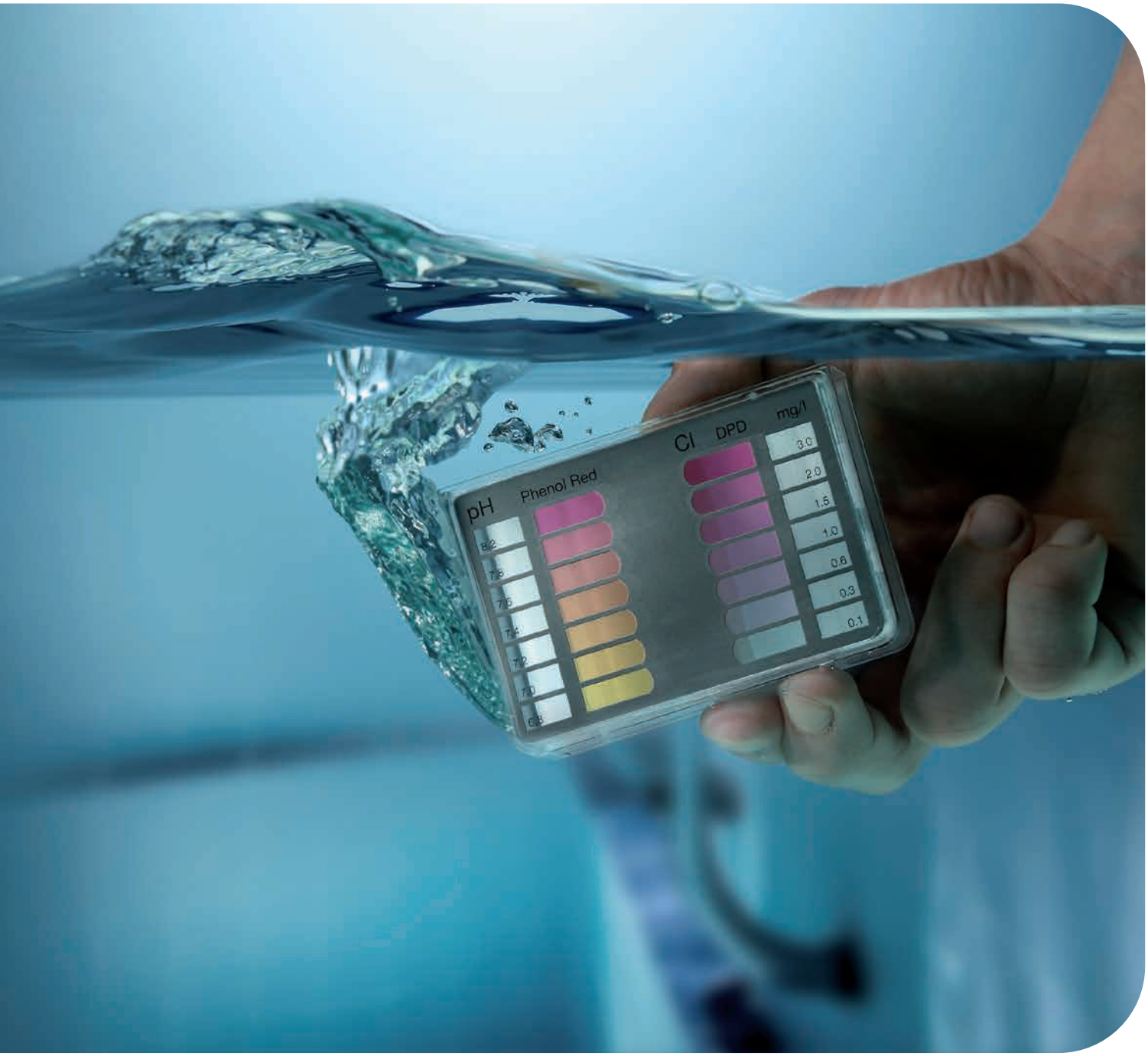
Rapid Tests



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.

Safe chlorine test with DPD Rapid

The less potassium iodide the better for your health. For our DPD Rapid tablets we have been using as little of the substance classified as hazardous to health as necessary for a long time. There is no faster and safer way to determine total chlorine in pool water.

Rapid Tests

Three-Chamber Tester

The Three-Chamber Tester is a competitively priced unit for the determination of disinfectants and the pH value. Interferences from the colour of the pool water are eliminated by the third, middle chamber.

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.

Compact Pool Test Kits

Item	Code
Chlorine-Bromine-pH LR, in mini case [1] Bromine 0.2-6.8 mg/L Chlorine 0.1-3.0 mg/L pH value 6.8 – 8.2	157700
Chlorine-Bromine-pH LR, in blister [2] Bromine 0.2-6.8 mg/L Chlorine 0.1-3.0 mg/L pH value 6.8-8.2	157520
Chlorine-pH HR, in blister [2] Chlorine 0.5-6.0 mg/L pH value 6.8-8.2	158010
Active Oxygen-pH, in blister [2] Acitive Oxygen 0 -10 mg/L pH value 6.8-8.2	157610
Biguanide (PHMB)-pH, in blister [2] Biguanide (PHMB) 10-100 mg/L pH value 6.8-8.2	156150
4 in 1 , in plastic case 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	151700

[1] Packaging unit 10 pcs.

[2] Packaging unit 6 pcs.

Delivery content

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

Pooltester

Item	Code
Chlorine-pH LR [4] Chlorine 0.1-3.0 mg/L pH value 6.8-8.2	151600
Chlorine-pH HR [4] Chlorine 0.5-6.0 mg/L pH value 6.8-8.2	151601
Bromine-pH [4] Bromine 1.0-8.0 mg/L pH value 6.8-8.2	151604
Active Oxygen-pH [4] O_2 0-10 mg/L pH value 6.8-8.2	151605
Copper LR/HR-pH [4] Copper LR 0.1-1.0 mg/L & HR 0.5-5.0 mg/L pH value 6.8-8.2	155190
Active Oxygen-Copper-pH [4] O_2 0-10 mg/L Copper 0.1-1.0 mg/L pH value 6.8-8.2	155235
Biguanide (PHMB) - Hydrogen Peroxide (H_2O_2)-pH [4] PHMB 10-100 mg/L H_2O_2 5-50 mg/L pH value 6.8-8.2	156100
Phosphate Test Kit [3] 0-1000 ppb (0-1mg/L PO_4)	157800

[3] Packaging unit 24 pcs.

[4] Packaging 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-Pooltester [5] 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	151900

[5] Packaging unit 5 pcs.

Green Chemistry

Evo = Potassium-Iodid reduced

Delivery content

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

Refill Packs (tablets)

Item	Code
Chlorine - Bromine - pH* 30 DPD No.1 Rapid 30 Phenol Red Rapid	515884
Active Oxygen - pH* 30 DPD No.4 Rapid 30 Phenol Red Rapid	515934
Active Oxygen - Copper- pH* 20 DPD No.4 Rapid 20 Copper No.1 20 Phenol Red Rapid	515865
PHMB - H_2O_2 - pH 20 PHMB 20 H_2O_2 20 Acidifying PT 20 Phenol Red Rapid	515870
PHMB - pH* 30 PHMB 30 Phenol Red Rapid	516155
Copper - pH* 30 Copper No.1 30 Phenol Red Rapid	515778
Combi pack for Three-Chamber-Tester 4 in 1 20 DPD No.1 Rapid 20 Phenol Red Rapid 20 CyA-Test 20 Alk LR	515935
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	515980

* Each pack contains 12 units

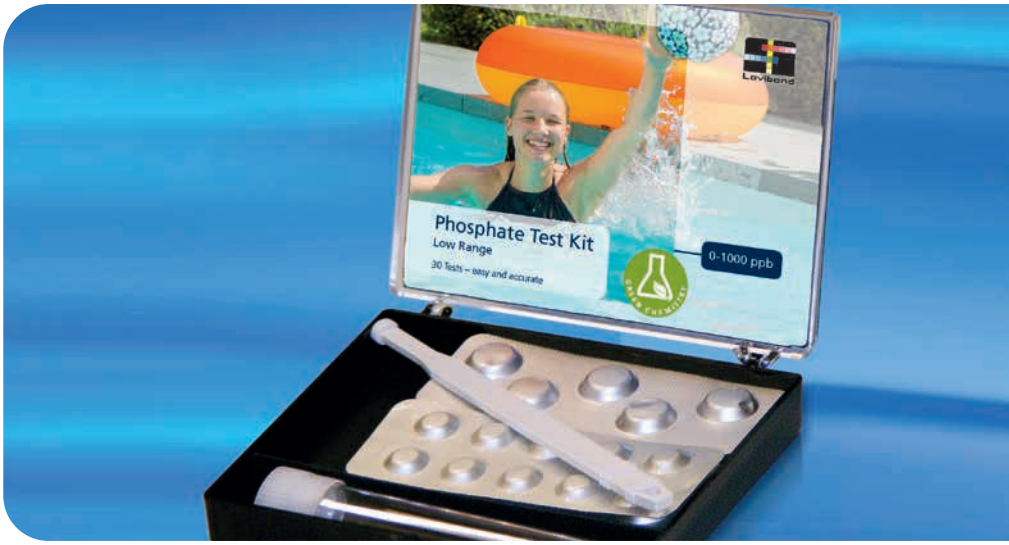
Reagents

Item	Quantity	Code
Acidifying PT	100 pc. 250 pc.	515490BT 515491BT
Alk LR	100 pc.	516040BT
Alk Test	100 pc.	515570BT
Bromthymolblue Rapid	100 pc. 250 pc.	511630BT 511631BT
Cal Test	100 pc.	515580BT
Copper No.1	100 pc. 250 pc.	513550BT 513551BT
Cyanuric Acid (CyA-Test)	100 pc. 250 pc.	511370BT 511371BT
DPD No.1 Rapid	100 pc. 250 pc. 500 pc.	511310BT 511311BT 511312BT
DPD No.3 Rapid	100 pc. 250 pc. 500 pc.	511290BT 511291BT 511292BT
DPD No.4 Rapid	100 pc. 250 pc. 500 pc.	511570BT 511571BT 511572BT
Hydrogenperoxide HR	100 pc. 250 pc.	515940BT 515941BT
Phenol Red Rapid (pH)	100 pc. 250 pc. 500 pc.	511790BT 511791BT 511792BT
PHMB (Biguanide)	100 pc. 250 pc.	515890BT 515891BT

also suitable for seawater
Green Chemistry
Evo = Potassium-Iodid reduced

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**



Video available

MINIKIT

Analysis	Type	Range	Methods Tablet Count	Speed Test	Yes/No Test
Acid capacity $K_{S4.3}$	AF 444	0.4 - 16 mmol/L ≅ 20 - 800 mg/L $CaCO_3$		■	
Alkalinity, Total-m	AF 444	20 - 800 mg/L $CaCO_3$ ≅ 0.4 - 16 mmol/L		■	
Alkalinity, Total-m	AF 413	10 - 500 mg/L $CaCO_3$ ≅ 0.2 - 10 mmol/L	■		
Alkalinity-p	AF 414	20 - 500 mg/L $CaCO_3$	■		
Calcium Hardness	AF 446	20- 800 mg/L $CaCO_3$ ≅ 0.4 - 16 mmol/L		■	
Calcium Hardness	AF 416	10- 500 mg/L $CaCO_3$ ≅ 0.1 - 5 mmol/L	■		
Chloride *	AF 418	5 - 5000 mg/L Cl	■		
Cyanuric Acid	AF 422	20 - 200 mg/L Cyanuric Acid			
QAC (Quaternary Ammonium Comp.)	AF 417	0 - 500 mg/L active QAC Limit 200 mg/L (Yes/No)	■		■
Sulphate *	AF 431	40 - 200 mg/L SO_4 (40 - 4000 mg/L by dilution)			
Total Hardness	AF 445	20 - 800 mg/L $CaCO_3$ ≅ 0.4 - 16 mmol/L		■	
Total Hardness	AF 424	5 - 500 mg/L $CaCO_3$ ≅ 0.05 - 5 mmol/L	■		

* also suitable for seawater

Green Chemistry (for more information see page 48)

The Methods

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

Tablet count method

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

Speed test

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

Yes/No test

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

Turbidity method

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

Delivery content

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

Turbidity	Code	Tablet Reagents	Code	Quantity
	414440	Alk-Test	515570BT	100
	414440	Alk-Test	515570BT	100
	414130	Total Alkalinity Tablets	515321BT	250
	414140	Alkalinity-p Tablets	515101	250
	414460	Cal-Test	515580BT	100
	414160	Calcium Hardness	515191BT	250
	414180	Chloride	515131	250
■	414220	CyA-Test	511370BT	100
	414170	QAC-Test	515410 515411	100 250
■	414310	Sulfate	515451BT	250
	414450	T Hardness Test	515590BT	100
	414240	Total Hardness	515161BT	250

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

Scuba II

Electronic Pooltester

Video available

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

Scuba II

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

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

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

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

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

Technical Data

Optics	temperature-compensated LED (λ = 530 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-display
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

Refill pack

Article	Code
Refill pack for Scuba II tablets 20 DPD No.1 Photometer 10 DPD No.3 *Evo* Photometer 10 Phenol Red Photometer 10 CyA-Test 10 Alka-M-Photometer	525600

Packaging unit = 12 packs

Determination	Range	Resolution	Accuracy
Chlorine free	0.1 - 6 mg/L Cl_2	0.1 mg/L	0 - 1 mg/L ± 0.1 mg/L ; 1 - 2 mg/L ± 0.2 mg/L 2 - 3 mg/L ± 0.4 mg/L ; 3 - 6 mg/L ± 0.5 mg/L
Chlorine total	0.1 - 6 mg/L Cl_2	0.1 mg/L	0 - 1 mg/L ± 0.1 mg/L ; 1 - 2 mg/L ± 0.2 mg/L 2 - 3 mg/L ± 0.4 mg/L ; 3 - 6 mg/L ± 0.5 mg/L
pH-value	6.5 - 8.4 pH	0.1 pH	± 0.2 pH
Cyanuric acid	1 - 160 mg/L	1.0 mg/L	1 - 50 mg/L ± 10 mg/L ; 50 - 160 mg/L ± 20 mg/L
Alkalinity-m	0 - 300 mg/L $CaCO_3$	1.0 mg/L	± 50 mg/L
Bromine	0.2 - 13.5 mg/L Br_2	0.1 mg/L	0 - 2 mg/L ± 0.2 mg/L 2 - 4 mg/L ± 0.4 mg/L 4 - 7 mg/L ± 0.8 mg/L 7 - 13.5 mg/L ± 1.1 mg/L

Delivery content

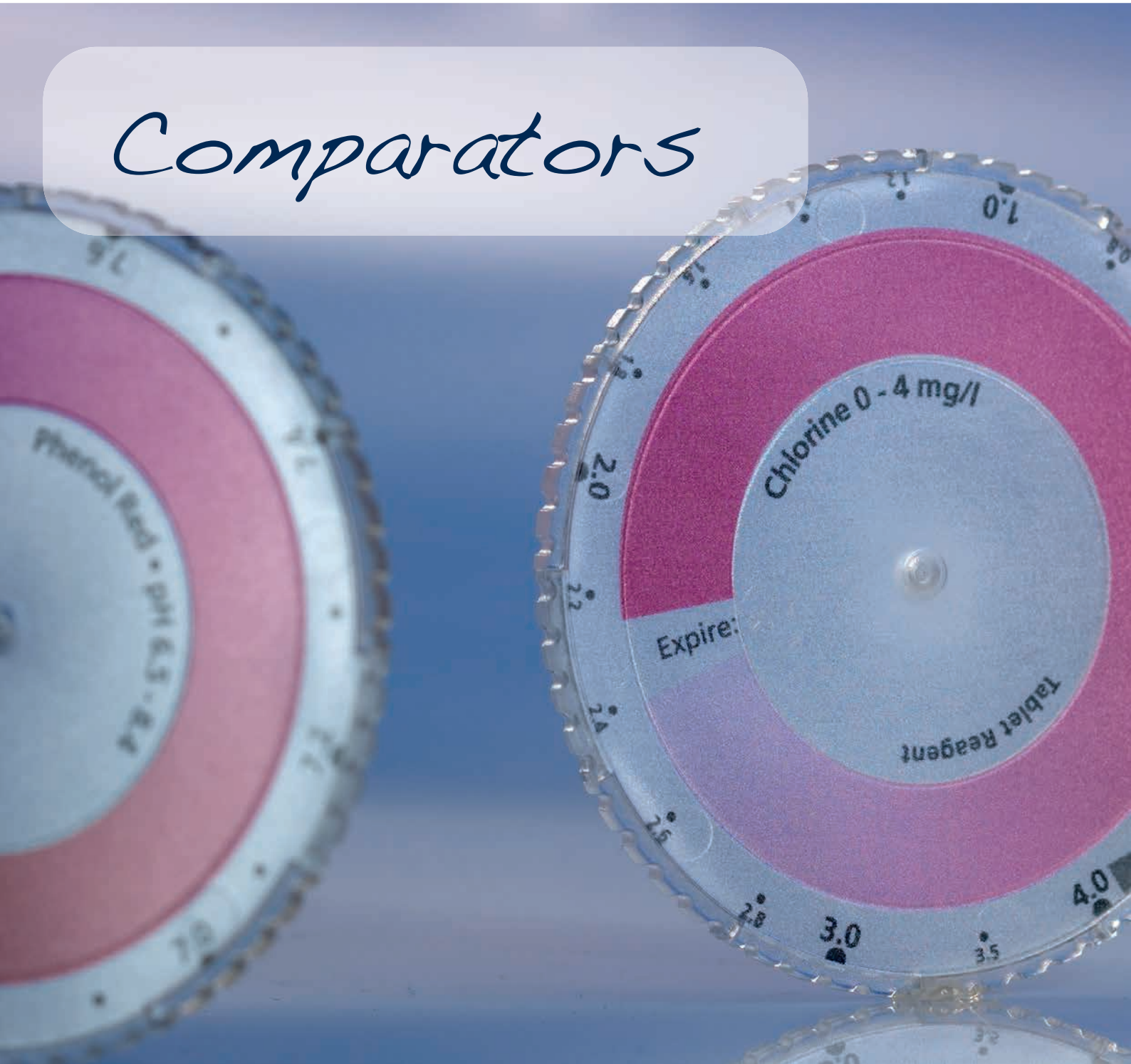
- Scuba II in a robust plastic box
- Tablet reagents
  20 DPD No.1
  20 Phenol Red Photometer
  10 DPD No.3 *Evo*
  10 CyA-Test
  10 Alka-m-Photometer
- 2 batteries (AAA)
- Stirring rod
- Instruction manual

Order code: 216100-17

Green Chemistry

Evo = Potassium-Iodid reduced

Comparators



CHECKIT® Comparator
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Comparator 2000+
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CHECKIT® Comparator

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

CHECKIT® Comparator

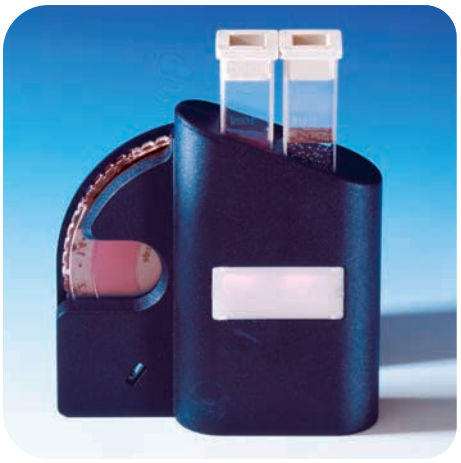
The Lovibond® CHECKIT® Comparator is a compact and handy colorimetric unit which is suitable for both mobile and static analysis work. Supplied with a generous number of different colour scales, it provides the basis for a comprehensive, easy-to-use colorimetric analysis system.

CHECKIT® Disc

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

Please see page 22 onwards for tests, ranges and reagents

Front view of the CHECKIT® Comparator with cells



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

Test Kit in carrying case, ready to use

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

CHECKIT® Discs with continuous and stable scales

Tablet reagents in blister

Plastic cells in pack, available:

5 cells - 145505
10 cells - 145500
100 cells - 145510

Delivery content

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

Single Parameter Test Kits

Test Kit	Range* (± 5 % Full Scale)	Reagent	Code
Acid capacity $K_{S4.3}$	0.5 - 5 mmol/L	Tablets	147460
Alkalinity-m	20 - 240 mg/L $CaCO_3$	Tablets	147450
Aluminium	0 - 0.3 mg/L Al	Tablets	147200
Ammonia	0 - 1 mg/L N	Tablets	147210
Bromine	0 - 5 mg/L Br	Tablets	147280
Chlorine (DPD) free, comb., total	0 - 1 mg/L Cl_2	Tablets	147010
Chlorine (DPD) free, comb., total	0 - 2 mg/L Cl_2	Tablets	147040
Chlorine (DPD) free, comb., total	0 - 4 mg/L Cl_2	Tablets	147020
Chlorine (DPD) free + total	0 - 3.5 mg/L Cl_2	Powder Reagents	147052
Copper, free	0 - 1 mg/L Cu	Tablets	147230
Copper, free + total	0 - 5 mg/L Cu	Tablets	147430
Iron LR	0.05 - 1 mg/L Fe	Tablets	147220
Iron HR	0- 10 mg/L Fe	Tablets	147320
Ozone (DPD)	0 - 1.0 mg/L O_3	Tablets	147275
Ozone (in presence of chlorine)	0 - 1.0 mg/L O_3	Tablets	147270
pH value (Bromocresol purple)	6.5 - 8.4 pH	Tablets	147100
pH value (Universal)	4 - 10 pH	Tablets	147130
Phosphate LR	0 - 4 mg/L PO_4	Tablets	147240
Phosphate HR	0 - 80 mg/L PO_4	Tablets	147250
Sodiumhypochlorite (Chlorine bleach)	2 - 18 % NaOCl	Tablets	147490

* Disc readings see following pages

also suitable for seawater · Green Chemistry · *Evo* = Potassium-Iodid reduced

Test Kits 2in1

Test Kit	Code
Chlorine 0 - 1.0 mg/L Cl_2* **pH value** 6.5 - 8.4 pH	147016
Chlorine 0.1 - 2.0 mg/L Cl_2* **pH value** 6.5 - 8.4 pH	147046
Chlorine 0 - 4.0 mg/L Cl_2* **pH value** 6.5 - 8.4 pH	147026
Bromine 0 - 5.0 mg/L Br **pH value** 6.5 - 8.4 pH	147285
Copper 0 - 1.0 mg/L Cu **pH value** 6.5 - 8.4 pH	147235

Test Kit 5in1

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 (m)** (Speed-Test)** 20 - 800 mg/L $CaCO_3$	147028

Testpak

The Testpak concept makes it easy to add new parameters to the CHECKIT® Comparator.

All you need is the basic CHECKIT® Comparator, order code 145000.

Testpaks: see following pages.

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 12

Please see page 22 onwards for tests, ranges and reagents

CHECKIT® Comparator Tests, Test Kits, Testpaks, Discs, Reagents

Test	Range	Readings (Accuracy ± 5 % Fullscale)	Test Kit	Testpak
Acid capacity $K_{S4.3}$	0.5 - 5 mmol/l	0.5 / 1 / 1.5 / 2 / 2.5 / 3 / 3.5 / 4 / 5	147460	147960
Alkalinity-m	20 - 240 mg/L $CaCO_3$	20 /30 / 40 / 50 / 60 / 70 / 80 / 90 / 100 / 110 / 120 / 130 140 / 160 / 180 / 200 / 220 / 240	147450	147950
Aluminium	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	147200	147700
Ammonia	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 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0	147210	147710
Bromine	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	147280	147780
Chlorine free. combined. total	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	147010	147510
Chlorine free. combined. total	0 - 2 mg/L Cl_2	0.1 / 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.1 / 1.2 / 1.3 / 1.4 / 1.5 / 1.6 / 1.7 / 1.8 / 1.9 / 2.0	147040	147540
Chlorine free. combined. total	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 /2.2 / 2.4 / 2.6 / 2.8 / 3.0 / 3.5 / 4.0	147020	147520
Chlorine free. combined. total	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	147052	147550,free 147551,total
Copper free **(Cu^{2+})**	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	147230	147730
Copper HR free & total	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	147430	147930
Iron LR	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	147220	147720
Iron HR	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	147320	147820
Ozone (DPD) in 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	147270	147770
Ozon (DPD)	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	147275	147775
pH	6.5 - 8.4 pH	6.5 / 6.6 / 6.7 / 6.8 / 6.9 / 7.0 / 7.1 / 7.2 / 7.3 / 7.4 / 7.5 / 7.6 / 7.7 / 7.8 / 7.9 / 8.0 / 8.1 / 8.2 / 8.3 / 8.4	147100	147600
pH universal	4 - 10 pH	4 / 4.5 / 5 / 5.5 / 6 / 6.5 / 7 / 7.5 / 8 / 8.5 / 9 / 9.5 / 10	147130	147630
Phosphate LR	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	147240	147740
Phosphate HR	0 - 80 mg/L PO_4	0 / 5 / 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50 / 55 / 60 / 65 / 70 / 75 / 80	147250	147750
Sodiumhypochlorite	2 - 18 %	2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15 / 16 / 17 / 18	147490	147990

* RAPID: fast dissolving tablets, # including stirring rod

Material Safety Data Sheets: www.lovibond.com

Disc	Reagent	Reagent form	Code					
146460	Alkacheck	T	100 Pc	**513200BT**	250	**513201BT**		
146450	Alkacheck	T	100 Pc	**513200BT**	250	**513201BT**		
146200	Aluminium No.1 Aluminium No.2 Combi pack# Aluminium each No.1 & No.2	T T T	100 Pc 100 Pc 100 Pc	**515460BT** **515470BT** **517601BT**	250 250 250	**515461BT** **515471BT** **517602BT**		
146210	Ammonia No.1 Ammonia No.2 Combi pack# Ammonia each No.1 & No.2		100 Pc 100 Pc 100 Pc	**512580BT** **512590BT** **517611BT**	250 250 250	**512581BT** **512591BT** **517612BT**		
146280	DPD No.1 Rapid*	T	100 Pc	**511310BT**	250	**511311BT**	500	**511312BT**
146010	DPD No.1 Rapid* DPD No.3 Rapid* DPD No.4 Rapid*	T T T	100 Pc 100 Pc 100 Pc	**511310BT** **511290BT** **511570BT**	250 250 250	**511311BT** **511291BT** **511571BT**	500 500 500	**511312BT** **511292BT** **511572BT**
146040	DPD No.1Rapid* DPD No.3-, No.4 Rapid*		s.a. s.a.					
146020	DPD No.1Rapid* DPD No.3-, No.4 Rapid*		s.a. s.a.					
146050	VARIO Chlorine Free DPD F5 VARIO Chlorine Total DPD F5	PP PP	100 Pc 100 Pc	**530090** **530080**				
146230	Copper/Zinc LR	T	100 Pc	**512620BT**	250	**512621BT**		
146430	Copper No.1 Copper No.2 Combi pack# Copper each No.1 & No.2	T T T	100 Pc 100 Pc 100 Pc	**513550BT** **513560BT** **517691BT**	250 250 250	**513551BT** **513561BT** **517692BT**		
146220	Iron LR (Fe^{2+} and Fe^{3+}) Iron (II) LR (Fe^{2+})	T T	100 Pc 100 Pc	**515370BT** **515420BT**	250 250	**515371BT** **515421BT**		
146320	Iron HR	T	100 Pc	**515380BT**	250	**515381BT**		
146270	DPD No.4 DPD Glycine f)	T T	100 Pc 100 Pc	**511220BT** **512170BT**	250 250	**511221BT** **512171BT**	500	**511222BT**
146275	DPD No.4	T	100 Pc	**511220BT**	250	**511221BT**	500	**511222BT**
146100	Phenol Red Rapid*	T	100 Pc	**511790BT**	250	**511791BT**	500	**511792BT**
146130	Universal pH	T	100 Pc	**515440BT**	250	**515441BT**		
146240	Phosphate No.1 LR Phosphate No.2 LR Combi pack# Phosphate each No.1 LR & No.2 LR	T T T	100 Pc 100 Pc 100 Pc	**513040BT** **513050BT** **517651BT**				
146250	Phosphate HR	T	100 Pc	**511980BT**				
146490	Chlorine HR (KI) Acidifying GP Combi pack# each Chlorine HR (Ki) & Acidifying GP Dilution set for sample preparation	T T T	100 Pc 100 Pc 100 Pc 1 Pc	**513000BT** **515480BT** **517721BT** **414470**	250 250 250	**513001BT** **515481BT** **517722BT**		

L = Liquid/Solution, P = Powder, PP = Powder Pack, T = Tablet, TT = Tube Test

Green Chemistry

Evo = Potassium-Iodid reduced

also suitable for seawater

Compensation for coloured & turbid samples

Integrated prism

High scratch resistant glass standards

Guaranteed stability of the coloured glass standards

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.

Please see the table on page 28 for information on the various test discs or refer to our **disc catalogue Lovibond Comparator 2000+**.

Cells

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

Lighting unit

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

Please see page 28 onwards for tests, ranges and reagents

Comparator 2000+


Lighting unit, battery operated


Plastic cells

Disc

Test Kits Comparator 2000+

Type	Designation/Combi	Test	Range*	Type Colour disc	Code
AF 112A	**Chlorine** free, comb. tot.	Chlorine[2)]	0.1 - 1 mg/L Cl_2	3/40 A	411120
AF 112B	**Chlorine** free, comb. tot.	Chlorine[2)]	0.2 - 4 mg/L Cl_2	3/40 B	411130
AF 112J/J	**Chlorine** free, comb. tot.	Chlorine[2)] pH value	0.1 - 2.0 mg/L Cl_2 6.8 - 8.4 pH	3/40 J 2/1 J	417246
AF 116A	**Chlorine, pH**	Chlorine[2)] pH value	0.1 - 1 mg/L Cl_2 6.8 - 8.4 pH	3/40 A 2/1 J	411140
AF 116B	**Chlorine, pH**	Chlorine[2)] pH value	0.2 - 4 mg/L Cl_2 6.8 - 8.4 pH	3/40 B 2/1 J	411160
AF 118S	**Chlorine, pH**	Chlorine[2)] pH value	0.1 - 4 mg/L Cl_2 5.2 - 8.4 pH	3/40 A 3/40 S 2/1 G 2/1 J	411181
AF 129	**Water Balance**	Chlorine[2)] pH value Alkalinity-m[3)] Calcium hardness[3)]	0.2 - 4.0 mg/L 6.8 - 8.4 20 - 500 mg/L $CaCO_3$ 0 - 1000 mg/L $CaCO_3$	3/40 B 2/1 J Tablet count meth. Tablet count meth.	411290
AF 405 M	**Municipal-Kit**	Chlorine[2)] pH value Cyanuric acid[3)] Alkalinity-m[3)] Calcium hardness[3)]	0.2 - 40 mg/L 6.8 - 8.4 20 - 200 mg/L Cyanuric Acid 20 - 800 mg/L $CaCO_3$ 20 - 800 mg/L $CaCO_3$	3/40 B 2/1 J Turbidity method Speed Test Speed Test	414051

Disc readings see following pages

[2)] All test kits for chlorine are for "free, combined and total chlorine"

[3)] Reagents for tablet count method, turbidity method and speed-test see MINIKIT, page 12

Green Chemistry

Evo = Potassium-Iodid reduced

Comparator 2000+ and Accessories

Type	Item	Code
TK 100	Comparator 2000+	142000
TK 102	Portable lighting unit, battery operated	142050
	Daylight Unit for Comparator 2000+, mains operated	171010
AF 631	Water sampler with two 500 mL bottles and one lid	170500
	Measuring beaker, 100 mL	384801
	Vial stand for 10 vials (ø 16 mm, acrylic glass	418957
	Glass stirring rod, 12 cm length	364110
	Plastic stirring rod,13 cm length	364100
	Brush, 11 cm length	380230
Type	**Item**	**Code**
Glass Cells		
DB424/S	5 glass cells, 13.5 mm path length, volume 10 mL, with lid, calibrated from 2 - 12 mL	354243
W680/40	Glass cell 40 mm path length, calibrated at 20 mL	606890
Plastic Cells		
	5 plastic cells, frosted on two sides,13.5 mm path length, volume 10 mL, with lid	145505
	10 plastic cells, as 145505	145500
	100 plastic cells, as 145505	145510

Delivery content

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

Test Kit

Comparator 2000+

Daylight unit, mains operated

Reagents

Comparator 2000+

Tests, Discs, Reagents, Cells

Test	Disc	Disc Readings	Range	Code Disc
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	230205
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	230060
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	230070
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	235310
Bromine *	3/53B	1/ 2/ 3/ 4/ 5/ 6/ 7/ 8/ 10 mg/L	1.0 - 10 mg/L	235320
Bromine *	3/53C	0.5/ 1/ 1.5/ 2/ 2.5/ 3/ 4/ 5/ 6 mg/L	0.5 - 6 mg/L	235330
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	234010
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	234140
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	234020
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	233930
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	234090
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	233920
Chlorine * free. combined. total	3/40HN	2/ 3/ 4/ 5/ 6/ 7/ 8/ 9/ 10 mg/L	2.0 - 10 mg/L	234081
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	230100
Iron. total *	3/117	1/ 2/ 3/ 4/ 5/ 6/ 7/ 8/ 10 mg/L	1.0 - 10 mg/L	230110
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	230050
Copper	3/110	0/ 0.5/ 1/ 1.5/ 2/ 2.5/ 3/ 3.5/ 4 mg/L	0 - 4.0 mg/L	230040

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

Material Safety Data Sheets: www.lovibond.com

Test disc with colour stable glass standards

i

Certification for Comparator 2000+ Discs

To allow users to demonstrate that test equipment has been assessed for conformance with accepted quality standards, Lovibond® colour discs can be certified by the Tintometer® Group to conform to ISO 9001. If requested at the time of order, new discs are issued with a serial number and a certificate of conformance stating that the disc has satisfied the relevant inspection criteria and conforms to the requirements of the appropriate test. Depending on the requirements of the user's quality control system, used discs can be returned at regular intervals to the Tintometer® Group for checking and recertification.

Type of certificate	**Code**
Certificate for a new test disc	999800
Certificate for a used test disc	999810
Calibration certificate for a new test disc	999820
Calibration certificate for a used test disc	999830

Reagent	Reagent form	Code						Accessories	Code
Aluminium No.1 Aluminium No.2 Combi pack# Aluminium par No.1 & No.2	T T T	100 Pc 100 Pc 100 Pc	515460BT 515470BT 517601BT	250 250 250	515461BT 515471BT 517602BT			13.5 mm Cell. 10 mL	354243
Ammonia No.1 Ammonia No.2 Combi pack# Ammonia par No.1 & No.2	T T T	100 Pc 100 Pc 100 Pc	512580BT 512590BT 517611BT	250 250 250	512581BT 512591BT 517612BT			40 mm Cell W680/40	606890
Ammonia No.1 Ammonia No.2 Combi pack# Ammonia par No.1 & No.2	T T T	100 Pc 100 Pc 100 Pc	512580BT 512590BT 517611BT	250 250 250	512581BT 512591BT 517612BT			13.5 mm Cell. 10 mL	354243
DPD No.1	T	100 Pc	511050BT	250	511051BT	500	511052BT	13.5 mm Cell. 10 mL	354243
DPD No.1	T	100 Pc	511050BT	250	511051BT	500	511052BT	13.5 mm Cell. 10 mL	354243
DPD No.1	T	100 Pc	511050BT	250	511051BT	500	511052BT	13.5 mm Cell. 10 mL	354243
DPD No.3 *Evo* DPD No.4 *Evo* DPD No.1 DPD No.2 DPD No.3 DPD No.4 Combi pack# DPD par No.1 & No.3	T T T T T T T	100 Pc 100 Pc 100 Pc 100 Pc 100 Pc 100 Pc 100 Pc	511420BT 511970BT 511050BT 511530BT 511080BT 511220BT 517711BT	250 250 250 250 250 250 250	511421BT 511971BT 511051BT 511531BT 511081BT 511221BT 517712BT	500 500 500 500 500 500	511422BT 511972BT 511052BT 511532BT 511082BT 511222BT	13.5 mm Cell. 10 mL	354243
DPD No.3 / 4 *Evo* DPD No.1/2/3/4		s.a.						13.5 mm Cell. 10 mL	354243
DPD No.3 / 4 *Evo* DPD No.1/2/3/4		s.a.						13.5 mm Cell. 10 mL	354243
DPD No.3 / 4 *Evo* DPD No.1/2/3/4		s.a.						13.5 mm Cell. 10 mL	354243
DPD No.3 / 4 *Evo* DPD No.1/2/3/4		s.a.						13.5 mm Cell. 10 mL	354243
DPD No.3 / 4 *Evo* DPD No.1/2/3/4		s.a.						13.5 mm Cell. 10 mL	354243
DPD No.3 / 4 *Evo* DPD No.1/2/3/4		s.a.						5 mm Cell W680/5	606790
Iron LR (Fe^{2+} and Fe^{3+}) Iron (II) LR (Fe^{2+})	T T	100 Pc 100 Pc	515370BT 515420BT	250 250	515371BT 515421BT			13.5 mm Cell. 10 mL	354243
Iron HR		100 Pc	515380BT	250	515381BT			13.5 mm Cell. 10 mL	354243
Copper/Zinc LR	T	100 Pc	512620BT	250	512621BT			13.5 mm Cell. 10 mL	354243
Copper/Zinc HR	T	100 Pc	512340BT	250	512341BT			13.5 mm Cell. 10 mL	354243

also suitable for seawater   Green Chemistry   *Evo* =Potassium-Iodid reduced

L = Liquid/Solution, P = Powder, PP = Powder Pack, T = Tablet, TT = Tube Test

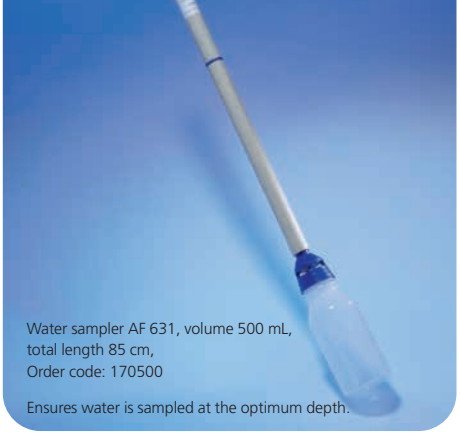
Comparator 2000+

Tests, Discs, Reagents, Cells

Test	Disc	Disc Readings	Range	Code Disc
Manganese	3/169	0/ 0.5/ 1/ 1.5/ 2/ 2.5/ 3/ 3.5/ 4 mg/L	0 - 4.0 mg/L	230690
Sodiumhypochlorite	3/2 Hypo	2/ 4/ 6/ 8/ 10/ 12/ 14/ 16 %	2 - 16 %	232110
Nitrate	3/142	10/ 20/ 30/ 40/ 50/ 60/ 70/ 80/ 100 mg/L	10 -100 mg/L NO_3	230360
Ozone	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	236700
Ozone	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	236710
Ozone	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	230440
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	221100
pH	2/1J	6.8/ 7/ 7.2/ 7.4/ 7.6/ 7.8/ 8/ 8.2/ 8.4	6.8 - 8.4 pH	221130
pH	2/1P	4/ 5/ 6/ 7/ 8/ 9/ 9.4/ 10/ 11	4.0 - 11 pH	221220
Phosphate	3/136	0/ 5/ 10/ 15/ 20/ 25/ 30/ 35/ 40 mg/L	0 - 40 mg/L PO_4	230310
Phosphate	3/70	0/ 10/ 20/ 30/ 40/ 50/ 60/ 80/ 100 mg/L	0 - 100 mg/L PO_4	237000
QAC (Quaternary Ammonia Compounds)	3/118	0/ 2/ 4/ 6/ 8/ 10/ 12/ 15/ 20 mg/L	0 - 20 mg/L	230120
QAC (Quaternary Ammonia Compounds)	3/119	0/ 20/ 40/ 60/ 80/ 100/ 120/ 150/ 200 mg/L	0 - 200 mg/L	230130
Hydrogen Peroxide	3/50 A	0.05/ 0.1/ 0.15/ 0.2/ 0.25/ 0.3/ 0.35/ 0.4/ 0.5 mg/L	0.05 - 0.5 mg/L	235000
Hydrogen Peroxide	3/50 B	0.1/ 0.2/ 0.3/ 0.4/ 0.6/ 1/ 1.5/ 2/ 3 mg/L	0.1 - 3 mg/L	235010
Hydrogen Peroxide	3/50 E	0.01/ 0.02/ 0.03/ 0.04/ 0.05/ 0.07/ 0.09/ 0.12/ 0.15 mg/L	0.01 - 0.15 mg/L	235020

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
Material Safety Data Sheets: www.lovibond.com



Water sampler AF 631, volume 500 mL,
total length 85 cm,
Order code: 170500

Ensures water is sampled at the optimum depth.

Reagent	Reagent form	Code						Accessories	Code
Manganese LR 1	T	100 Pc	**516080BT**	250	**516081BT**			13.5 mm Cell. 10 mL	**354243**
Manganese LR 2	T	100 Pc	**516090BT**	250	**516091BT**				
Combi pack# Manganese LR par LR 1 & LR 2	T	100 Pc	**517621BT**	250	**517622BT**				
Chlorine HR (KI)	T	100 Pc	**513000BT**	250	**513001BT**			13.5 mm Cell. 10 mL	**354243**
Acidifying GP	T	100 Pc	**515480BT**	250	**515481BT**				
Combi pack# par Chlorine HR (KI) & Acidifying GP	T	100 Pc	**517721BT**	250	**517722BT**				
Dilution Set NaOCl for sample preparation		1 Pc	**414470**						
Nitrate No.1	T	100 Pc	**513110**					13.5 mm Cell. 10 mL	**354243**
Nitrate No.2	T	100 Pc	**513120**						
DPD No.4 *Evo*	T	100 Pc	**511970BT**	250	**511971BT**	500	**511972BT**	13.5 mm Cell. 10 mL	**354243**
DPD No.4	T	100 Pc	**511220BT**	250	**511221BT**	500	**511222BT**		
DPD No.4 *Evo*	T	s.a.						40 mm Cell W680/40	**606890**
DPD No.4									
Ozone Indigo	T	100 Pc	**513170BT**	250	**513171BT**			40 mm Cell W680/40	**606890**
Bromocresol Purple	T	100 Pc	**511730BT**	250	**511731BT**			13.5 mm Cell. 10 mL	**354243**
Phenol Red	T	100 Pc	**511750BT**	250	**511751BT**	500	**511752BT**	13.5 mm Cell. 10 mL	**354243**
Universal pH Indicator	L	25 mL	**451770**					13.5 mm Cell. 10 mL	**354243**
		100 mL	**451771**	250	**451772**				
Phosphate HR	T	100 Pc	**511980BT**					13.5 mm Cell. 10 mL	**354243**
Phosphate HR	T	100 Pc	**511980BT**					13.5 mm Cell. 10 mL	**354243**
QAC LR	T	100 Pc	**515390BT**	250	**515391BT**			40 mm Cell W680/40	**606890**
Acidifying GP	T	100 Pc	**515480BT**	250	**515481BT**				
QAC HR	T	100 Pc	**515400BT**	250	**515401BT**			13.5 mm Cell. 10 mL	**354243**
Acidifying GP	T	100 Pc	**515480BT**	250	**515481BT**				
Hydrogen Peroxide LR	T	100 Pc	**512380BT**	250	**512381BT**			13.5 mm Cell. 10 mL	**354243**
Hydrogen Peroxide LR	T	100 Pc	**512380BT**	250	**512381BT**			13.5 mm Cell. 10 mL	**354243**
Hydrogen Peroxide LR	T	100 Pc	**512380BT**	250	**512381BT**			40 mm Cell W680/40	**606890**

also suitable for seawater Green Chemistry *Evo* =Potassium-Iodid reduced

L = Liquid/Solution, P = Powder, PP = Powder Pack, T = Tablet, TT = Tube Test

Photometry


Lovibond® Water Testing
Tintometer® Group
DPD NO. 1
51 10 51BT
100% boric acid free
PM 630

MD100 / 110 / 200

page 36

PM600 / 620 / 630

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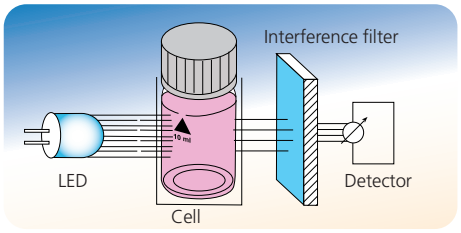
Photometry

The principle of photometry

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

When a light beam passes through the coloured sample, energy with a specific wavelength is absorbed by the test substance.
The photometer determines the coloration of the sample by measuring the transmission or absorption of light of this wavelength (in other words, monochromatic light).



High-quality interference filters precisely limit the wavelength and are a prerequisite for obtaining high precision measurement results. The use of such interference filters is one Lovibond® filter photometers to the quality standard. The photometer digitally calculates the required concentration and displays the result.

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 **MD100*** and **MD110*** as hand-held model to the multi parameter photometer **MD200*** as benchtop model in different parameter variants.

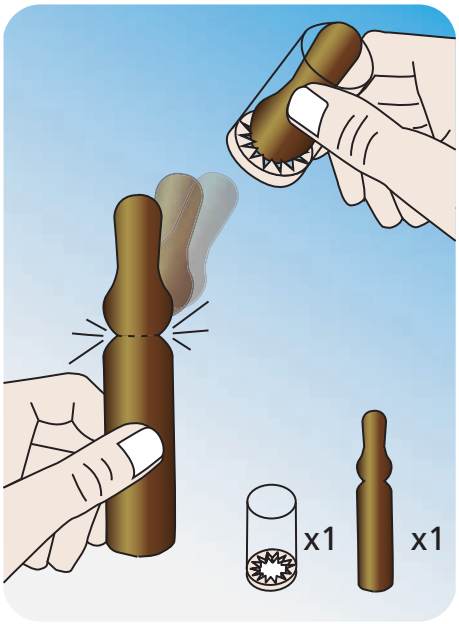
The multi-functional **PM600, PM620 & PM630 photometers** provide the answer to all requirements relating to the analysis of water used in modern swimming pools and baths. They offer a wide variety of pre-programmed methods and are therefore suitable for the demands of modern water analysis.

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

Parameter	MD100* & MD110*	MD200*	PM620 & PM630	PM600
Acid Capacity $K_{S4.3}$		■	■	
Alkalinity-m	■	■	■	■
Aluminium			■	
Ammonia			■	
Bromine	■	■	■	■
Calcium Hardness	■	■	■	■
Chlorine	■	■	■	■
Chlorine Dioxide		■	■	
Copper		■	■	■
Cyanuric acid	■	■	■	■
Hydrogen Peroxide		■	■	
Iodine			■	

Parameter	MD100* & MD110*	MD200*	PM620 & PM630	PM600
Iron (Fe^{2+}, Fe^{3+}), soluble		■	■	■
Langelier-Saturation Index			■	■
Langelier Water Balance			■	■
Oxygen, active			■	
Ozone			■	■
PHMB (Biguanide)			■	
Phosphat			■	■
pH value	■	■	■	■
Sodium Hypochlorite		■	■	
Sulphate			■	
Total Hardness			■	
Urea		■	■	

* 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).



ValidCheck Solution Chlorine (Cl_2)

Quality management of analytical methods is a fundamental prerequisite for reliable water analysis. With the new ValidCheck standard solution, ready-to-use solution is available to the user. The precisely adjusted concentration is modified to the particular application case.

With the ValidCheck Standard, the user can immediately check all important steps of its analysis: precise sample preparation, detection accuracy of the photometer and the chemical method DPD. The ValidCheck real chlorine standard contains a sealed ampoule with sodium hypochlorite solution of an exactly

defined concentration. This solution is diluted with the volume of deionized water supplied to form a 100 mL standard with a concentration of 1.5 mg/L chlorine (Cl_2). This freshly prepared standard can be used for 30 minutes.

The ValidCheck Chlorine is delivered with a "Step by Step" instruction and a "Certificate of Analysis".

Order code: 48105510

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 Tablet No.1 and No.3 together
Chlorine Dioxide and Chlorine Dioxide presence of Residual Chlorine	➡	DPD No.1 Tablet DPD No.1 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

Preparing samples for photometric measurements

Membrane filter set

Advantages

- removes turbid materials from samples
- differentiates between dissolved and total substances
- 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.

Where certain methods are employed (e.g., iron, manganese, CSB, etc.) a membrane filter set must be used to differentiate samples in terms of dissolved and total substances. The filter mesh size of 0.45 µm is in accordance with the official German unitary procedure for water testing.

Order code 366150
(covers 25 x 0.45 µm membrane filters and two 20 mL syringes)


PM600 & PM620

PM630


Aqua LX App

Photometer MD100, MD110 & MD200

Measurements using high quality interference filters with long-life LEDs as a light source in a transparent sample chamber.

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

Using an internal ring memory, the last 16 data sets (MD100, MD200) and 125 data sets (MD110) are stored automatically with date, time, parameter and measurement value.

The tests are conducted using either Lovibond® tablet reagents with long-term stability, VARIO powder reagents or liquid reagents.

Bluetooth® is a wireless technology subject to regional approval. The use of the MD110 with **Bluetooth®** is currently only permitted within Europe, the USA, Japan and in Canada. The use of the MD110 will also be possible in other regions in the future. For current regions and further information, visit:
bluetooth.lovibond.com
Regions in which the MD110 with **Bluetooth®** can currently be used (status: 01/2019): within Europe (according R&TTE Directive 1999/5/EC) ; USA (according to FCC part 15, comprised in FCC ID QOQBT113) ; Canada (comprised in IC 5123A-BGTBLE113), Japan (includes CAB ID 007-AB0103)

** analog IP 68, 1 hour at 1 m, floatable*

Scroll Memory (SM)

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)

For certain versions of the instrument it is not necessary to zero the instrument each time.
The zero setting is held in memory until the instrument is turned off. (**O**ne **T**ime **Z**ero - OTZ).
The zero setting can be confirmed whenever it is required.

Manufacturers Test Certificate M

Besides the "Certificate of Compliance" the manufacturers test certificates M is 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.

NIST Traceability

The instrument is factory pre-adjusted to international standards. The user can set the instrument in "user calibration mode" with standards traceable to NIST adjust.
(NIST = National Institute of Standards and Technology)

Data Transfer

The optional available IRiM (infrared interface module) uses modern infrared technology to transmit measurement data from the **MD100** and **MD200** 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 IRiM.

The **MD110** photometers have a **Bluetooth®** feature.

Via the **Bluetooth®** interface, the measurement results are transmitted to external instruments for prompt assessment and processing, so that all data can be evaluated and collated directly on site. In order to get the best use out of this, Tintometer offers an app for mobile instruments and PC software with a dongle.

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

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

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

Code	2444480

For more information please see:
www. bluetooth.lovibond.com

GET IT ON Google Play

Download on the App Store

Verification Standard Kit

The verification standards serve to verify the photometric accuracy and reproducibility of the results at the different wavelengths. The absorbance value is stated.
The kit contains one zero standard, six different vials for checking six different wave lengths and allows checking the complete range of MD100 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 (MD100, MD110 & MD200)	215670

Reference Standard Kit for MD100, MD110 and MD200

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	275650
Kit Chlorine for instruments with tablet / liquid reagent 0.5* and 2.0* mg/L	275655
Kit Chlorine for instruments with tablet / liquid reagent 1.0* and 4.0* mg/L	275656
Kit Chlorine for instruments with powder reagent 0.2* and 1.0* mg/L	275660
Kit pH for instruments with tablet / liquid reagent 7.45* pH	275670

* Approximate figure, actual figure specified in Certificate of Analysis

Reagents (order codes) page 50

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	Instrument with Parameter	OTZ*	Range	usable reagent form	delivery content incl. reagents	MD100	MD110	MD200
2in1	**Chlorine Tablet**	✓	0.01 - 6.0 mg/L Cl_2 0.02 - 4 mg/L Cl_2	Tablet or Liquid	Tablets for Chlorine, pH	278020	-	2889402
			0.1 - 10 mg/L Cl_2**	Tablet	Liquid reagents for Chlorine, pH	278025	-	2889412
	pH		6.5 - 8.4 pH	Tablet/Liquid				
	Chlorine Powder		0.02 - 2.0 mg/L Cl_2	Powder	Powder reagents for Chlorine, Tablets for pH	278030	-	-
			0.1 - 8.0 mg/L Cl_2 (10 mm multi vial-2)	Powder				
	pH		6.5 - 8.4 pH	Tablet/Liquid				
	Copper	✓	0.05 - 5.0 mg/L Cu	Tablet	Tablets for Cu and pH	-	-	2872102
	pH		6.5 - 8.4 pH	Tablet/Liquid				
	Hydrogen-peroxide		1 - 50 mg/L H_2O_2 40 - 500 mg/L H_2O_2	Liquid	Liquid reagents for H_2O_2 and pH	-	-	2888102
	pH		6.5 - 8.4 pH	Liquid				
3in1	**Chlorine**	✓	0.01 - 6.0 mg/L Cl_2	Tablet or	Tablets for Chlorine, pH, CyA	278010	2980102	2860102
			0.02 - 4 mg/L Cl_2	Liquid	Tablets CyA Liquid reagents for Chlorine, pH	278015	2980152	2882002
			0.1 - 10 mg/L Cl_2**	Tablet				
	pH		6.5 - 8.4 pH	Tablet/Liquid				
	Cyanuric acid		0 - 160 mg/L Cya	Tablet				
	Chlorine	✓	0.01 - 6.0 mg/L Cl_2	Tablet or	Tablets for Chlorine, pH, Alka-M	278060	-	2889002
			0.02 - 4 mg/L Cl_2	Liquid	Tablets Alka-M Liquid reagents for Chlorine, pH	278065	-	2889302
			0.1 - 10 mg/L Cl_2**	Tablet				
	pH		6.5 - 8.4 pH	Tablet/Liquid				
	Alkalinity-m		5 - 200 mg/L $CaCO_3$	Tablet				
	Chlorine		0.01 - 6.0 mg/L Cl_2 0.02 - 4 mg/L Cl_2	Tablet or Liquid	Tablets for Chlorine, Chlorine HR	278000	-	-
	Chlorine HR (KI)		5 - 200 mg/L Cl_2	Tablet				
	Chlorine dioxide		0.02 - 11 mg/L ClO_2	Tablet				
	Chlorine	✓	0.01 - 6.0 mg/L Cl_2 0.02 - 4 mg/L Cl_2	Tablet or Liquid	Tablets for Chlorine, pH, Bromine	-	-	2861802
	pH		6.5 - 8.4 pH	Tablet/Liquid				
	Brome		0.05 - 13 mg/L Br_2	Tablet				
	Chlorine	✓	0.01 - 6.0 mg/L Cl_2	Tablet or	Tablets for Chlorine, pH, Acid capacity	-	-	2889012
			0.02 - 4 mg/L Cl_2	Liquid	Tablets Acid capacity Liquid reagents for Chlorine, pH	-	-	2889202
			0.1 - 10 mg/L Cl_2**	Tablet				
	pH		6.5 - 8.4 pH	Tablet/Liquid				
	Acid capacity		0.1 - 4.0 mmol/L $K_{S4.3}$	Tablet				

* OTZ (zero adjustment applies to all methods of the measuring instrument)

** Delivery without reagents

Green Chemistry *Evo* =Potassium-Iodid reduced

4in1

Instrument with Parameter	OTZ*	Range	usable reagent form	delivery content incl. reagents	MD100	MD110	MD200
Chlorine	✓	0.01 - 6.0 mg/L Cl_2	Tablet or	Tablets for Chlorine, pH, CyA, Alka-M	278070	2980702	2860502
		0.02 - 4 mg/L Cl_2	Liquid	Tablets for CyA, Alka-M Liquid reagents for Chlorine and pH	278075	2980752	2860542
		0.1 - 10 mg/L Cl_2**	Tablet				
pH		6.5 - 8.4 pH	Tablet/Liquid				
Cyanuric Acid		0 - 160 mg/L Cya	Tablet				
Alkalinity-m		5 - 200 mg/L $CaCO_3$	Tablet				
Chlorine DUO		0.01 - 6.0 mg/L Cl_2	Tablet	Powder reagents for Chlorine, Tablets for Chlorine, pH, CyA, Alka-M	278160	-	-
		0.02 - 3.5 mg/L Cl_2	Powder				
		5 - 200 mg/L Cl_2**	Tablet				
pH		6.5 - 8.4 pH	Tablet/Liquid				
Alkalinity-m		5 - 200 mg/L $CaCO_3$	Tablet				
Hardness, Calcium		0 - 500 mg/L $CaCO_3$	Tablet				
Chlorine	✓	0.01 - 6.0 mg/L Cl_2	Tablet or	Tablets for Chlorine, pH, CyA and Acid Capacity	-	-	2860512
		0.02 - 4 mg/L Cl_2	Liquid	Tablets for CyA and Acid Capacity Liquid reagents for Chlorine and pH	-	-	2860522
		0.1 - 10 mg/L Cl_2**	Tablet				
pH		6.5 - 8.4 pH	Tablet/Liquid				
Cyanuric Acid		0 - 160 mg/L Cya	Tablet				
Acid Capacity		0.1 - 4.0 mmol/L $K_{S4.3}$	Tablet				
Chlorine	✓	0.01 - 6.0 mg/L Cl_2 0.02 - 4 mg/L Cl_2	Tablet or Liquid	Tablets for Chlorine, pH, Acid Capacity, Urea (add. Liquid)	-	-	2862912
		0.1 - 10 mg/L Cl_2**	Tablet				
pH		6.5 - 8.4 pH	Tablet/Liquid				
Acid Capacity		0.1 - 4.0 mmol/L $K_{S4.3}$	Tablet				
Urea		0.1 - 2.5 mg/L Urea	Tablet/Liquid				
		0.2 - 5 mg/L Urea (by dilution)					
Chlorine	✓	0.01 - 6.0 mg/L Cl_2 0.02 - 4 mg/L Cl_2	Tablet or Liquid	Tablets for Chlorine, pH, Acid Capacity	-	-	2863802
		0.1 - 10 mg/L Cl_2**	Tablet				
Chlorine dioxide		0.02 - 11 mg/L ClO_2	Tablet				
pH		6.5 - 8.4 pH	Tablet/Liquid				
Acid Capacity		0.1 - 4.0 mmol/L $K_{S4.3}$	Tablet				

* OTZ (zero adjustment applies to all methods of the measuring instrument)
** Delivery without reagents
Green Chemistry *Evo* =Potassium-Iodid reduced

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Delivery Content

- Instrument in carrying case
- **MD100 & MD110**
  4 micro batteries (AAA)
  MD200
  4 micro batteries (AA),
- 3 round vials (glass) with lids
- 1 stirring rod & 1 brush & syringe
- Reagents (see tables)
- Warranty information
- Certificate (Certificate of Compliance)
- Instruction Manual

	Instrument with Parameter	OTZ*	Range	usable reagent form	delivery content incl. reagents	MD100	MD110	MD200
5in1	**Chlorine**	✓	0.01 - 6.0 mg/L Cl_2 0.02 - 4 mg/L Cl_2	Tablet or Liquid	Tablets for Chlorine, pH, CyA, Alka-M, CaH	278080	-	2861202
			0.1 - 10 mg/L Cl_2**	Tablet				
	pH		6.5 - 8.4 pH	Tablet/Liquid				
	Cyanuric Acid		0 - 160 mg/L Cya	Tablet				
	Alkalinity-m		5 - 200 mg/L $CaCO_3$	Tablet				
	Hardness, Calcium		0 - 500 mg/L $CaCO_3$	Tablet				
	Chlorine		0.01 - 6.0 mg/L Cl_2 0.02 - 4 mg/L Cl_2	Tablet or Liquid	Tablets for Chlorine, pH, CyA, Acid Capacity, CaH	-	-	2861212
			0.1 - 10 mg/L Cl_2**	Tablet				
	pH		6.5 - 8.4 pH	Tablet/Liquid				
	Cyanuric Acid		0 - 160 mg/L Cya	Tablet				
	Acid Capacity		0.1 - 4.0 mmol/l $K_{S4.3}$	Tablet				
	Hardness, Calcium		0 - 500 mg/L $CaCO_3$	Tablet				
6in1	**Chlorine**	✓	0.01 - 6.0 mg/L Cl_2 0.02 - 4 mg/L Cl_2	Tablet or Liquid	Tablets for Chlorine, Bromine, pH, CyA, Alka-M, CaH	278090	2980902	2861902
			0.1 - 10 mg/L Cl_2**	Tablet				
	Bromine		0.05 - 13 mg/L Br_2	Tablet				
	pH		6.5 - 8.4 pH	Tablet/Liquid				
	Cyanuric Acid		0 - 160 mg/L Cya	Tablet				
	Alkalinity-m		5 - 200 mg/L $CaCO_3$	Tablet				
	Hardness, Calcium		0 - 500 mg/L $CaCO_3$	Tablet				
	Chlorine	✓	0.01 - 6.0 mg/L Cl_2 0.02 - 4 mg/L Cl_2	Tablet or Liquid	Tablets for Chlorine, Bromine, pH, CyA, Acid Capacity, CaH	-	-	2861912
			0.1 - 10 mg/L Cl_2**	Tablet				
	Bromine		0.05 - 13 mg/L Br_2	Tablet				
	pH		6.5 - 8.4 pH	Tablet/Liquid				
	Cyanuric Acid		0 - 160 mg/L Cya	Tablet				
	Acid Capacity		0.1 - 4.0 mmol/l $K_{S4.3}$	Tablet				
	Hardness, Calcium		0 - 500 mg/L $CaCO_3$	Tablet				
	Chlorine	✓	0.01 - 6.0 mg/L Cl_2 0.02 - 4 mg/L Cl_2	Tablet or Liquid	Tablets for Chlorine, Bromine, pH, CyA, Alka-M, Copper, Iron	-	-	2862102
			0.1 - 10 mg/L Cl_2**	Tablet				
	pH		6.5 - 8.4 pH	Tablet/Liquid				
	Cyanuric Acid		0 - 160 mg/L Cya	Tablet				
	Alkalinity-m		5 - 200 mg/L $CaCO_3$	Tablet				
	Copper		0.05 - 5.0 mg/L Cu	Tablet				
	Iron		0.02 - 1.0 mg/L Fe	Tablet				

* OTZ (zero adjustment applies to all methods of the measuring instrument)
** Delivery without reagents

Green Chemistry *Evo* =Potassium-Iodid reduced

Accessories

Item	Code
Set of 12 round vials with lid height 48 mm, Ø 24 mm	197620
Set of 5 round vials with lid height 48 mm, Ø 24 mm	197629
Satz à 10 round vials with lid, height 90 mm, Ø 16 mm	197665
Adapter for round vials ø 16 mm	19802190
Set of 12 plastic vials (PC), with lid "Multi"-Type 2, ☐10 mm	197600
Vial stand for 6 round vials Ø 24 mm, acrylic glass	418951
Vial stand for 10 vials (Ø 16 mm), acrylic glass	418957
Mixing cylinder, 25 mL, with stopper required accessory for molybdenum LR test with MD100 (276140)	19802650
Membrane filter set for use when preparing samples, 25 membrane filters, 0.45 µm, 2 syringes 20 mL	366150
Cleaning cloth for vials	197635
Set of 12 sealing rings for round vial ø 24 mm	197626
4 micro batteries (AAA) MD100, MD110	1950026
4 batteries (AA) MD200	1950025
Battery lid MD100, MD110	19802617
Battery lid MD200	19802241
Measuring beaker, volume 100 mL	384801
Plastic funnel with handle	471007
Plastic stirring rod, 13 cm length	364100
Plastic stirring rod, 13 cm length, (10 pcs.)	364120
Plastic stirring rod, 10 cm length	364109
Plastic stirring rod, 10 cm length, (10 pcs.)	364130
Infrared data transfer module IRiM (MD100, MD200 only)	214050
Bluetooth-Dongle and Software (MD110 only)	2444480
Serviceplan	19802801
Factory calibration certificate	999750

Technical Data	MD100	MD110	MD200
Interface for data transfer	Infrared interface (IRiM needed)	**Bluetooth®**-interface	Infrared interface (IRiM needed)
Storage	internal ring memory for **16** data sets	internal ring memory for **125** data sets	internal ring memory for **16** data sets
Power Supply	4 micro batteries (AAA), capacity approx. 17 hours or approx. 5000 tests in continuous operation with the display lighting switched off	4 micro batteries (AAA), capacity approx. 17 hours or approx. 5000 tests in continuous operation with the display lighting and **Bluetooth®** Function switched off	4 batteries (AA), capacity approx. 53 hours or 15000 tests (continuous operation without display lighting)
Dimensions	155 x 75 x 35 mm (L x W x H)		190 x 110 x 55 mm (L x W x H)
Weight	basic unit ca. 260 g		basic unit ca. 455 g (batteries incl.)
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 Δ λ = 5 nm 530 nm Δ λ = 5 nm 560 nm Δ λ = 5 nm 580 nm Δ λ = 5 nm 610 nm Δ λ = 6 nm 660 nm Δ λ = 5 nm		
Wavelength Accuracy	± 1 nm		
Photometric Accuracy[4)]	3 % FS (T = 20 °C - 25 °C)		
Photometric Resolution	0.01 A		
Absorption range	-2500 to 2500 m Abs		
Auto - OFF	automatic switch-off		
Display	backlit LCD (on keypress)		
Time	real time clock and date		
Calibration	factory calibration and user calibration. Reset to factory calibration possible		
Environmental conditions	temperature: 5 - 40 °C rel. humidity: 30 - 90 % (non condensing)		
Conformity	CE		

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PM Photometer

All pool parameters in one instrument

PM600 / PM620 / PM630

The Lovibond® PM600 series of photometers has simplified the pool water analysis decisively. The PM600 and PM620 Photometers meet all requirements of demanding pool operators for a modern water analysis. The series is extended by the PM630 with **Bluetooth®** data transmission.

The **PM600** focusses on the main pool parameters required for balanced water including: Alkalinity, Bromine, Chlorine, Cyanuric Acid, Iron, Calcium Hardness, Copper, Sodium Hypochlorite, Ozone and pH-value.

The **PM620** also has the following detection methods: Aluminium, Ammonia, Biguanides (PHMB), Chlorine dioxide, Total Hardness, Urea, Iodine, Phosphate, Acid capacity $KS_{4.3}$, Oxygen (active), Sulphate und Hydrogen peroxide.

The **PM630** corresponds to the PM620. It is additionally equipped with a **Bluetooth®** interface. This allows data to be transferred quickly and easily to a smartphone or tablet.

All instruments have a back-lit display. Operator guidance displays information about the measurement range and reagent type, as well as automatic countdown timers for accurate response times. The internal memory is capable of storing up to 1000 results with date, time and sample ID. These results can be retrieved and transmitted at any time.

Data transfer

PM600 and **PM620** can transfer data via an optional infrared module (IRIM) to the PC.

Code: 214050

For the **PM630**, a set of software and **Bluetooth®** dongle is available for data transfer to the PC.

Code: 2444480

Aqua LX® App

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.

Scan and download the **AquaLX® App**

GET IT ON Google Play

Download on the App Store

Technical Data

Display	Graphic-display
Interfaces	Infrared[1] (PM600 / PM620), **Bluetooth®** 4.0 (PM630), RJ45 socket for Internet updates[1]
Optics	LEDs, interference filters and photo sensor
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)
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
Memory Capacity	approx. 500 data sets (PM630) approx. 1000 data sets (PM600, PM620)
Approval	CE

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

* tested with standard solutions

Furthermore, additional personalized information, like sample takers or place of sampling can be added. Records can be transferred at the touch of a button by email either as a graphic or database record, simplifying the transfer, management and sharing of results.

PoolM8 App

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.

Scan and download the **PoolM8® App**

GET IT ON Google Play

Download on the App Store

Bluetooth® is a wireless technology subject to regional approval. The use of the PM630 with **Bluetooth®** is currently only permitted within Europe, the USA, Japan and in Canada. The use of the PM630 will also be possible in other regions in the future. For current regions and further information, visit: **bluetooth.lovibond.com**
Regions in which the PM 630 with **Bluetooth®** can currently be used (status: 01/2019): within Europe (according R&TTE Directive 1999/5/EC) ; USA (according to FCC part 15, comprised in FCC ID QOQBLE113) ; Canada (comprised in IC 5123A-BGTBLE113), Japan (includes CAB ID 007-ABO 103)

Reference Standard Kits

The reference standards are used to check the photometric accuracy and reproducibility of the photometer's chlorine method.
An adjustment of the overall system from photometric meter and reagents is not possible with the reference standard kits.

The shelf life is two years from the date of manufacture when used and stored properly.

Reference Standard Kit Chlorine 215630
0.2* and 1.0* mg/L
for tablet and VARIO methods [1)]

Reference Standard Kit Chlorine 215635
0.5* and 2.0* mg/L
for tablet methods only

Reference Standard Kit Chlorine 215636
1.0* and 4.0* mg/L
for tablet methods only

Reference Standard Kit pH 215665
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 PM620 only, because this method is not available on the PM600

Verification Standard Kit

The verification standards for the photometer PM600/620/630 are used to check the photometric accuracy and reproducibility of all wavelengths in the instruments. The shelf life of the standards is two years from the date of manufacture when used and stored properly. The measurements are in units of mAbs.

Verification Standard Kit **215680**

Delivery Content

- Instrument in carrying case
- 4 batteries (AA)
- 3 round vials 24 mm ø
- Syringe, brush, stirring rod
- 1 plastic beaker 100 mL
- Reagents for
  Chlorine (free, combined, total)
  pH value
  Calcium Hardness
  Acid capacity $K_{S4.3}$ (Alkalinity-m)
- Instruction Manual

Certificate of Compliance and Warranty information

PM600 (13 Parameters, Infrared)
Order code: 214060

PM620 (34 Parameters, Infrared)
Order code: 214065

PM630 (34 Parameters, **Bluetooth®**)
Order code: 214070

Additional available	
Serviceplan	19802804
Factory calibration certificate	999751

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Green Chemistry *Evo* = Potassium-Iodid reduced

Lovibond® Service Products

You want to maintain your instrument and at the same time trust in the reliability of your measurements and get valid results?

The Lovibond® service products are specially designed to support you in the best possible way.

We provide the following options for you to better maintain your product:

- 3 years service plan
- Fixed price service packages
- Factory calibration certificates

Lovibond® Service Plan – for all new devices

You want to be sure that your measuring instruments for water analysis have the longest possible service life and continuously deliver reliable measurement results. Lovibond® offers you the optimal and cost-effective solution for every photometer with the 3-year service plan.

Take advantage of our annual service and avoid unnecessary costs, get the full performance potential out of your equipment and prevent compliance & downtime risks. Keep your workflows & processes running smoothly protect your equipment investment.

Includes:

- Inspection
- Functions check
- Fault detection
- Troubleshooting
- Repairs
- Spare parts replacement
- Calibration
- Test protocol
- Firmware update
- Return shipping costs within EU

3 years Service Plan

Device	Duration	Part No.
MD100 / MD110 / MD200	3 years	19802801
PM600 / PM620 / PM630		19802804

Conditions

- Is offered only at the time of purchase and will be activated immediately
- Applicable to all Lovibond® photometers, expires after 3 years
- Clients will be informed in case of an unrepairable damage (Possibly exchange of parts)
- Service contracts only available for newly purchased devices
- Price for the whole contract has to be paid upfront
- Offer is only valid within Europe

Lovibond® Fixed Price Packages – for all used devices

Get safety for 5 years outside warranty for possible defects and cost calculation in case of inspection, calibration or repair. The Lovibond® Fixed Price Service Package for photometers include everything you need and can be ordered at any time.

Fixed Price Service Packages

Device	Duration	Part No.
MD100 / MD110 / MD200	One time deal	19802701
PM600 / PM620 / PM630		19802704

Includes:

- Inspection
- Functions check
- Fault detection
- Troubleshooting
- Repairs
- Spare parts replacement
- Calibration
- Test protocol
- Firmware update

Conditions

- One time deal
- 24 months warranty duration (up to 5 years after the end of legal warranty period)
- Shipping costs are not included
- Clients will be informed in case of an unrepairable damage (Possibly exchange of parts)

Factory calibration certificate ISO 9001

Ensure the compliance of your instrument with regulatory requirements. Even for documentation, reporting and recording purposes calibration certificates are essential. We provide certificates for all our photometers and turbidimeters.

Device	Part No.
MD100 / MD110 / MD200	999750
PM600 / PM620 / PM630	999751
TB211 IR	999765

Conditions

- Certificates are offered for both new and used devices.
- In case of used instruments, standard fixed price service package charges apply on top of certificate price.


Reagents
DPD No.1

Indicator Systems
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Reagents
page 50

Reagents from our own production

For decades, Tintometer has been producing reagents for water analysis and distributing them marketed worldwide under the name Lovibond®. Different forms of reagents are needed for different areas of application. Even internationally, users prefer different forms of presentation.

Our wide range of products extends from blistered tablets to powder reagents packaged in aluminium foil to liquid reagents in dosage-precise dropper bottles.

By the way: Tintometer is the only supplier on the market that designs all reagent forms with its own research & development and manufactures them in its own production.

Indicator-Systems

Green Chemistry

low the green ribbon on Lovibond® reagents. The Erlenmeyer flask with the leaf in the green Green Chemistry logo is more than a promise: For all tablets, powder and liquid reagents, it is our claim, formulations to be particularly environmentally compatible. Hazardous substances are - if possible - are replaced by non-hazardous and functionally equivalent substitutes.

Where this is not possible due to the required chemistry of the detection reaction, their concentration is reduced to the minimum necessary. And this is done without compromising the quality of the analysis results.

For example, all reagents offered for the pool sector are free of boric acid, which is often used as an auxiliary substance throughout the industry.

Boric acid is classified by the EU as harmful to reproductive ability.

However, the Lovibond® DPD No.1 tablet is not only 100 % free of boric acid, it also guarantees the sufficient buffering effect prescribed by the standard. With these properties it therefore occupies the top position in the competition.

By the way, our Green Chemistry has been awarded for its innovation.

More information about our "green chemistry" can be found here:

With DPD *Evo* one step ahead

The purple band on our DPD *Evo* reagents puts you ahead of the game when it comes to determining total chlorine levels. The semi-filled potassium iodide crystal leads you directly to the most advanced and safest DPD tablets on the market. As a pioneer of the DPD method, Tintometer is once again one step ahead. We have developed new formulations for the reagent tablets DPD No.3, DPD No.3 HR and DPD No.4, which contain considerably less potassium iodide, which is harmful to health. Because your health and safety are important to us!

Lovibond® has thus reacted at an early stage to the new general hazard classification for potassium iodide (KI). Potassium iodide is considered without exception to be a "hazard for organ damage (thyroid)". Above a certain level, hazard labelling is required and there are restrictions on distribution.

The *Evo* new products are label-free and guarantee the usual reliable test results. They are fully compatible with the classic DPD No.3 and DPD No.4 tablets. The *Evo* reagents can also be purchased as usual by private pool owners.

For all classic DPD No.3 and DPD No.4 formulations with more than 1% and almost always more than 10% potassium iodide, the new labelling requirement will have a considerable impact in future.

These tablets are mainly used in pools and swimming pools for the detection of total chlorine and oxygen.

With the analysis results, hygiene and care products can be dosed correctly. The reason for the high AI content of the reagents lies in the standardised analytical procedures for chlorine determination, which are used, for example, in public swimming pools and for drinking water testing. In the private environment, however, these standards are irrelevant.

Classic DPD tablets with a potassium iodide content of ≥ 10 % require hazard labelling with immediate effect and the ECHA classification STOT RE1, H372 applies.

Sale to private users requires:

- Official permission for sale**
- Proof of expert knowledge of the seller**
- Obligation to identify and advise on sale**
- Documentation obligation in the form of a dispensing book by the seller**
- Prohibition of mail-order sales of appropriately labelled products (thus no Internet trade!)**
- Sale to private individuals only in child-resistant packaging marked with Braille

** only valid for sale in Germany

According to the ECHA, the classification STOT RE2, H373 applies to conventional tablets containing more than 1% and less than 10% potassium iodide. For the supply of these products to private users within the EU, they must be labelled with Braille.

Our new *Evo* tablets are not affected by this labelling obligation. They may be sold as usual and purchased via self-service in the trade. Retailers and customers gain security with the new *Evo* tablets from Lovibond® and also save effort, time and above all money.

More information about our *Evo* products can be found here:

Tablet reagents

The reagent tablet is the most popular indicator system because it has several advantages. Its precise dosability, easy handling and very long shelf life make it a popular choice. Tablets can withstand almost all climatic conditions.

In part only thanks to the aluminium their blister packaging, from which they can be released at the press of a finger. Their compact form leaves almost no room for changes in the mixture due to external influences. Individually packaged, some tablets can be stored for up to 10 years.
The weight of the tablet is fixed within very narrow limits. This allows a high dosing accuracy to be achieved. These solid tablets are designed for ease of use and to dissolve easily in the sample being tested.
Achieving a tablet substance which has both the solidity and the ease of dissolution needed for ease of use whilst having no undesired effects upon the analytical results requires many years of experience and a deep knowledge of the underlying chemistry.

You can therefore rely on over 130 years of expertise in the production of reagent tablets by Lovibond®.

The shelf life also deteriorates after opening.
If the storage conditions are observed, Lovibond® DPD and Phenolred solutions have a shelf life of up to two years from the date of manufacture.

Powder reagents

Simply tear open the aluminium foil pack and add the contents to the water sample: Powder reagents can be used easily and quickly. This makes the Powder Packs a popular means of detection in water analysis in many countries.
Lovibond® Powder Packs are manufactured to the same high quality standards that have been tried and tested in tablet production for decades.

Tintometer is appreciated worldwide for this.

The Lovibond® Powder Pack range is a valuable addition to the range of reagent systems. In addition, the range covers all known parameters - from aluminum to zinc.

Due to their chemical properties, Lovibond® Powder Packs can also be used in Hach® equipment.

Liquid reagents

The use of liquid reagents has one decisive advantage: their speed, because there is no need to dissolve reagents in solid form. However, liquid reagents must be dosed exactly, for example, with a pipette. Warning: Incorrect handling can result in significant dosage errors. In addition, pipettes must be checked continuously to ensure that they remain accurate.

Because of these issues, the counting of droplets for simple dosing has therefore become established.

Here, too, there are external factors that can influence the result. This is because the drop size can change due to temperature, material, diameter of the dosing tip and composition of the reagent.

Liquid reagents have a significantly shorter shelf life than comparable products in solid form.

Specifications and Certificate of Analysis

To underline the high quality standard of Lovibond® reagents, a specification is available for each reagent and a certificate of analysis for each lot (**www.lovibond.com**).

Detailed information see page 50

* HACH® is a registered trademark of Hach Company, Loveland, Colorado. The use of the HACH® trademark does not imply any affiliation with
or approval by Hach Company regarding the formulation, testing or compatibility of these products for use in HACH® brand spectrophotometers or other instruments or systems.

Reagents

Test	Range	Wave lengths λ / nm MD100 & MD110	MD200	PM620 & PM630	PM600	Method	Tube	Display
Acid capacity $K_{S4.3}$	0.1 - 4 mmol/L	-	610	610	-	Acid / Indicator [1, 2]	24 mm ø	
Alkalinity-m	5 - 200 mg/L	610	610	610	610	Acid/Indicator [1, 2, 5]	24 mm ø	$CaCO_3$
Alkalinity-m HR	5 - 500 mg/L	-	-	610	610	Acid/Indicator [1, 2, 5]	24 mm ø	$CaCO_3$
Aluminium VARIO	0.01 - 0.25 mg/L	530	-	530	-	Eriochromcyanin R [2]	24 mm ø	Al
Ammonia	0.02 - 1 mg/L	610	-	610	-	Indophenole blue [2, 3]	24 mm ø	NH_4 - N
Biguanides (see PHMB)								
Bromine	0.05 - 13 mg/L	530	530	530	530	DPD [5]	24 mm ø	Br_2
Calcium Hardness	20 - 500 mg/L	560	560	560	560	Murexide [4]	24 mm ø	$CaCO_3$
Chlorine [a)]	0.01 - 6 mg/L	530	530	530	530	DPD [1, 2]	24 mm ø	Cl_2
Chlorine HR (DPD) [a)]	0.1 - 10 mg/L	530	530	530	530	DPD [1, 2]	24 mm ø	Cl_2
Chlorine [a)]	0.02 - 4 mg/L	530	530	530	-	DPD [1, 2]	24 mm ø	Cl_2
Chlorine Powder MR	0.02 - 3.5 mg/L	530	-	-	-	DPD [1, 2]	24 mm ø	Cl_2
Chlorine Powder [a)]	0.02 - 2 mg/L 0.1 - 8 mg/L	530 530	- -	530 530	- -	DPD [1, 2]	24 mm ø 10 mm ☐ Multivial	Cl_2

Material Safety Data Sheets: www.lovibond.com
or other reagent quantities please see our current price list.

[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®

Reagent	Reagent form							
Alka-M-Photometer	T	100 Pc	**513210BT**	250	**513211BT**		
Alka-M-Photometer	T	100 Pc	**513210BT**	250	**513211BT**		
Alka-M-HR-Photometer	T	100 Pc	**513240BT**	250	**513241BT**		
	Set		**535000**				
VARIO Aluminum ECR F20	PP	100 Pc					
VARIO Aluminum Hexamine F20	PP	100 Pc					
VARIO Aluminum ECR Masking Reagent	L	25 mL					
Ammonia No.1	T	100 Pc	**512580BT**	250	**512581BT**		
Ammonia No.2	T	100 Pc	**512590BT**	250	**512591BT**		
Combi pack# Ammonia par No.1 & No.2	T	100 Pc	**517611BT**	250	**517612BT**		
Ammonia conditioning powder (for seawater), for 50 tests	P	26 g	**460170**				
in absence of Chlorine: DPD No.1 Bromine beside Chlorine: DPD No.1, Glycine differentiated bromine determination:							
DPD No.1	T	100 Pc	**511050BT**	250	**511051BT**	500	**511052BT**
Glycine [f]	T	100 Pc	**512170BT**	250	**512171BT**		
DPD No.1 High Calcium [e]	T	100 Pc	**515740BT**	250	**515741BT**	500	**515742BT**
Combi pack# Calcio H par No.1 & No.2	T	100 Pc	**517761BT**	250	**517762BT**		
DPD No.3 *Evo*	T	100 Pc	**511420BT**	250	**511421BT**	500	**511422BT**
Combi pack# DPD No.1 & DPD No.3 *Evo*	T	100 Pc	**517931BT**	250	**517932BT**		
DPD No.1	T	100 Pc	**511050BT**	250	**511051BT**	500	**511052BT**
DPD No.3	T	100 Pc	**511080BT**	250	**511081BT**	500	**511082BT**
Combi pack# DPD par No.1 & No.3	T	100 Pc	**517711BT**	250	**517712BT**		
DPD No.1 High Calcium [e]	T	100 Pc	**515740BT**	250	**515741BT**	500	**515742BT**
DPD No.3 High Calcium [e]	T	100 Pc	**515730BT**	250	**515731BT**	500	**515732BT**
Combi pack# DPD par No.1 & No.3 High Calcium [e]	T	100 Pc	**517781BT**	250	**517782BT**		
DPD No.3 HR *Evo*	T	100 Pc	**00511920BT**	250	**00511921BT**	500	**00511922BT**
DPD No.1 HR	T	100 Pc	**511500BT**	250	**511501BT**	500	**511502BT**
DPD No.3 HR	T	100 Pc	**511590BT**	250	**511591BT**	500	**511592BT**
Combi pack# DPD HR par No.1 & No.3	T	100 Pc	**517791BT**	250	**517792BT**		
	Set		**471056**				
DPD 1 Buffer solution	L	15 mL	**471010**	100	**471011**		
DPD 1 Reagent solution	L	15 mL	**471020**	100	**471021**		
DPD 3 Solution	L	15 mL	**471030**	100	**471031**		
VARIO Chlorine Free DPD F10	PP	100 Pc	**530180**			1000	**530183**
VARIO Chlorine Total DPD F10	PP	100 Pc	**530190**			1000	**530193**
Chlorine Free DPD F10	PP	100 Pc	**530100**			1000	**530103**
Chlorine Total DPD F10	PP	100 Pc	**530120**			1000	**530123**

[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 $CaCO_3$

[i] high range by dilution

[#] including stirring rod

Green Chemistry

Evo = Potassium-Iodid reduced

L = Liquid/Solution, P = Powder, PP = Powder Pack, T = Tablet, TT = Tube Test

Reagents

Test	Range	Wave lengths λ / nm MD100 & MD110	MD200	PM620 & PM630	PM600	Method	Tube	Display
Chlorine dioxide	0.02 - 11 mg/L	530	530	530	-	DPD/Glycine [1,2]	24 mm ø	ClO_2
Copper [a)]	0.05 - 5 mg/L	560	560	560	560	Biquinolin [4]	24 mm ø	Cu
Copper, free **VARIO**	0.05 - 5 mg/L	560	-	560	-	Bicinchoninat	24 mm ø	Cu
Cyanuric acid	10 - 160 mg/L	530	530	530	530	Melamine	24 mm ø	CyA
Hardness, total	2 - 50 mg/L 20 - 500 mg/L [i)]	560 560	- -	560 560	- -	Metallphthalein [3]	24 mm ø	$CaCO_3$
Hydrogen peroxide	1 - 50 mg/L 40 - 500 mg/L [i)]	- -	430 530	- 530	- -	Titanium tetrachloride / Acid	16 mm ø	H_2O_2
Iodine	0.05 - 3.6 mg/L	-	-	530	-	DPD [5]	24 mm ø	I
Iron (II, III) soluble	0.02 - 1 mg/L	560	560	560	560	Ferrozine / Thioglycolate	24 mm ø	Fe
Oxygen, active	0.1 - 10 mg/L	-	-	530	-	DPD		O_2
Ozone	0.02 - 2 mg/L	530	530	530	530	DPD/Glycine [5]	24 mm ø	O_3
PHMB (Biguanides)	2 - 60 mg/L	-	-	560	-	Buffer/Indicator	24 mm ø	PHMB
Phosphate LR, ortho	0.05 - 4 mg/L	660	-	610	610	Phosphomolybdenum blue	24 mm ø	PO_4 - P PO_4

Material Safety Data Sheets: www.lovibond.com
or other reagent quantities please see our current price list.

[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®

Reagent	Reagent form		Code				
DPD No.3 *Evo*	T	100 Pc	**511420BT**	250	**511421BT**	500	**511422BT**
Combi pack# DPD No.1 & DPD No.3 *Evo*	T	100 Pc	**517931BT**	250	**517932BT**		
in absence of chlorine: DPD No.1 Chlorine dioxide beside Chlorine: DPD No.1, Glycine, DPD No.3							
DPD No.1	T	100 Pc	**511050BT**	250	**511051BT**	500	**511052BT**
Glycine [f]	T	100 Pc	**512170BT**	250	**512171BT**		
DPD No.3	T	100 Pc	**511080BT**	250	**511081BT**	500	**511082BT**
Combi pack# par DPD No.1 & Glycine	T	100 Pc	**517731BT**	250	**517732BT**		
Combi pack# par DPD No.1 & No.3	T	100 Pc	**517711BT**	250	**517712BT**		
DPD No.1 High Calcium[e]	T	100 Pc	**515740BT**	250	**515741BT**	500	**515742BT**
Copper No.1	T	100 Pc	**513550BT**	250	**513551BT**		
Copper No.2	T	100 Pc	**513560BT**	250	**513561BT**		
Combi pack# Copper par No.1 & No.2	T	100 Pc	**517691BT**	250	**517692BT**		
Vario Cu 1 F10	PP	100 Pc	**530300**			1000	**530303**
CyA-Test	T	100 Pc	**511370BT**	250	**511370BT**		
Hardcheck P	T	100 Pc	**515660BT**	250	**515661BT**		
H_2O_2 Reagent solution	L	15 mL	**424991**				
DPD No.1	T	100 Pc	**511050BT**	250	**511051BT**	500	**511052BT**
Iron LR (Fe^{2+} and Fe^{3+})	T	100 Pc	**515370BT**	250	**515371BT**		
Iron (II) LR (Fe^{2+})	T	100 Pc	**515420BT**	250	**515421BT**		
DPD No.4 *Evo*	T	100 Pc	**511970BT**	250	**511971BT**	500	**511972BT**
DPD No.4	T	100 Pc	**511220BT**	250	**511221BT**	500	**511222BT**
DPD No.3 *Evo*	T	100 Pc	**511420BT**	250	**511421BT**	500	**511422BT**
Combi pack# DPD No.1 & DPD No.3 *Evo*	T	100 Pc	**517931BT**	250	**517932BT**		
O_3 in absence of Cl_2: DPD No.1/No.3							
DPD No.1	T	100 Pc	**511050BT**	250	**511051BT**	500	**511052BT**
DPD No.3	T	100 Pc	**511080BT**	250	**511081BT**	500	**511082BT**
O_3 in absence of Cl_2: DPD No.1/No.3/Glycine							
Combi pack# DPD par No.1 & No.3	T	100 Pc	**517711BT**	250	**517712BT**		
Glycine [f]	T	100 Pc	**512170BT**	250	**512171BT**		
PHMB Photometer	T	100 Pc	**516100BT**	250	**516101BT**		
Phosphate No.1 LR	T	100 Pc	**513040BT**				
Phosphate No.2 LR	T	100 Pc	**513050BT**				
Combi pack# Phosphate par No.1 LR & No.2 LR	T	100 Pc	**517651BT**				

[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 $CaCO_3$

[i] high range by dilution

including stirring rod

Green Chemistry

Evo = Potassium-Iodid reduced

L = Liquid/Solution, P = Powder, PP = Powder Pack, T = Tablet, TT = Tube Test

Reagents

Test	Range	Wave lengths λ / nm MD100 & MD110	MD200	PM620 & PM630	PM600	Method	Tube	Display
pH value	5.2 - 6.8	-	-	560	-	Bromcresol purple [5]	24 mm ø	pH
pH value	6.5 - 8.4	560	560	560	560	Phenol red [5]	24 mm ø	pH
pH value	6.5 - 8.4	560	560	560	-	Phenol red [5]	24 mm ø	pH
pH value	8.0 - 9.6	-	-	560	-	Thymol blue [5]	24 mm ø	pH
Sodiumhypochlorite	0.2 - 16 %	-	-	530	530	Potassium iodide [5]	24 mm ø	NaOCl
Sulphate VARIO	5 - 100 mg/L	530	-	530	-	Bariumsulphate Turbidity [2]	24 mm ø	SO_4
Sulphate	5 - 100 mg/L	-	-	610	-	Bariumsulphate Turbidity [2]	24 mm ø	SO_4
Urea	0.1 - 2.5 mg/L 0.2 - 5 mg/L [i)]	610 610	610 -	610 -	- -	Indophenol / Urease	24 mm ø	CH_4N_2O

Material Safety Data Sheets: www.lovibond.com
or other reagent quantities please see our current price list.

[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®

Reagent	Reagent form		Code				
Bromocresol Purple Photometer	T	100 Pc	**515700BT**	250	**515701BT**		
Phenol Red Photometer	T	100 Pc	**511770BT**	250	**511771BT**	500	**511772BT**
Phenol Red	L	15 mL	**471040**	100	**471041**		
Thymol Blue Photometer	T	100 Pc	**515710BT**	250	**515711BT**		
Acidifying GP	T	100 Pc	**515480BT**	250	**515481BT**		
Chlorine HR (KI)	T	100 Pc	**513000BT**	250	**513001BT**		
also available in bottle	T	100 Pc	**501210**	250	**501211**		
Combi pack# par Chlorine HR (KI) & Acidifying GP	T	100 Pc	**517721BT**	250	**517722BT**		
Dilution Set for sample preparation		1 Pc	**414470**				
VARIO Sulfa 4 F10	PP	100 Pc	**532160**				
Sulfate T	T	100 Pc	**515450BT**	250	**515451BT**		
Urea Reagent 1	L	15 mL	**459300**				
Urea Reagent 2	L	10 mL	**459400**				
Ammonia No.1	T	100 Pc	**512580BT**	250	**512581BT**		
Ammonia No.2	T	100 Pc	**512590BT**	250	**512591BT**		
Combi pack# Ammonia par No.1 & No.2 (without Urea-Reagent 1 & 2, please order seperatly)	T	100 Pc	**517611BT**	250	**517612BT**		
Urea Pretreat (compensates for the interference of free Chlorine up to 2 mg/L)	T	100 Pc	**516110BT**				
Urea Reagent Set, contains: par Urea Reagent 1&2, Ammonia No.1&2, Urea Pretreat	**Set**	100 Pc	**517800BT**				
Ammonia conditioning powder (for seawater), for 50 tests		26 g	**460170**				

[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 $CaCO_3$

[i] high range by dilution

including stirring rod

Green Chemistry

Evo = Potassium-Iodid reduced

L = Liquid/Solution, P = Powder, PP = Powder Pack, T = Tablet, TT = Tube Test

Electrochemistry

SD150
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SensoDirect 150

Multi-parameter handheld instrument for the determination of dissolved oxygen (O_2), O_2 Concentration, conductivity, TDS, pH and ORP.

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

Technical Data SD150

Parameter	pH	ORP	Oxygen	Conductivity	TDS	Temperature
Range / Resolution	0.00 … 14.00 pH	-1999 … 1999 mV	O_2 dissolved: 0.0 … 20.0 mg/L Air O_2: 0.0 … 100.0 %	0.0 … 200.0 µS/cm 0.200 ... 2.000 mS/cm 2.00 … 20.00 mS/cm 20.0 … 200.0 mS/cm	0.0 ... 132.0 ppm 132 … 1,320 ppm 1,320 … 13,200 ppm 13,200 … 132,000 ppm	0.0 … 60.0 °C 32.0 … 140.0 °F
Accuracy	± 0.02 pH	± 0.5% of measured value	O_2 dissolved: ± 0.4 mg/L Air O_2: ± 0.7 %	± 2 % of measured value		± 0.8 °C (± 1.5 °F)
Temperature compensation	automatically (with temperature electrode) and manually	-	automatically	adjustable: 0… 5.0 % / °C		-
Calibration	(1-, 2- or 3-point calibration (automatically or custom)	1-point calibration (custom, standards only > +100 mV)	1-point calibration (automatically)	1- or 2-point calibration, manually		-
Standards for automatic detection	USA: 4.01 / 7.00 / 10.01 pH	-	oxygen content air	-		
Salinity correction	-		0 … 39 %, manually	-		
Air Pressure compensation	-		0 … 8900 m, manually	-		
Display	58 x 34 mm LCD					
Data-Hold-Function	Yes					
Automatic Power Off	after 10 min, optional					
Operating conditions	0 … 50 °C, 0 … 80 % relative density (non-condensing)					
Power Supply	4 x 1.5 V batteries AA or DC 9V adapter					
Weight	ca. 620 g (battery and protective armouring)					
Dimensions	203 x 76 x 38 mm (battery and protective armouring)					
Protection class	IP 51					
Conformity	CE					
Order Info Sets:						
Set 1 724200	✓	-	✓	✓	✓	✓
Set 2 724210	✓	-	-	✓	✓	✓
Set 3 724220	✓	-	✓	-	-	✓
Set 4 724230	✓	✓	-	-	-	✓

Delivery Content

All Sets include:

- Stable plastic case
- Measuring device with protective armor
- 4 x 1.5 V Batteries AA
- pH electrode type 226
- Temperature probe Pt1000
- pH 4.01 und 7.00 calibration buffer each 90 mL, traceable to NIST
- Instruction manual

SensoDirect 150 Set 1

- pH / Con / TDS / dissolved O_2 / Temp.
- Conductivity probe type 110/150
- Oxygen sensor type 150
- electrolyte and membrane heads (2 pc.)

SensoDirect 150 Set 2

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

SensoDirect 150 Set 3

- pH / dissolved O_2 / Temp.
- Oxygen sensor type 150
- Electrolyte and membrane heads (2 pc.)

SensoDirect 150 Set 4

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

Accessories (Sensores, Standards, etc.) on page 64

SensoDirect 110

Focus on the essentials

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

Variable in use and user-friendly in operation

Delivery Content

- Basic unit
- Battery
- pH-electrode
- Warranty information
- Instruction manual

Technical data	SensoDirect 110 pH	SensoDirect 110 Con	SensoDirect 110 Salt
Range / Resolution	0.00 … 14.00 pH	0.000 … 1.999 mS/cm 0.01 … 19.99 mS/cm	0.01 … 10.00 % Salt
Accuracy	± 0.07 pH	± 3 % Full Scale	± 0.5 % Full Scale
Temperature compensation	-	automatically, 2 % / °C	
Calibration	custom (manually via set screws)		
Display	52 x 37 mm LCD		
Data-Hold-Function	Yes		
Ambient conditions	0…50 °C, 0…80 % rel. humidity (non condensing)		
Battery	9 V-Block		
Weight	ca. 380 g (with battery and protective armor)		
Dimensions	208 x 110 x 34 mm (with protective armor)		
Protection classification	IP 51		
Approval	CE		
Order-Info			
Device, Sensor and Accessories in stable plastic box	721300	722300	723300
Device and Sensor	721310	722310	-

Accessories (Sensores, Standards, etc.) on page 64

SD Pocket Tester

Technical Data	SD50 pH	SD60 ORP
Range / Resolution	0.00 … 14.00 pH	-1,000.0 … +1,000.0 mV -1,800 … +1,800 mV
Accuracy	± 0.05 pH	± 2 mV
Calibration	1-, 2- or 3-point calibration (automatically)	1-point calibration (custom)
Standards for automatic recognition	USA: 4.01 / 7.00 / 10.01 pH NIST: 4.01 / 6.86 / 9.18 pH	-
Temperature: Range / Resolution	0.0 … 60.0 °C / 32.0 … 140 °F	
Temperature: Accuracy	± 1 °C / ± 1.8 °F	
Auto-off	8 minutes non-use	20 minutes non-use
Temperature compensation	automatically	-
Battery life	> 350 hours (backlight OFF)	
Display	22 x 22 mm LCD, with backlight	
Memory	25 data sets with time and date	
Data-Hold-Function	Yes	
Operating conditions	0 … 60 °C / 0 … 80 % rel. humidity (non condensing)	
Power supply	2 x 1.5 V batteries, AAA	
Dimensions, Weight	205 x 44 x 33 mm, approx. 155 g with batteries	
Conformity	CE	
Order Info		
Instrument and Accessories in plastic box	194800-16	194801-16
Instrument and Accessories in case	194830-16	-
Replacement electrode	194820	194821

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

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

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

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

Delivery Content

- Meter in a robust plastic case with hanging tab
- 2 x 1.5 V Batteries, AAA
- Lanyard
- Instruction Manual
- pH 4, 7 and 10 Buffer tablets 3 x 10 pc. (only SD50 pH)
- pH 4.01 und 7.00 Calibration buffer and 2 x 100 mL Measuring cup (only SD50 pH in case)

SD50 in case, Code: 194830-16

Conversion table

1 mS/cm	=	1,000 µS/cm
1 ppt	=	1,000 ppm
1 ppt	=	0.1 %
1 ppt	≈	1 g/L
1 ppm	≈	1 mg/L
ppt	-	Parts per thousand
ppm	-	Parts per million

SD70 Con	SD80 TDS	SD90 Salt/Salz
0 … 1,999 µS/cm 2.00 … 20.00 mS/cm	0 … 1,499 ppm 1.50 … 15.00 ppt	0 … 999 ppm 1.00 … 20.00 ppt 0.00 … 2.00 %
± 3 % range		
1- or 2-point calibration (automatically or custom)	1- or 2-point calibration (custom)	
1413 µS/cm and 12.88 mS/cm	-	-
0.0 … 60.0 °C / 32.0 … 140 °F		
± 1 °C / ± 1.8 °F		
8 minutes non-use		
automatically, 2 % / °C		
> 100 hours (backlight OFF)		
22 x 22 mm LCD, with backlight		
25 data sets with time and date		
Yes		
0 … 60 °C / 0 … 80 % rel. humidity (non condensing)		
2 x 1.5 V batteries, AAA		
205 x 44 x 33 mm, approx. 155 g with batteries		
CE		
194802-16	194803-16	194804-16
-	-	-
194822		

Accessories (Sensores, Standards, etc.) on page 64

Accessories SD devices

	Parameter	Article	Description
Electrodes	pH	SD pH electrode type 226	0 … 14 pH, gel/plastic, BNC, low conductivities
	pH	SD pH electrode type 330	0 … 14 pH, gel/plastic, BNC, universal use
	pH	SD pH electrode type 235	0 … 14 pH, gel/glass, BNC, double junction
	pH / T	SD50 pH Replacement electrode	0 … 14 pH, gel/plastic, pocket tester
	T	SD Temperature probe type 150	0 … 60 °C, Pt1000
	ORP	SD ORP electrode type 242	± 2000 mV, platinum, gel/plastic, BNC
	ORP/T	SD60 ORP Replacement electrode	± 1800 mV, platinum, gel/plastic, pocket tester
	Con / TDS / T	SD Conductivity probe type LC 8	< 200 mS/cm, 2-pole graphite, K ≈ 1.0 cm^{-1}
	Salt / T	SD Conductivity probe type LC 9	< 10 % salt 2-pole graphite, K ≈ 1.0 cm^{-1}
	Con / T	SD70 Con Replacement electrode	< 20 mS/cm, 2-pole graphite, K ≈ 1.0 cm^{-1}, pocket tester
	TDS / T	SD80 TDS Replacement electrode	< 15 ppt, 2-pole graphite, K ≈ 1.0 cm^{-1}, pocket tester
	Salt / T	SD90 Salt Replacement electrode	< 2 %, 2-pole graphite, K ≈ 1.0 cm^{-1}, pocket tester
	DO / T	SD Oxygen probe type Oxi 150	< 20 mg/l, polearographic Au/Ag, 4 m cable
Solutions	pH	Buffer solution pH 4.01 ± 0.01	90 mL, traceable to NIST
	pH	Buffer solution pH 4.01 ± 0.01	1 L, traceable to NIST
	pH	Buffer solution pH 7.01 ± 0.015	90 mL, traceable to NIST
	pH	Buffer solution pH 7.01 ± 0.015	1 L, traceable to NIST
	pH	Buffer solution pH 10.01 ± 0.03	90 mL, traceable to NIST
	pH	Buffer solution pH 10.01 ± 0.03	1 L, traceable to NIST
	pH	Buffer solution Set pH 4 / 7 / 10	each 90 mL, traceable to NIST
	pH	Buffer tablets pH 4.00 ± 0.05	100 pcs.
	pH	Buffer tablets pH 4.00 ± 0.05	250 pcs.
	pH	Buffer tablets pH 7.00 ± 0.05	100 pcs.
	pH	Buffer tablets pH 7.00 ± 0.05	250 pcs.
	pH	Buffer tablets pH 10.00 ± 0.05	100 pcs.
	pH	Buffer tablets pH 10.00 ± 0.05	250 pcs.
	pH / ORP	Storage solution for pH/ORP electrodes	25 mL
	pH / ORP	Storage solution for pH/ORP electrodes	100 mL
	ORP	Redox/ORP Standard solution 470 mV	100 mL
	Con	Conductivity solution 1413 µS/cm	500 mL, traceable to NIST
	Con	Conductivity solution 1413 µS/cm	90 mL, traceable to NIST
	Con	Conductivity solution 12.89 mS/cm	90 mL, traceable to NIST
	Con / TDS	Conductivity solution 1413 µS/cm TDS 988 ppm	100 mL
	Con / TDS	Conductivity solution 12.89 mS/cm TDS 9.02 ppth	100 mL
	Salt	0.5 % NaCl Solution (5 g/L)	100 mL
	Salt	0.1 % NaCl Solution (1 g/L)	100 mL
	DO	Electrolyte for oxygen probe SD150	ca. 30 mL
Miscellaneous	DO	Spare membrane oxygen probe type Oxi 150	1 pc.
		Power supply SD150	1 pc.
		Block battery, 9 V	1 pc.
		AA batteries, 1.5 V	4 pcs.
		AAA batteries, 1.5 V	4 pcs.
		Plastic beaker, 100 mL	1 pc.
		Deionised water (DI)	250 mL

SD50 pH	SD60 ORP	SD70 Con	SD80 TDS	SD90 Salt	SD110 pH	SD110 Con	SD110 Salt	SD150	Order code
					•			•	721226
					•			•	721330
					•			•	721235BNC
•									194820
								•	724420
								•	721242
	•								194821
						•		•	724400
							•		724430
		•							194822
			•						194822
				•					194822
								•	724410
•					•			•	721247
•					•			•	721252
•					•			•	721248
•					•			•	721254
•					•			•	721249
•					•			•	721256
•					•			•	721250
•					•			•	515620BT
•					•			•	515621BT
•					•			•	515610BT
•					•			•	515611BT
•					•			•	515600BT
•					•			•	515601BT
•	•				•			•	726402
•	•				•			•	726404
	•							•	195070
		•	•			•		•	722250
		•	•			•		•	726654
		•	•			•		•	726684
		•	•			•		•	467642
		•	•			•		•	467643
				•					467621
				•					467631
								•	724420
								•	724460
								•	724540
					•	•	•		1950012
								•	1950025
•	•	•	•	•					1950026
•	•	•	•	•	•	•	•	•	384801
•	•	•	•	•	•	•	•	•	457022

pH = potentia Hydrogenii
ORP = Redox potential
T = Temperature
Con = Conductivity
Salt = Salinity
TDS = Total dissolved solids
DO = Dissolved oxygen

Turbidity Measurement

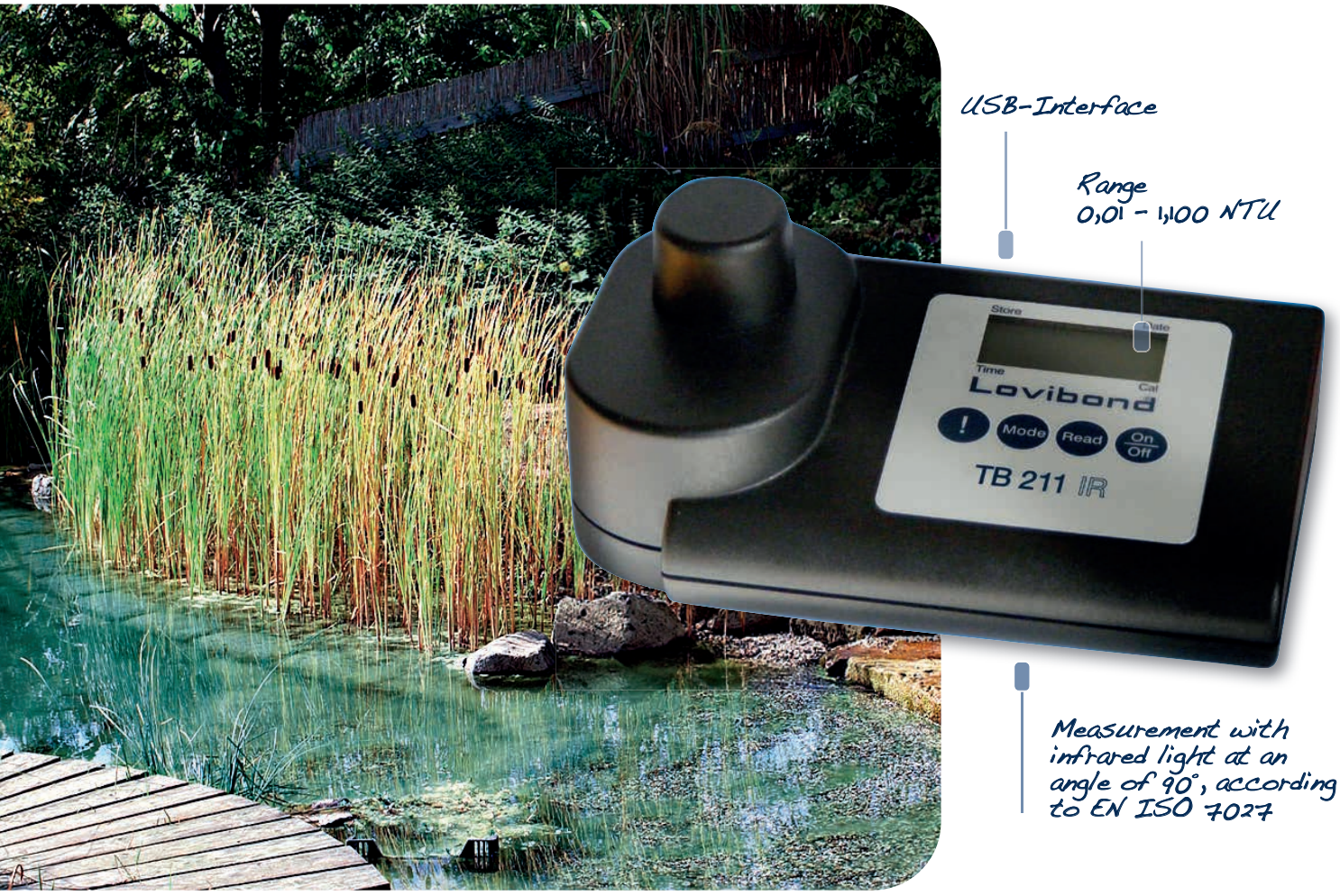


Photo: Grafinger, www.naturerlebnisbad.de

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

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

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

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

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

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

TB211 IR with USB-Interface
and with infrared light source (EN ISO 7027)

The compact Lovibond® infrared turbimeter TB211 IR is designed to allow fast, precise on site testing. The unit measures the scattered light at an angle of 90°, as stipulated in EN ISO 7027.

The wide measuring range from 0.01-1,100 TE/F = NTU = FNU makes the instrument suitable for various applications, ranging from drinking water to waste water.

Since the measurements are made by means of infrared light, both colored and colorless water samples can be measured. A direct transfer of the measurement results to a PC is through the USB interface TB211 IR easy to set up. The necessary USB cable is already part of the delivery.

Technical data

Measurement cycle	approx. 8 seconds
Display	backlit LCD (on keypress)
Optics	temperature-compensated LED (λ = 860 nm) and photosensor amplifier in water proof sample chamber, infrared light
Keypad	Conditionally acidic and solvent resistant polycarbonate film
Power supply	9 V power pack battery
Auto - OFF	automatic switch-off
Interface	Micro-USB
Storage	internal ring memory for 125 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 - 1,100 NTU = 1 NTU
Accuracy	± 2.5 % of reading or ± 0.01 NTU whichever is bigger 500 - 1100 NTU: ± 5 % of reading
Housing	ABS
Dimensions (L x W x H)	190 x 110 x 55 mm
Weight (base unit)	approx. 0.4 kg
Ambient conditions	Temperature: 5 - 40 °C rel. humidity: 30 - 90 %
Test equipment fitness	Software-supported user adjustment under use from T-CAL standards
CE-Conformity	

Delivery Content

- Instrument in carrying case
- 4 turbidity standards (< 0.1, 20, 200 and 800 NTU)
- 9 V battery
- 2 vials (ø 24 mm) with lids
- Warranty information
- Certificate of Compliance
- Instruction Manual
- USB cable 1.5 m

  Order code: 266030

Accessories

Item	Code
Turbidity standard set T-CAL (< 0.1, 20, 200, 800 NTU)	194150
Set empty vials, 24 mm ø (12 pc.)	197655
Cleaning cloth for vials	197635
Sample chamber lid	19801100
Battery, 9 V	1950012
Formazin Stock Solution (4,000 NTU), 125 mL	48012912
Formazin Stock Solution (4,000 NTU), 500 mL	48012950
USB-Cable 1.5 m	19802509

Natural Swimming Ponds

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

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

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

Chemical Requirements for fresh water - possibly after preconditioning*

Ammonia	≤ 0.5 mg/L
Iron	≤ 0.2 mg/L
Total Phosphorus [P_{total}]	≤ 0.03 mg/L
Hardness (Total alkaline earths) match Total Hardness	≥ 1.0 mmol/L ≥ 5.6 dH°
Conductivity	≤ 1,000 µS/cm at 20 °C
Manganese	≤ 0.05 mg/L
Nitrate	≤ 50.0 mg/L
ortho Phosphate (Specified as P)	≤ 0.01 mg/L
pH value	6.0 - 9.0
Acid capacity $K_{S4.3}$ match Carbonate hardness	≥ 2.0 mmol/L ≥ 5.6 dH°

Chemical guide values for the usage area

Parameter	**Guide Value**
Ammonia	≤ 0.3 mg/L
Total Phosphorus [P_{total}]	≤ 0.03 mg/L (Type I - III) ≤ 0.01 mg/L (Type IV. V)
Hardness (Total alkaline earths) match Total Hardness	≥ 1.0 mmol/L ≥ 5.6 dH°
Conductivity	≤ 1000 µS/cm at 20 °C
Nitrate	≤ 30.0 mg/L
Nitrite	≤ 0.01 mg/L
ortho Phosphate (Specified as P)	≤ 0.03 mg/L (Type I - III) ≤ 0.01 mg/L (Type IV. V)
pH value	7.0 - 9.0
Acid capacity $K_{S4.3}$ match Carbonate hardness	≥ 2.0 mmol/L ≥ 5.6 dH°

Photo: Grafinger, www.naturerlebnisbad.de

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

Bathing Water

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

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

Microbiology

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

Parasites

- e.g. *Cryptosporidian*

Chemical and physical characteristics

Dissolved Oxygen

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

pH-value

The pH-value is the determination of the hydrogen ion (H^+) 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 pH 5 or above pH 9.

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 68

Test methods for a.m. parameter see index page 71.

Membrane filter set for sample preparation, see page 35

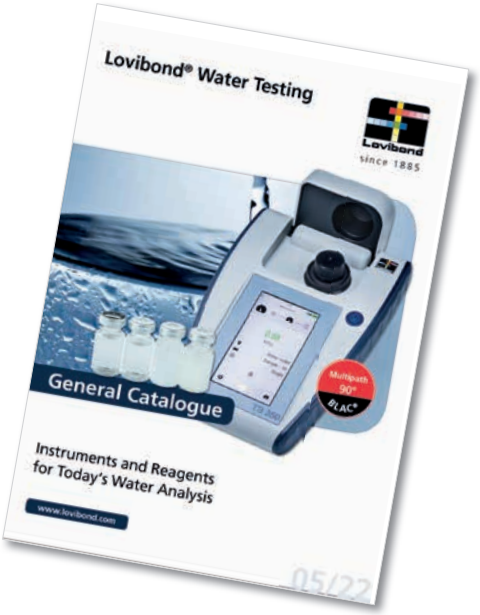
Environmental Water Analysis

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: 938020

Visit the download area on our website at **www.lovibond.com**, to obtain a copy of the catalogue.



Public Relations

Bundesverband Schwimmbad & Wellness e.V.
An Lyskirchen 14
50676 Köln, Germany
www.bsw-web.de

Lehr- und Versuchsgesellschaft
für innovative Hygienetechnik GmbH
Bleichstraße 6-8
45468 Mülheim, Germany
www.lvht.de

Österreichischer Verband
der Schwimmbad- und Saunawirtschaft
Wiedner Hauptstraße 63
1045 Wien, Austria
www.oevs-verband.at

Bundesverband Deutscher
Schwimmmeister e.V.
Römerstr. 151
50389 Wesseling, Germany
www.bds-ev.de

Schweizerische Vereinigung von Firmen
für Wasser- und Schwimmbadtechnik
Schlösslistraße 9 A
3001 Bern, Switzerland
www.aquasuisse.ch

TÜV Rheinland Akademie GmbH
TÜV Rheinland Group
Rhinstr. 46
12681 Berlin, Germany
www.tuev-schwimmbadbauer.de

Verein zur Förderung des IWW Rheinisch-Westfälisches
Institut für Wasserforschung e.V.
Moritzstraße 26
45476 Mülheim an der Ruhr, Germany
www.iww-online.de

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

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

Association Africaine de l'Eau Côte d'Ivoire
Abidjan - Cocody,
Riviera Palmeraie
05 BP 1910 Abidjan 05
www.afwa-hq.org

Malaysian Swimming Pool Association
47 Jalan Perdana 10/4
Pusat Perdagangan Tasik Perdana
Pandan Perdana
55300 Kuala Lumpur, Malaysia
www.mspa.org.my

acqua e vita Wasserforum e.V.
Dörpfeldstraße 34
12489 Berlin, Germany
www.acqua-e-vita.de

Asociación Española de Profesionales
del Sector Piscinas
Calle Agustín de Betancourt, 21,
28003 Madrid, Spain
www.asofap.es

Index

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

Handbook order code:
938101

Tintometer GmbH
Lovibond® Water Testing
Schleefstraße 8-12
44287 Dortmund
Tel.: +49 (0)231/94510-0
sales@lovibond.com
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@lovibond.uk
www.lovibond.com
UK

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

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

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@lovibond.com
www.lovibond.com
Malaysia

Tintometer China
Room 1001, China Life Tower
16 Chaoyangmenwai Avenue,
Beijing, 100020
Tel.: +86 10 85251111 App. 330
Customer Care China: 4009021628
Fax: +86 10 85251001
chinaoffice@lovibond.com
www.lovibond.com
China

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

Tintometer India Pvt. Ltd.
Door No: 7-2-C-14, 2nd, 3rd & 4th Floor
Sanathnagar Industrial Estate,
Hyderabad: 500018, Telangana
Tel: +91 (0) 40 23883300
Toll Free: 1 800 599 3891/ 3892
indiaoffice@lovibond.in
www.lovibondwater.in
India

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