Lovibond® Water Testing

Tintometer® Group

Pool & Spa Water Analysis

Instruments and Reagents

www.lovibond.com

Lovibond®-Handbook

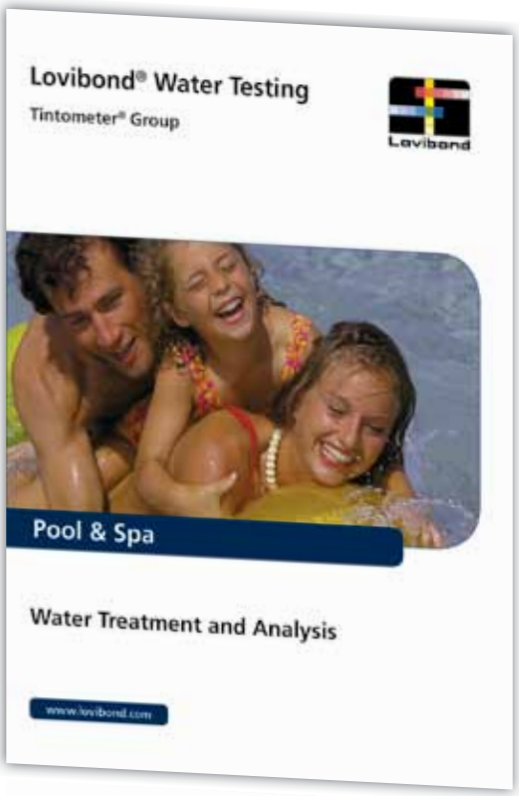
Pool & Spa

Water Treatment and Analysis

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

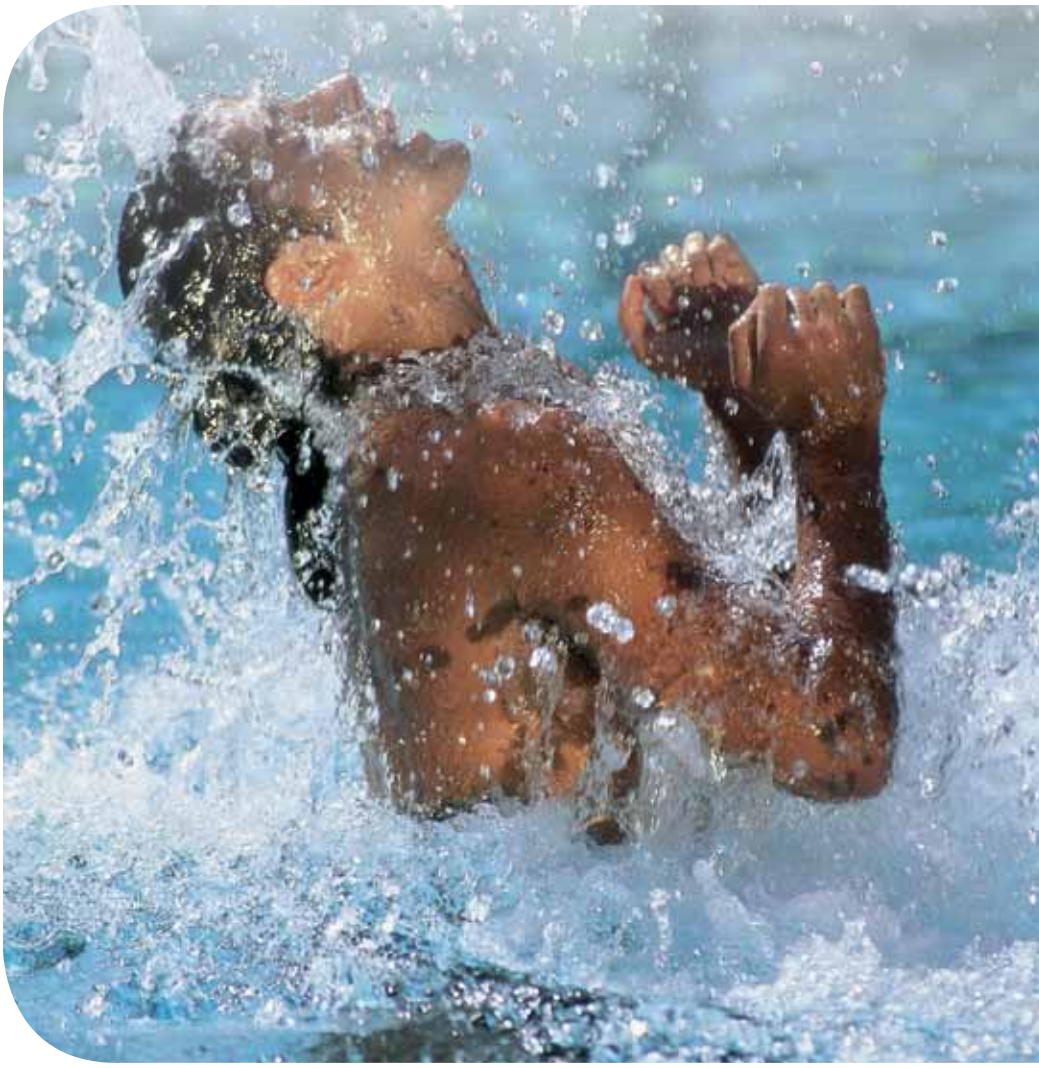
Handbook order code: 93 81 01

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



Content

Pools & Spas



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

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

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

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

Water Treatment and Water Testing

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

It goes without saying that the main water quality parameters need to be checked on a regular basis in order to ensure an optimum water treatment programme in changing operating conditions. If testing shows that the hygiene-related parameters deviate from the target values or recommended limit values, the operator can immediately take corrective action to avoid potential risks to health before such risks are allowed to arise.

And this is where the system of Lovibond® water testing equipment and reagents comes into play. The Lovibond® range of instruments provides operators of private and public baths with analysis systems that measure the actual condition and quality of the water with maximum precision. Moreover, the Lovibond® systems succeed in reconciling the seemingly irreconcilable goals of easy handling, safe reagents offering long-term stability, high detection accuracy, and reproducibility of results. We hope you will find the information on the following pages convincing.

Associations-Memberships

In order to support ongoing development in basic and advanced training, standardisation, and chemical and technical innovation, the Tintometer Group of Companies plays an active role in the following associations/federations under its brand name Lovibond®:

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

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

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

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

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

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

APSP
The Association of Pool & Spa Professionals
2111 Eisenhower Ave.
Alexandria, VA 22314
USA
www.apsp.org

RAPID TESTS

POOLTESTER

Three Chamber Tester

MINIKIT

Get the clip!

http://scuba-II.lovibond.com

CHECKIT® Comparator

Comparator 2000+

Scuba II

Rapid Tests

Active Oxygen
Biguanide (PHMB)
Bromine
Calcium Hardness
Chloride
Chlorine
Copper
Hydrogen Peroxide
pH-value
QAC
Sulphate
Stabilizer (Cyanuric acid)
Total Alkalinity
Total Hardness

Water Treatment

pH value

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

DISINFECTION

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

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

Rapid Tests

MINITESTER

The MINITESTER with an interchangeable colour comparison chart is a competitively priced starter unit with one measuring chamber for the determination of either chlorine, bromine, active oxygen and the pH value.

THREE-CHAMBER TESTER

The THREE-CHAMBER TESTER with an interchangeable colour comparison chart is a competitively priced unit for the determination of disinfectants and the pH value.

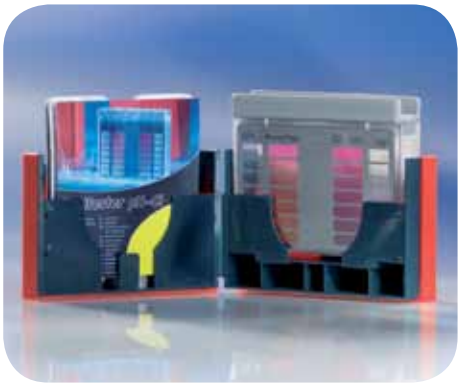
POOLTESTER

The POOLTESTER allows simultaneous determination of the most popular water treatment agents and the pH value.

Golden Wave

Category: Water Treatment & Chemicals
given by:
Schwimmbad & Sauna
Fachschriften-Verlag
70736 Fellbach

Pooltester-Set
The new box with its practical closure mechanism provides total protection for all the utensils in the "Pooltester" set and is now even easier for the user to handle.



Highlights

- Easy to use
- Award-winning design
- RAPID tablets fast dissolving

MINITESTER

Item	Code
Chlorine-pH[1)] Chlorine 0.1–3.0 mg/l / pH value 6.8–8.2	15 70 60
Bromine-pH[1)] Bromine 1–8 mg/l / pH value 6.8–8.2	15 80 20
Active Oxygen-pH[1)] Active Oxygen 0–10 mg/l / pH value 6.8–8.2	15 73 80

[1)] in bubble pack ; [2)] in plastic case
[3)] Stabilizer = cyanuric acid

THREE-CHAMBER-TESTER

Item	Code
Chlorine-pH LR[1)] Chlorine 0.1–3.0 mg/l / pH value 6.8–8.2	15 75 20
Chlorine-pH HR[1)] Chlorine 0.5–6.0 mg/l / pH value 6.8–8.2	15 80 10
Bromine-pH[1)] Bromine 1.0–8.0 mg/l / pH value 6.8–8.2	15 72 00
Active Oxygen-pH[1)] Active Oxygen 0 – 10 mg/l / pH value 6.8–8.2	15 76 10
Biguanide (PHMB)-pH[1)] Biguanide (PHMB) 10–100 mg/l pH value 6.8–8.2	15 61 50
4 in 1 [2)] Chlorine LR 0.1-3.0 mg/l / pH value 6.8-8.2 Stabilizer[3)] 20-200 mg/l / Alkalinity-M 50-300 mg/l	15 17 00
4 in 1 [2)] Chlorine HR 0.5-6.0 mg/l / pH value 6.8-8.2 Stabilizer[3)] 20-200 mg/l / Alkalinity-M 50-300 mg/l	15 17 10
5 in 1 [2)] Chlorine LR 0.1-3.0 mg/l / pH value 6.8-8.2 Stabilizer[3)] 20-200 mg/l / Alkalinity-M 50-300 mg/l Calcium hardness 50-300 mg/l	15 17 20
5 in 1 [2)] Chlorine HR 0.5-6.0 mg/l / pH value 6.8-8.2 Stabilizer[3)] 20-200 mg/l / Alkalinity-M 50-300 mg/l Calcium hardness 50-300 mg/l	15 17 30
6 in 1 [2)] Chlorine LR 0.1-3.0 mg/l / pH value 6.8-8.2 Stabilizer[3)] 20-200 mg/l / Alkalinity-M 50-300 mg/l Calcium hardness 50-300 mg/l / Acid demand	15 17 40
6 in 1 [2)] Chlorine HR 0.5-6.0 mg/l / pH value 6.8-8.2 Stabilizer[3)] 20-200 mg/l / Alkalinity-M 50-300 mg/l Calcium hardness 50-300 mg/l / Acid demand	15 17 50

POOLTESTER

Item	Code
Chlorine-pH LR Chlorine 0.1–3.0 mg/l / pH value 6.8–8.2	15 16 00
Chlorine-pH HR Chlorine 0.5–6.0 mg/l / pH value 6.8–8.2	15 16 01
Bromine-pH Bromine 1.0–8.0 mg/l / pH value 6.8–8.2	15 16 04
Active Oxygen-pH O_2 0–10 mg/l / pH value 6.8–8.2	15 16 05
Copper LR/HR-pH Copper LR 0.1–1.0 mg/l & HR 0.5–5.0 mg/l pH value 6.8–8.2	15 51 90
Active Oxygen-Copper-pH O_2 0–10 mg/l / Copper 0.1–1.0 mg/l pH value 6.8–8.2	15 52 35
Biguanide (PHMB)-Hydrogen Peroxide (H_2O_2)-pH PHMB 10–100 mg/l / H_2O_2 5–50 mg/l pH value 6.8–8.2	15 61 00
Quaternary Ammonia Compounds (QAC)-pH QAC 25–150 mg/l / pH value 6.8–8.2	15 10 40

Delivery content

- MINITESTER in a bubble pack
- Tablet reagents for 20 tests
- Instruction manual
- Pack contains 6 units

Delivery content

- THREE-CHAMBER-TESTER in a bubble pack
- Tablet reagents for 20 tests
- Instruction manual
- Pack contains 6 units

Delivery content

- POOLTESTER in a sturdy plastic box
- Tablet reagents for 20 tests
- Instruction manual
- Pack contains 6 units

Refill Packs

Item	Code
Chlorine / pH* 30 DPD No.1 / RAPID-tablets and 30 PHENOL RED / RAPID-tablets	51 58 84
Bromine / pH* 30 DPD No.1 / RAPID-tablets and 30 PHENOL RED / RAPID-tablets	51 58 68
Active Oxygen - pH* 30 DPD No.4 / RAPID-tablets and 30 PHENOL RED / RAPID-tablets	51 59 34
Active Oxygen - Copper - pH* 20 DPD No.4 / RAPID-tablets 20 COPPER No.1-tablets and 20 PHENOL RED / RAPID-tablets	51 58 65
PHMB/H_2O_2 - pH 20 PHMB-, 20 H_2O_2-, 20 ACIDIFYING PT- and 20 PHENOL RED / RAPID-tablets	51 58 70
PHMB - pH* 30 PHMB-tablets and 30 PHENOL RED / RAPID-tablets	51 61 55
QAC HR - pH* 20 QAC-, 20 ACIDIFYING GP- and 20 PHENOL RED / RAPID-tablets	51 58 69
Copper - pH* 30 COPPER No.1-tablets and 30 PHENOL RED / RAPID-tablets	51 57 78
Combi pack for Three-Chamber-Tester 4 in 1 20 DPD No.1/ RAPID-, 20 PHENOL RED / RAPID-, 20 ALK LR- 20 CyA-TEST-tablets	51 59 35
Combi pack for Three-Chamber-Tester 5 in 1 20 DPD No.1/ RAPID-, 20 PHENOL RED / RAPID-, 20 ALK LR- 20 CyA-TEST 20 CALC-tablets	51 59 85

* Each pack contains 12 units

Reagents

Item	Quantity	Code
ACID DEMAND	10 ml	15 60 09
ACIDIFYING GP	100 pc.	51 54 80BT
	250 pc.	51 54 81BT
ACIDIFYING PT	100 pc.	51 54 90
	250 pc.	51 54 91
ALK LR	100 pc.	51 60 40
CALC	100 pc.	51 57 20
COPPER No.1 ★	100 pc.	51 35 50BT
	250 pc.	51 35 51BT
DPD No.1 / RAPID ★	100 pc.	51 13 10BT
	250 pc.	51 13 11BT
	500 pc.	51 13 12BT
DPD No.3 / RAPID ★	100 pc.	51 12 90BT
	250 pc.	51 12 91BT
	500 pc.	51 12 92BT
DPD No.4 / RAPID ★	100 pc.	51 15 70BT
	250 pc.	51 15 71BT
	500 pc.	51 15 72BT
HYDROGENPEROXIDE HR	100 pc.	51 59 40
	250 pc.	51 59 41
PHENOL RED/RAPID	100 pc.	51 17 90BT
	250 pc.	51 17 91BT
	500 pc.	51 17 92BT
PHMB	100 pc.	51 61 00BT
	250 pc.	51 61 01BT
QAC HR	100 pc.	51 54 00
	250 pc.	51 54 01
Stabilizer CyA-TEST	100 pc.	51 13 70BT
	250 pc.	51 13 71BT

★ also suitable for seawater

Highlights

- Lovibond®-RAPID tablets DPD and PHENOL RED will dissolve quickly, have a guaranteed 10 year shelf-life and are provided in green-printed foil blister.
- Material Safety Data Sheets: www.lovibond.com

MINIKIT

Analysis	Type	Range	Methods: Tablet Count	Speed Test	Yes/No Test	Turbidity	Code
Alkalinity, Total-M	AF 413	10 - 500 mg/l $CaCO_3$ ≅ 0.1 - 5 mmol/l	■				41 41 30
Alkalinity, Total-M	AF 444	20 - 800 mg/l $CaCO_3$ ≅ 0.4 - 16 mmol/l		■			41 44 40
Alkalinity-P	AF 414	20 - 500 mg/l $CaCO_3$ ≅ 0.2 - 5 mmol/l	■				41 41 40
Calcium Hardness	AF 446	20 - 800 mg/l $CaCO_3$ ≅ 0.4 - 16 mmol/l		■			41 44 60
Calcium Hardness	AF 416	10 - 500 mg/l $CaCO_3$ ≅ 0.1 - 5 mmol/l	■				41 41 60
Chloride ✶	AF 418	5 - 5000 mg/l Cl	■				41 41 80
Cyanuric Acid , see Stabilizer							
QAC (Quaternary Ammonium Comp.)	AF 417	0 - 500 mg/l active QAC Limit 200 mg/l (Yes/No)	■		■		41 41 70
Sulphate ✶	AF 431	40 - 200 mg/l SO_4 (40 - 4000 mg/l by dilution)				■	41 43 10
Stabilizer	AF 422	20 - 200 mg/l Cyanuric Acid				■	41 42 20
Total Hardness	AF 424	5 - 500 mg/l $CaCO_3$ ≅ 0.05 - 5 mmol/l		■			41 42 40
Total Hardness	AF 445	20 - 800 mg/l $CaCO_3$ ≅ 0.4 - 16 mmol/l	■				41 44 50

✶ also suitable for seawater

The Methods

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

Tablet count method

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

Speed test

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

Yes/No test

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

Turbidity method

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

Highlights

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

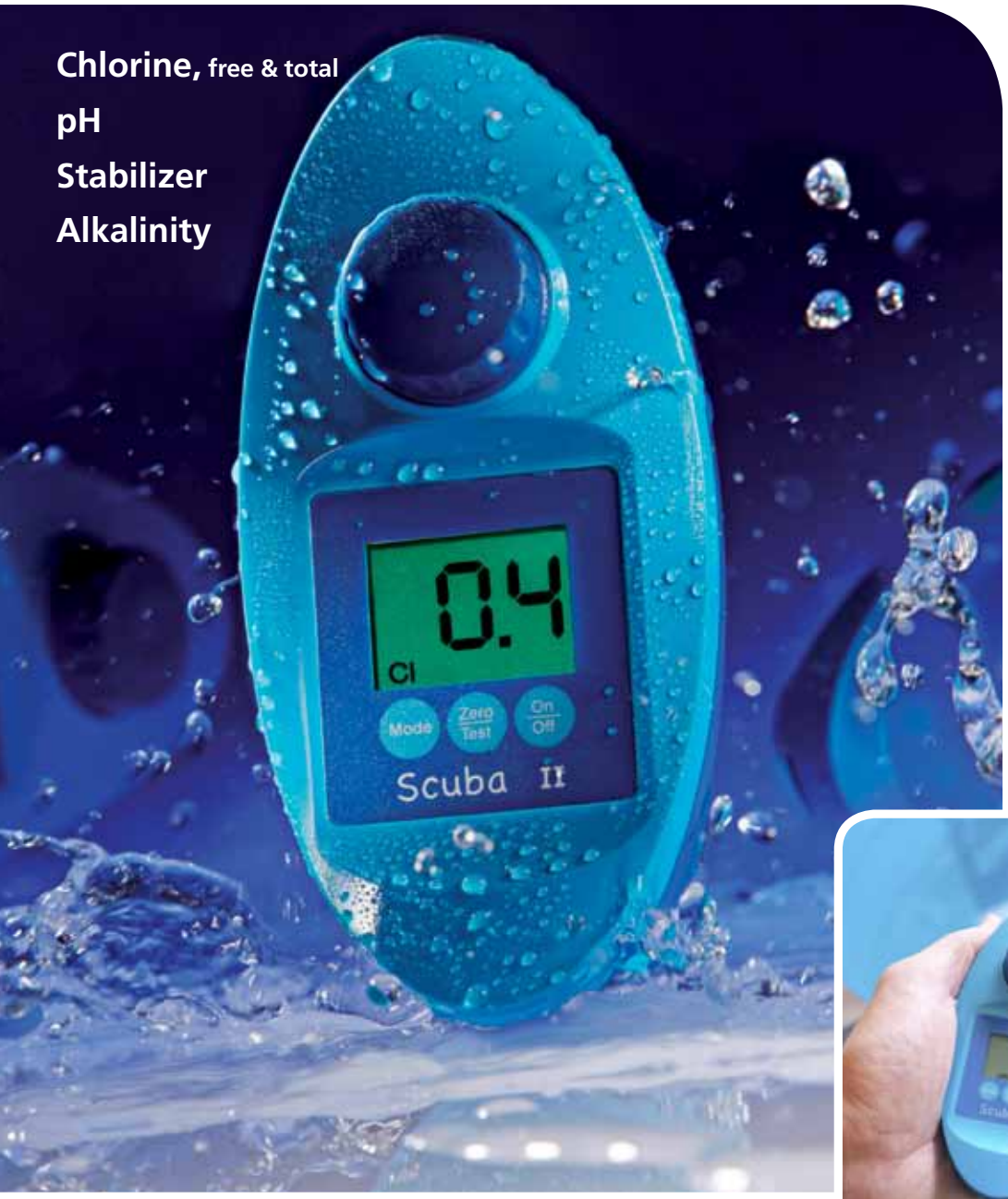
Tablet Reagents	Code	Quantity
ALKALINITY-M $BaCl_2$-Tablets	51 53 21 BT 51 51 10	250 100
ALK-TEST	51 55 70 BT	100
ALKALINITY-P	51 51 01	250
CAL-TEST	51 55 80	100
CALCIUM HARDNESS	51 51 90	100
CHLORIDE	51 51 31	250
QAC-Test	51 54 10 51 54 11	100 250
SULFATE	51 54 51 BT	250
CyA-TEST	51 13 70 BT	100
TOTAL HARDNESS	51 51 61 BT	250
T HARDNESS-TEST	51 55 90	100

Delivery content

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

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

Scuba II Electronic Pooltester



Test equipment for the responsible private swimming pool and whirlpool operator

Scuba II

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

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

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

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

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

Technical Data

Optics	temperature-compensated LED (λ = 530 nm) and photo-sensor
Power supply	2 batteries (AAA), capacity minimum 500 tests
Auto-Off	automatic switch-off approx. 5 minutes after last key press
Display	LCD
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
CE-Conformity	

Highlights

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

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

Refill pack

Article	Code
Refill pack for Scuba II 20 DPD No.1 Photometer tablets 10 DPD No.3 Photometer tablets 10 PHENOL RED Photometer tablets 10 CyA-Test tablets 10 Alka-M-Photometer tabletsn	52 56 00

Packaging unit = 12 packs

http://scuba-II.lovibond.com

Delivery content

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

Order code: 21 61 00

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
Stabilizer (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 (total)	0 - 300 mg/l $CaCO_3$	1.0 mg/l	± 50 mg/l

CHECKIT®Comparator

with
continuous
colour scales

Front view of the CHECKIT®Comparator with cells

Test Kit in carrying case, ready to use

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

Tablet reagents in foil blister strips

CHECKIT®Discs with continuous and stable scales

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

CHECKIT®Comparator

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

CHECKIT®Disc

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

Please see pages 20 onwards for tests, ranges and reagents

Highlights

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

CHECKIT®Comparator

Photo: Riviera Pool

Colorimeter for regular testing in Pools and Spas

Test Kits 2 in 1

Test Kit	Code
Chlorine 0 – 1.0 mg/l Cl_2* **pH value** 6.5 – 8.4 pH	14 70 16
Chlorine 0.1 – 2.0 mg/l Cl_2* **pH value** 6.5 – 8.4 pH	14 70 46
Chlorine 0 – 4.0 mg/l Cl_2* **pH value** 6.5 – 8.4 pH	14 70 26
Bromine 0 – 5.0 mg/l Br **pH value** 6.5 – 8.4 pH	14 72 85
Copper 0 – 1.0 mg/l Cu **pH value** 6.5 – 8.4 pH	14 72 35

Delivery content

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

Test Kit 5 in 1

Water Balance	Code
Chlorine 0 – 4.0 mg/l Cl_2* **pH value** 6.5 – 8.4 pH **Stabilizer** (turbidity method)* 20 – 200 mg/l Cys **Calcium hardness** (Speed-Test)* 20 – 800 mg/l $CaCO_3$ **Total Alkalinity** (Speed-Test)* 20 – 800 mg/ $CaCO_3$	14 70 28

Disc readings see following pages

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

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

Please see pages 20 onwards for tests, ranges and reagents

Single Parameter Test Kits

Test Kit	Range* (±5% Full Scale)	Reagent	Code
Aluminium	0 - 0.3 mg/l Al	Tablets	14 72 00
Ammonia ✶	0 - 1 mg/l N	Tablets	14 72 10
Bromine	0 - 5 mg/l Br	Tablets	14 72 80
Chlorine (DPD), free, comb., total ✶	0 - 1 mg/l Cl_2	Tablets	14 70 10
Chlorine (DPD), free, comb., total ✶	0 - 2 mg/l Cl_2	Tablets	14 70 40
Chlorine (DPD), free, comb., total ✶	0 - 4 mg/l Cl_2	Tablets	14 70 20
Chlorine (DPD) free+total ✶	0 - 3.5 mg/l Cl_2	Powder Reagents	14 70 52
Copper, free	0 - 1 mg/l Cu	Tablets	14 72 30
Copper, free + total ✶	0 - 5 mg/l Cu	Tablets	14 74 30
Iron ✶	1 - 10 mg/l Fe	Tablets	14 73 20
Iron ✶	0.05 - 1 mg/l Fe	Tablets	14 72 20
Ozone (DPD)	0 - 1.0 mg/l O_3	Tablets	14 72 75
Ozone (in presence of chlorine)	0 - 1.0 mg/l O_3	Tablets	14 72 70
pH value (Phenol red)	6.5 - 8.4 pH	Tablets	14 71 00
pH value (Bromocresol purple)	5.2 - 6.8 pH	Tablets	14 71 10
pH value (Universal)	4 - 10 pH	Tablets	14 71 30
Phosphate	0 - 4 mg/l PO_4	Tablets	14 72 40
Phosphate ✶	0 - 80 mg/l PO_4	Tablets	14 72 50
Sodiumhypochlorite	2 - 18 % NaOCl	Tablets	14 74 90
Total Alkalinity	20 - 240 mg/l $CaCO_3$	Tablets	14 74 50

* Disc readings see following pages

✶ also suitable for seawater

Plastic cells in pack, available: 5 cells - 14 55 05
10 cells - 14 55 00
100 cells - 14 55 10

Testpak

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

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

Testpaks: see following pages.

Delivery content

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

CHECKIT®Comparator

Tests, Test Kits, Testpaks, Discs, Reagents

Test	Range	Readings (Accuracy ± 5% Fullscale)	Test Kit	Testpak
Aluminium Tablets	0 - 0.3 mg/l Al	0 / 0.01 / 0.02 / 0.03 / 0.04 / 0.05 / 0.06 / 0.07 / 0.08 / 0.09 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3	14 72 00	14 77 00
Ammonia ✶ Tablets	0 - 1 mg/l N	0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.9 / 0.95 / 1.0	14 72 10	14 77 10
Bromine Tablets	0 - 5 mg/l Br	0 / 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2 / 1.4 / 1.6 / 1.8 / 2 / 2.5 / 3 / 3.5 / 4 / 4.5 / 5	14 72 80	14 77 80
Chlorine ✶ free, combined, total Tablets	0 - 1 mg/l Cl_2	0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.85 / 0.9 / 0.95 / 1.0	14 70 10	14 75 10
Chlorine ✶ free, combined, total Tablets	0 - 2 mg/l Cl_2	0 / 0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0 / 1.1 / 1.2 / 1.3 / 1.4 / 1.6 / 1.8 / 2.0	14 70 40	14 75 40
Chlorine ✶ free, combined, total Tablets	0 - 4 mg/l Cl_2	0 / 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2 / 1.4 / 1.6 / 1.8 / 2.0 / 2.5 / 3.0 / 3.5 / 4.0	14 70 20	14 75 20
Chlorine ✶ free, combined, total Powder Reagent	0 - 3.5 mg/l Cl_2	0 / 0.2 / 0.4 / 0.6 / 0.8 / 1 / 1.2 / 1.4 / 1.6 / 1.8 / 2 / 2.2 / 2.4 / 2.6 / 2.8 / 3 / 3.2 / 3.4 / 3.5	14 70 52	14 75 50, frei 14 75 51, gesamt
Copper, free (Cu^{2+}) Tablets	0 - 1 mg/l Cu	0 / 0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0	14 72 30	14 77 30
Copper HR free and total Tablets	0 - 5 mg/l Cu	0 / 0.5 / 1.0 / 1.5 / 2.0 / 2.5 / 3.0 / 3.5 / 4.0 / 4.5 / 5.0	14 74 30	14 79 30

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

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

Material Safety Data Sheets: www.lovibond.com

CHECKIT®Comparator

Tests, Test Kits, Testpaks, Discs, Reagents

Test	Range	Readings (Accuracy ± 5% Fullscale)	Test Kit	Testpak
Iron LR ✶ Tablets	0 - 1 mg/l Fe	0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.9 / 1.0	14 72 20	14 77 20
Iron HR ✶ Tablets	1 - 10 mg/l Fe	1 / 1.5 / 2 / 2.5 / 3 / 3.5 / 4 / 4.5 / 5 / 5.5 / 6 / 6.5 / 7 / 7.5 / 8 / 8.5 / 9 / 10	14 73 20	14 78 20
Ozone (DPD) Tablets	0 - 1.0 mg/l O_3	0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.9 / 1.0	14 72 75	14 77 75
Ozone (DPD) in the presence of chlorine	0 - 1.0 mg/l O_3	0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.9 / 1.0	14 72 70	14 77 70
pH Tablets	5.2 - 6.8 pH	5.2 / 5.3 / 5.4 / 5.5 / 5.6 / 5.7 / 5.8 / 5.9 / 6.0 / 6.1 / 6.2 / 6.3 / 6.4 / 6.5 / 6.6 / 6.7 / 6.8	14 71 10	14 76 10
pH Tablets	4 - 10 pH	4 / 4.5 / 5 / 5.5 / 6 / 6.5 / 7 / 7.5 / 8 / 8.5 / 9 / 9.5 / 10	14 71 30	14 76 30
Phosphate HR ✶ Tablets	0 - 80 mg/l PO_4	0 / 5 / 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50 / 55 / 60 / 65 / 70 / 75 / 80	14 72 50	14 77 50
Phosphate LR Tablets	0 - 4 mg/l PO_4	0 / 0.25 / 0.5 / 0.75 / 1.0 / 1.25 / 1.5 / 1.75 / 2.0 / 2.25 / 2.5 / 2.75 / 3.0 / 3.25 / 3.5 / 3.75 / 4.0	14 72 40	14 77 40
Sodiumhypochlorite Tablets	2 - 18 %	2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15 / 16 / 18	14 74 90	14 79 90
Total Alkalinity Tablets	20 - 240 mg/l $CaCO_3$	20 /30 / 40 / 50 / 60 / 70 / 80 / 90 / 100 / 110 / 120 / 130 140 / 150 / 160 / 170 / 180 / 190 / 200 / 220 / 240	14 74 50	14 79 50

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

Disc	Reagents	Quantity	Code
14 62 20	IRON LR (Fe^{2+} and Fe^{3+})	100	51 53 70 BT
		250	51 53 71 BT
	IRON (II) LR (Fe^{2+})	100	51 54 20 BT
14 63 20	IRON HR	100	51 53 80
		250	51 53 81
14 62 75	DPD No. 4	100	51 12 20 BT
		250	51 12 21 BT
14 62 70	DPD No. 4	100	51 12 20 BT
		250	51 12 21 BT
	DPD Glycine	100	51 21 70 BT
		250	51 21 71 BT
14 61 10	BROMOCRESOL PURPLE	100	51 17 30
		250	51 17 31
14 61 30	UNIVERSAL PH	100	51 54 40
		250	51 54 41
14 62 50	PHOSPHATE HR	100	51 19 80
		250	51 19 81
14 62 40	PHOSPHATE No. 1 LR	100	51 30 40
		250	51 30 41
	PHOSPHATE No. 2 LR	100	51 30 50 BT
		250	51 30 51 BT
	Combi pack#	each 100	51 76 51 BT
	PHOSPHATE No.1 LR / No.2 LR	each 250	51 76 52 BT
14 64 90	CHLORINE HR (KI)	100	51 30 00 BT
		250	51 30 01 BT
	ACIDIFYING GP	100	51 54 80 BT
		250	51 54 81 BT
	Combi pack#	each 100	51 77 21 BT
	CHLORINE HR (Ki)/ACIDIFYING GP	each 250	51 77 22 BT
	Dilution set for sample preparation	1	41 44 70
14 64 50	ALKACHECK	100	51 32 00 BT
		250	51 32 01 BT

Material Safety Data Sheets: www.lovibond.com

Comparator 2000+

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

Comparator 2000+

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

Discs

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

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

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

Cells

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

Lightning unit

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

Please see pages 28 onwards for tests, ranges and reagents

Highlights

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

Lighting unit, battery operated

Comparator 2000+

Disc

Test Kits 2000+

Photo: Riviera Pool

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

Type*	Test Kits	Code
AF 118 S	**Chlorine** 0.1 – 1.0 mg/l, Type 3/40 A** **Chlorine** 1.0 – 4.0 mg/l, Type 3/40 S** **pH value** 5.2 – 6.8, Type 2/1 G **pH value** 6.8 – 8.4, Type 2/1 J	41 11 81
AF 129	**Water Balance** **Chlorine** 0.2 – 4.0 mg/l, Type 3/40 B** **pH value** 6.8 – 8.4, Type 2/1 J **Total Alkalinity-M***** 0 – 500 mg/l $CaCO_3$ Tablet Count Method **Calcium Hardness***** 0 – 1000 mg/l $CaCO_3$ Tablet Count Method	41 12 90

Type*	Test Kits	Code
AF 405 M	**Municipal Kit** **Chlorine** 0.2 – 4.0 mg/l, Type 3/40 B** **pH value** 6.8 – 8.4, Type 2/1 J **Stabilizer***** 20 – 200 mg/l Cyanuric Acid Turbidity Method **Total Alkalinity-M***** 20 – 800 mg/l $CaCO_3$ Speed-Test **Calcium Hardness***** 20 – 800 mg/l $CaCO_3$ Speed-Test	41 40 51

* Disc readings see following pages

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

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

Comparator 2000+ and Accessories

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

Glass Cells

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

Plastic Cells

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

Delivery content

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

Daylight unit, mains operated

Compararator 2000+

Test Kit

Plastic cells

Comparator 2000+

Tests, Discs, Reagents, Cells

Test	Disc	Disc Readings	Range	Code
Aluminium	3/127 A	0; 0.05; 0.1; 0.15; 0.2; 0.25; 0.3; 0.4; 0.5 mg/l	0 - 0.5 mg/l	23 02 05
Ammonia ✶	3/112	0; 0.05; 0.1; 0.15; 0.2; 0.25; 0.3; 0.35; 0.4 mg/l	0 - 0.4 mg/l NH4	23 00 60
Ammonia	3/113	0; 0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.8; 1 mg/l	0 - 1.0 mg/l N	23 00 70
Bromine ✶	3/53A	0.2; 0.4 ; 0.6; 0.8; 1; 1.2; 1.4; 1.6; 2 mg/l	0.2 - 2.0 mg/l	23 53 10
Bromine ✶	3/53B	1; 2; 3; 4; 5; 6; 7; 8; 10 mg/l	1.0 - 10 mg/l	23 53 20
Bromine ✶	3/53C	0.5; 1; 1.5; 2; 2.5; 3; 4; 5; 6 mg/l	0.5 - 6 mg/l	23 53 30
Chlorine ✶ free, combined, total	3/40A	0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.7; 0.8; 1 mg/l	0.1 - 1.0 mg/l	23 40 10
Chlorine ✶ free, combined, total	3/40J	0.1; 0.2; 0.3; 0.4; 0.6; 0.8; 1; 1.5; 2 mg/l	0.1 - 2.0 mg/l	23 41 40
Chlorine ✶ free, combined, total	3/40B	0.2; 0.4; 0.6; 1; 1.5; 2; 2.5; 3; 4 mg/l	0.2 - 4.0 mg/l	23 40 20

✶ also suitable for seawater, # including stirring rod

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

Reagents	Quantity	Code	Accessories	Code
ALUMINIUM No.1	100	51 54 60 BT	13.5 mm cell, 10ml	35 42 43
	250	51 54 61 BT		
ALUMINIUM No.2	100	51 54 70 BT		
	250	51 54 71 BT		
Combi pack#	each 100	51 76 01 BT		
ALUMINIUM No.1 / No.2	each 250	51 76 02 BT		
AMMONIA No.1	100	51 25 80 BT	40 mm cell W680/40	60 68 90
	250	51 25 81 BT		
AMMONIA No.2	100	51 25 90 BT		
	250	51 25 91 BT		
Combi pack#	each 100	51 76 11 BT		
AMMONIA No.1 / No.2	each 250	51 76 12 BT		
AMMONIA No.1/2			13.5 mm cell, 10ml	35 42 43
DPD No.1	100	51 10 50 BT	13.5 mm cell, 10ml	35 42 43
	250	51 10 51 BT		
	500	51 10 52 BT		
DPD No.1			13.5 mm cell, 10ml	35 42 43
DPD No.1			13.5 mm cell, 10ml	35 42 43
DPD No.1	100	51 10 50 BT	13.5 mm cell, 10ml	35 42 43
	250	51 10 51 BT		
	500	51 10 52 BT		
DPD No.1 HIGH CALCIUM*	100	51 57 40 BT		
DPD No.2	100	51 15 30 BT		
	250	51 15 31 BT		
	500	51 15 32 BT		
DPD No.3	100	51 10 80 BT		
	250	51 10 81 BT		
	500	51 10 82 BT		
DPD No.3 HIGH CALCIUM*	100	51 57 30 BT		
Combi pack#	each 100	51 77 11 BT		
DPD No.1 / No.3	each 250	51 77 12 BT		
Combi pack#	each 100	51 77 81 BT		
DPD No.1 / No.3 HIGH CALCIUM*	each 250	51 77 82 BT		
DPD No.4	100	51 12 20 BT		
	250	51 12 21 BT		
	500	51 12 22 BT		
DPD No.1/2/3/4			13.5 mm cell, 10ml	35 42 43
DPD No.1/2/3/4			13.5 mm cell, 10ml	35 42 43

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

Comparator 2000+

Tests, Discs, Reagents, Cells

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

✶ also suitable for seawater, # including stirring rod

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

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

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

Ensures water is sampled at the optimum depth.

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

Comparator 2000+

Tests, Discs, Reagents, Cells

Test	Disc	Disc Readings	Range	Code
Nitrate	3/142	10; 20; 30; 40; 50; 60; 70; 80; 100 mg/l	10 -100 mg/l NO3	23 03 60
Ozone (DPD)	3/67	0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.7; 0.8; 1 mg/l	0.1 - 1.0 mg/l	23 67 00
Ozone (DPD)	3/67A	0.01; 0.02; 0.03; 0.04; 0.05; 0.06; 0.07; 0.08; 0.1 mg/l	0.01 - 0.1 mg/l	23 67 10
Ozone (Indigo)	3/148	0; 0.05; 0.1; 0.15; 0.2; 0.25; 0.3; 0.4; 0.5 mg/l	0 - 0.5 mg/l	23 04 40
pH	2/1G	5.2; 5.4; 5.6; 5.8; 6; 6.2; 6.4; 6.6; 6.8	5.2 - 6.8 pH	22 11 00
pH	2/1J	6.8; 7; 7.2; 7.4; 7.6; 7.8; 8; 8.2; 8.4	6.8 - 8.4 pH	22 11 30
pH	2/1P	4; 5; 6; 7; 8; 9; 9.4; 10; 11	4.0 - 11 pH	22 12 20
Phosphate	3/136	0; 5; 10; 15; 20; 25; 30; 35; 40 mg/l	0 - 40 mg/l PO4	23 03 10
Phosphate	3/70	0; 10; 20; 30; 40; 50; 60; 70; 80; 100 mg/l	0 - 100 mg/l PO4	23 70 00
QAC (Quaternary Ammonia Compounds)	3/118	0; 2; 4; 6; 8; 10; 12; 15; 20 mg/l	0 - 20 mg/l	23 01 20
QAC (Quaternary Ammonia Compounds)	3/119	0; 20; 40; 60; 80; 100; 120; 150; 200 mg/l	0 - 200 mg/l	23 01 30
Sodiumhypochlorite	3/2 Hypo	2; 4; 6; 8; 10; 12; 14; 16 %	2 - 16 %	23 21 10

* also suitable for seawater, # including stirring rod
* alternative reagent, used instead of DPD No.1 in case of turbidity in the water sample caused by high concentration of calcium and/or high conductivity

Reagents	Quantity	Code	Accessories	Code
NITRATE No.1	100	51 31 10	13.5 mm cell, 10 ml	35 42 43
	250	51 31 11		
NITRATE No.2	100	51 31 20		
	250	51 31 21		
Combi pack#	each 100	51 76 41		
Nitrate No.1 / No.2	each 250	51 76 42		
DPD No.4	100	51 12 20 BT	13.5 mm cell, 10 ml	35 42 43
	250	51 12 21 BT		
DPD No.4	100	51 12 20 BT	40 mm cell W680/40	60 68 90
	250	51 12 21 BT		
OZONE-INDIGO	100	51 31 70	40 mm cell W680/40	60 68 90
	250	51 31 71		
BROMOCRESOL PURPLE	100	51 17 30	13.5 mm cell, 10 ml	35 42 43
	250	51 17 31		
PHENOL RED	100	51 17 50 BT	13.5 mm cell, 10 ml	35 42 43
	250	51 17 51 BT		
UNIVERSAL PH	25 ml	45 17 70	13.5 mm cell, 10 ml	35 42 43
Indicator	100 ml	45 17 71		
	250 ml	45 17 72		
	500 ml	45 17 73		
PHOSPHATE HR	100	51 19 80	13.5 mm cell, 10 ml	35 42 43
	250	51 19 81		
PHOSPHATE HR	100	51 19 80	13.5 mm cell, 10 ml	35 42 43
	250	51 19 81		
QAC LR	100	51 53 90 BT	40 mm cell W680/40	60 68 90
	250	51 53 91 BT		
QAC HR	100	51 54 00	13.5 mm cell, 10 ml	35 42 43
	250	51 54 01		
CHLORINE HR (KI)	100	51 30 00 BT	13.5 mm cell, 10 ml	35 42 43
	250	51 30 01 BT		
ACIDIFYING GP	100	51 54 80 BT		
	250	51 54 81 BT		
Combi pack#	each 100	51 77 21 BT		
CHLORINE HR (KI)/ ACIDIFYING GP	each 250	51 77 22 BT		
Dilution set for sample preparation	1	41 44 70		

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

PHOTOMETRY

MD 100

MD 200

PM 600 & 620


10 ml
10 ml
10 ml
ovibond.com

Photometry

The History

Several decades have passed since the appearance of the first Lovibond® PC 100 photometer system.

Since that time, Tintometer has become a world-famous name as the manufacturer of photometer systems sold under the brand name of Lovibond®.

Our range of photometer systems extends from the **MD 100** as hand-held model over the multi parameter photometer **MD 200** as desktop model to the **SpectroDirect** spectrophotometer for laboratories.

The multi-functional **PM 600 & 620 photometers** provide the answer to all requirements relating to the analysis of water used in modern swimming pools and baths. They offer a wide variety of pre-programmed methods and are therefore suitable for the demands of modern water analysis.

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

Parameter	MD 100	MD 200	PM 620	PM 600
Alkalinity-M (total)	■	■	■	■
Aluminium			■	
Ammonia			■	
Bromine	■	■	■	■
Calcium Hardness	■	■	■	■
Chlorine	■	■	■	■
Chlorine Dioxide		■	■	
Copper		■	■	■
Hydrogen Peroxide		■	■	
Iodine			■	
Iron (Fe^{2+}, Fe^{3+}), soluble		■	■	■
Langelier Water Balance			■	■

MD 100

MD 200

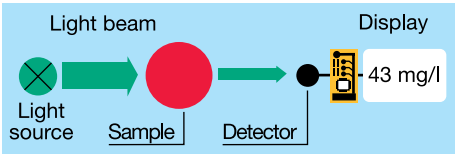
PM Photometer

Parameter	MD 100	MD 200	PM 620	PM 600
Oxygen, active			■	
Ozone			■	■
pH value	■	■	■	■
PHMB (Biguanides)			■	
Phosphate			■	■
Sodium Hypochlorite			■	■
Stabilizer (Cyanuric acid)	■	■	■	■
Sulphate			■	
Total Hardness			■	
Turbidity (nephelometric), see TurbiCheck page 66				
Urea		■	■	

The photometric principle

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

When a light beam passes through the coloured sample, energy with a specific wavelength is absorbed by the test substance. The photometer determines the coloration of the sample by measuring the transmission or absorption of light of this wavelength (in other words, monochromatic light). The photometer then uses a microprocessor to calculate the required concentration and displays the result.




MD 600


SpectroDirect


TurbiCheck

MD 100 Photometer

Precise Water Analysis in Ergonomic Design

Please see pages 50 onwards for reagents (order codes)

Highlights

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

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

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

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

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

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

Scroll Memory

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

Zero Setting (OTZ)

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

Please see pages 50 onwards for reagents (order codes)

2in1

Test	Code
Chlorine, pH, tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 6.5 - 8.4 pH	27 80 20
Chlorine, pH, liquid reagent 0.02 - 4 mg/l Cl_2 / 6.5 - 8.4 pH	27 80 25
Chlorine, pH powder reagents for chlorine 0.02 - 2.0 mg/l Cl_2 (ø 24 mm glass vial) 0.1 - 8.0 mg/l Cl_2 (ø 10 mm multi vial-2) 6.5 - 8.4 pH	27 80 30

3in1

Test	Code
Chlorine, pH, Stabilizer tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 6.5 - 8.4 pH ; 2 - 160 mg/l cyanuric acid	27 80 10
Chlorine, pH, Stabilizer liquid reagent for chlorine and pH 0.02 - 4 mg/l Cl_2 / 6.5 - 8.4 pH 2 - 160 mg/l cyanuric acid	27 80 15
Chlorine, pH, Alkalinity-M (total) tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 6.5 - 8.4 pH ; 5 - 200 mg/l $CaCO_3$ (TA)	27 80 60
Chlorine, pH, Alkalinity-M (total) liquid reagent for chlorine and pH 0.02 - 4 mg/l Cl_2 / 6.5 - 8.4 pH 5 - 200 mg/l $CaCO_3$ (TA)	27 80 65

4in1

Test	Code
Chlorine, pH, Stabilizer, Alkalinity-M (total) tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 6.5 - 8.4 pH ; 2 - 160 mg/l cyanuric acid 5 - 200 mg/l $CaCO_3$ (TA)	27 80 70
Chlorine, pH, Stabilizer, Alkalinity-M (total) liquid reagent for chlorine and pH 0.02 - 4 mg/l Cl_2 / 6.5 - 8.4 pH 2 - 160 mg/l cyanuric acid / 5 - 200 mg/l $CaCO_3$ (TA)	27 80 75

5in1

Test	Code
Chlorine, pH, Stabilizer, Alkalinity-M (total), Calcium hardness tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 6.5 - 8.4 pH ; 2 - 160 mg/l cyanuric acid 5 - 200 mg/l $CaCO_3$ (TA) ; 0 - 500 mg/l $CaCO_3$ (CaH)	27 80 80

6in1

Test	Code
Chlorine, Bromine, pH Stabilizer, Alkalinity-M (total), Calcium hardness tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 0.05 - 13 mg/l Br ; 6.5 - 8.4 pH 2 - 160 mg/l cyanuric acid 5 - 200 mg/l $CaCO_3$ (TA) ; 0 - 500 mg/l $CaCO_3$ (CaH)	27 80 90

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

MD 100 Photometer

Technical Data

Optics	LEDs, interference filters (IF) and photo sensor in transparent sample chamber. Depending on the version, up to 3 different interference filters are used. Wavelength specifications of interference filters: 430 nm 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
Power Supply	4 micro batteries (AAA), capacity approx. 17 hours or 5000 tests
Auto - OFF	automatic switch-off
Display	backlit LCD (on keypress)
Storage	internal ring memory for 16 data sets
Interface	infrared interface for test data transfer
Additional feature	real time clock and date
Calibration	factory calibration and user calibration. Reset to factory calibration possible
Dimensions	155 x 75 x 35 mm (L x W x H)
Weight	basic unit approx. 260 g
Environmental conditions	temperature: 5 – 40 °C rel. humidity: 30 – 90% (non condensing)
CE-Conformity	

[4] tested with standard solutions

Delivery Content

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

Manufacturers Test Certificate M

Besides the "Certificate of Compliance" which is supplied with the MD 100, manufacturers test certificates M are available at cost on request. Manufacturers test certificates M are individually supplied per instrument and per method.

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

Please see pages 50 onwards for reagents (order codes)

Accessories

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

Data Transfer

The optional available IRiM (infra-red interface module) uses infra-red technology to transmit measurement data from the MD 100 photometer to one of 3 optional interfaces. These interfaces can be used to connect to a PC, a USB printer[1)] or alternatively a serial printer[2)].

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

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

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

[1)] USB printer: HP Deskjet 6940 ; [2)] each ASCII printer

Windows® is a registered Trademark of Microsoft Corporation

Verification Standard Kit

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

Verification Standard Kit 21 56 70

Reference Standard Kits

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

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

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

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

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

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

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

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

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

MD 200 Photometer

Precise results using high-quality interference filters

Highlights

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

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

2in1

Test	Code
Chlorine, pH, tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 6.5 - 8.4 pH	28 89 402
Chlorine, pH, liquid reagents 0.02 - 4 mg/l Cl_2 / 6.5 - 8.4 pH	28 89 412
Copper, pH tablet reagents 0.05 - 5 mg/l Cu / 6.5 - 8.4 pH	28 72 102
Hydrogen peroxide, pH (no OTZ) liquid reagents 1 - 50 mg/l H_2O_2 / 40 - 500 mg/l H_2O_2 6.5 - 8.4 pH	28 88 102

3in1

Test	Code
Chlorine, pH, Bromine tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 6.5 - 8.4 pH / 0.05 - 13 mg/l Br	28 61 802
Chlorine, pH, Stabilizer tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid	28 60 102
Chlorine, pH, Stabilizer liquid reagents for chlorine and pH 0.02 - 4 mg/l Cl_2 / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid	28 82 002
Chlorine, pH, Alkalinity-M tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 6.5 - 8.4 pH / 5 - 200 mg/l $CaCO_3$ (TA)	28 89 002
Chlorine, pH, Alkalinity-M liquid reagents for chlorine and pH 0.02 - 4 mg/l Cl_2 / 6.5 - 8.4 pH 5 - 200 mg/l $CaCO_3$ (TA)	28 89 302

4in1

Test	Code
Chlorine, pH, Stabilizer, Alkalinity-M tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 5 - 200 mg/l $CaCO_3$ (TA)	28 60 502
Chlorine, pH, Stabilizer, Alkalinity-M liquid reagents for chlorine and pH 0.02 - 4 mg/l Cl_2 / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid / 5 - 200 mg/l $CaCO_3$ (TA)	28 60 542

5in1

Test	Code
Chlorine, pH, Stabilizer, Alkalinity-M, Calcium hardness tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 5 - 200 mg/l $CaCO_3$ (TA) / 0 - 500 mg/l $CaCO_3$ (CaH)	28 61 202

6in1

Test	Code
Chlorine, Bromine, pH, Stabilizer, Alkalinity-M, Calcium hardness tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 0.05 - 13 mg/l Br / 6.5 - 8.4 pH 0 - 160 mg/l cyanuric acid / 5 - 200 mg/l $CaCO_3$ (TA) 0 - 500 mg/l $CaCO_3$ (CaH)	28 61 902
Chlorine, pH, Stabilizer, Alkalinity-M, Copper, Iron tablet reagents 0.01 - 6.0 mg/l Cl_2 / 0.1 - 10 mg/l Cl_2* 6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid 5 - 200 mg/l $CaCO_3$ (TA) / 0.05 - 5 mg/l Cu 0.02 - 1 mg/l $Fe^{2+/3+}$	28 62 102

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

Delivery Content

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

MD 200 Photometer

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

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

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

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

Scroll Memory (SM)

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

Zero Setting (OTZ)

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

Technical Data

Optics	LEDs, interference filters (IF) and photo sensor in transparent sample chamber. Depending on the version, up to 3 different interference filters are used. Wavelength specifications of interference filters: 430 nm 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
Power Supply	4 batteries (AA), capacity approx. 53 hours or 15000 tests (continuous operation without display lighting)
Auto - OFF	automatic switch-off
Display	backlit LCD (on keypress)
Storage	internal ring memory for 16 data sets
Interface	infrared interface for test data transfer to IRiM
Additional feature	real time clock and date
Calibration	factory calibration and user calibration. Reset to factory calibration possible
Dimensions	190 x 110 x 55 mm (L x W x H)
Weight	basic unit approx. 455 g (with batteries)
Environmental conditions	temperature: 5 – 40 °C rel. humidity: 30 – 90% (non condensing)
CE-Conformity	

[4] tested with standard solutions

Accessories

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

Please see pages 50 onwards for reagents (order codes)

Data Transfer

The optional available IRiM (infra-red interface module) uses infra-red technology to transmit measurement data from the MD 200 photometer to one of 3 optional interfaces. These interfaces can be used to connect to a PC, a USB printer[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.

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

[1)] USB printer: HP Deskjet 6940 ; [2)] each ASCII printer

Windows® is a registered Trademark of Microsoft Corporation

Manufacturers Test Certificate M

Besides the "Certificate of Compliance" which is supplied with the MD 200, manufacturers test certificates M are available at cost on request. Manufacturers test certificates M are individually supplied per instrument and per method.

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

Verification Standard Kit

The verification standard kit for the MD 200 is designed to assure the user of the accuracy and the reliability of the results.
The kit contains one zero standard, 6 different vials for checking 6 different wave lengths and allows for checking the complete range of MD 200 photometers.
The shelf life of the verification standard kit is two years from the date of production, provided that storage and use are in accordance with the instructions provided.
Measurements are taken in mAbs.

Verification Standard Kit 21 56 70

Reference Standard Kits

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

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

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

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

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

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

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

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

Please see pages 50 onwards for reagents (order codes)

PM 600 & 620 Photometers

NEW

Highlights

- Two units – 13 or 34 parameters
- Hand-held and portable for ease-of-use
- Fully waterproof (IP68)* for anytime, anyplace analysis
- Robust casing for guaranteed longevity
- Back-lit display for enhanced viewing
- PC compatibility – stores up to 1000 results
- Assured Lovibond® accuracy
- Self-contained in sturdy case with accessories and space for additional re-agents

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

Active oxygen
Alkalinity-M (total)
Aluminium
Ammonia
Bromine
Calcium hardness
Chlorine
Chlorine dioxide
Copper
Hardness, total
Hardness, calcium
Hydrogen peroxide
Iron
Iodine
Langelier Index
Ozone
pH
PHMB (Biguanide)
Phosphate
Sulphate
Sodium Hypochlorite
Stabilizer (Cyanuric acid)
Urea
Water Balance

Assignment of parameters, see pages 36 and 37

Photometers PM 600 / PM 620

The PM 600 and PM 620 photometer range brings pool testing to the next level for discerning pool operators. The ergonomic, portable, waterproof design enables users to select just one unit for accurate analysis of up to 34 parameters anytime and anyplace.

The **PM 600** focusses on the main pool parameters required for balanced water including: Alkalinity, Bromine, Chlorine, Cyanuric Acid, Iron, Calcium Hardness, Copper, Sodium Hypochlorite, Ozone and pH-value. Compatible with the tried and trusted Lovibond® Tablet reagents, it is designed to be robust, reliable yet easy-to-use for any pool operator.

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

Both units offer a large, back-lit graphic display to aid analysis by providing on-screen method prompts, information regarding test measurement range and reagent type and automatic countdown timers for accurate reaction periods. The internal memory is capable of storing up to 1000 results with date, time and sample ID. These results can be reviewed at any time and can be downloaded to a PC via an additional Infra-Red module (IRiM)*.

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

* available as an option : IRiM (infra-red interface

Please see pages 50 onwards for reagents (order codes)

Technical Data

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

[1] optional available: IRiM (Infrared Interface Modul)
[2] optional available: connection cable with integrated electronics (RS 232 / RJ-45 plug)
* tested with standard solutions

Reference Standard Kits

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

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

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

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

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

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

Reference Standard Kit pH 21 56 65
7.45* pH

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

[1)] The standard values mentioned in kit 215630 for the VARIO method are for photometer PM 620 only, because this method is not available in the PM 600

Verification Standard Kit

The verification standard kit for the PM 600 and PM 620 photometers is designed to reassure the user about the accuracy and the reliability of the results.
The shelf life of the verification standard kit is two years from the date of production, provided that storage and use are in accordance with the instructions provided.
Measurements are taken in mAbs.

Verification Standard Kit **21 56 80**

Delivery Content

- Instrument in carrying case
- 4 batteries (AA)
- 3 round vials 24 mm ø
- 1 syringe, 1 brush, 1 stirring rod
- 1 plastic beaker 100 ml
- Guarantee sheet
- Certificate of Compliance
- Instruction Manual

PM 600
- 100 tablet reagents each for chlorine (free, combined, total), pH value, calcium hardness, alkalinity-M
  Order code: 21 40 60

PM 620
- 100 tablet reagents each for chlorine (free, combined, total), pH value, stabilizer, alkalinity-M
  Order code: 21 40 65

Reagents

History

For more than thirty years, Tintometer has been manufacturing reagents for water testing and marketing these reagents around the world under the brand name Lovibond®.

Different forms of reagents are required for different fields of application. It is fair to say that, in terms of quality, tablet reagents are the best form of reagent. Thanks to production techniques of the type used in the pharmaceutical industry and stringent internal quality standards, Tintometer is able to produce tablet reagents for water testing with a guaranteed shelf life of 5 or 10 years. These tablets are individually sealed in high-grade, polyethylene-coated aluminium foil and represent the reagent form of choice for everyday water testing applications.

Users in different countries traditionally prefer forms of reagent other than tablets. Lovibond® powder reagents are designed to allow fast and easy testing.

Powder reagents are packed in aluminium foil for a wide range of applications and represent an alternative reagent form recently introduced by Tintometer.

Last but not least, liquid reagents are indispensable for many testing tasks. Testing for substances that are hard to detect, for parameters like total nitrogen, or for the aggregate parameter COD, require the use of a wide range of reagents in a form that permits more "aggressive" sample processing. The Lovibond® programme is rounded off by reagent tests and tube tests, making Tintometer the only reagent producer in the world that offers a complete range of reagent forms.

Tablets

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

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

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

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

Now we have improved even further on this highly successful format to the tight quality control processes, integral to our tablet manufacturing process, and integral test procedures, we have added new blister packaging.

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

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

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

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

As a result of improved sealing efficiency, the blister pack has been reduced in size to 91 x 34mm making them even more convenient for storage and shipping.

'BT' is added to the end of the code to identify the new style of packaging, for example – 511060BT.

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

Specification and Certificate of Analysis

To express the high quality standard of Lovibond® tablet reagents, specification for each type of tablet as well as a "Certificate of Analysis" for each lot is available in the down-load area at www.lovibond.com.

Liquids

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

The useful life of liquid reagents is reduced by temporary contact with oxygen in the air when the bottle is opened as well as by unsuitable storage environments (presence of sunlight or high temperatures). Provided that the bottles are stored within the temperature range +6°C to +10°C, the Lovibond® DPD and Phenol Red solutions can be used for a period of one year from the production date.

VARIO Powder Packs

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

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

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

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

Their chemical properties are suitable also for use with Hach-Photometer-Systems.

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

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

Membrane filter set

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

Advantage

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

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

Order code: 36 61 50
(covers 25 x 0.45 µm membrane filters and two 20 ml syringes)

Reagents

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

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

For other reagent quantities please see our current price list.

Legend

[1] Deutsche Einheitsverfahren zur Wasser-, Abwasser- und Schlamm- Untersuchung
[2] Standard Methods for the Examination of Water and Wastewater, 18th Edition; 1992
[3] Photometrische Analysenverfahren, Schwedt, Wissenschaftliche Verlagsgesellschaft mbH, Stuttgart; 1989
[4] Photometrische Analyse, Lange/Vejdelek, Verlag Chemie; 1980
[5] Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond®

Display	Reagent	Form of reagent/Quantity	Order code
	ALKA-M-PHOTOMETER	Tablet / 100	51 32 10 BT
$CaCO_3$	ALKA-M-PHOTOMETER	Tablet / 100	51 32 10 BT
$CaCO_3$	ALKA-M-HR-PHOTOMETER	Tablet / 100	51 32 40 BT
Al	VARIO Aluminum ECR/F20 VARIO Aluminum Hexamine/F20 VARIO Aluminum ECR Masking Reagent	Powder Pack / 100 Powder Pack / 100 Liquid reagent / 25 ml **Set**	 53 50 00
Al	ALUMINIUM No. 1 ALUMINIUM No. 2 Combi pack# ALUMINIUM No.1 / No.2 Combi pack# ALUMINIUM No.1 / No.2	Tablet / 100 Tablet / 100 each 100 each 250	51 54 60 BT 51 54 70 BT 51 76 01 BT 51 76 02 BT
N	AMMONIA No. 1 AMMONIA No. 2 Combi pack# AMMONIA No.1 / No.2 Combi pack# AMMONIA No.1 / No.2 Ammonia conditioning powder (for seawater)	Tablet / 100 Tablet / 100 each 100 each 250 Powder / 15 g / 100 Tests	51 25 80 BT 51 25 90 BT 51 76 11 BT 51 76 12 BT 46 01 70
N	VARIO Ammonia Salicylate F10 VARIO Ammonia Cyanurate F10	Powder Pack / 100 Powder Pack / 100 **Set**	 53 55 00
Br	DPD No. 1 DPD No. 1 HIGH CALCIUM [e]	Tablet / 100 Tablet / 100	51 10 50 BT 51 57 40 BT
Cl_2	DPD No. 1 DPD No. 3 Combi pack# DPD No.1 / No.3 Combi pack# DPD No.1 / No.3 DPD No. 1 HIGH CALCIUM [e] DPD No. 3 HIGH CALCIUM [e] Combi pack# DPD No.1 / No.3 HIGH CALCIUM [e] Combi pack# DPD No.1 / No.3 HIGH CALCIUM [e]	Tablet / 100 Tablet / 100 each 100 each 250 Tablet / 100 Tablet / 100 each 100 each 250	51 10 50 BT 51 10 80 BT 51 77 11 BT 51 77 12 BT 51 57 40 BT 51 57 30 BT 51 77 81 BT 51 77 82 BT
Cl_2	DPD No. 1 HR DPD No. 3 HR	Tablet / 100 Tablet / 100	51 15 00 BT 51 15 90 BT
Cl_2	DPD 1 Buffer solution DPD 1 Reagent solution DPD 3 Solution	Liquid reagent / 15 ml Liquid reagent / 15 ml Liquid reagent / 15 ml **Set**	47 10 10 47 10 20 47 10 30 47 10 56

[a] determination of free, combined and total
[e] alternative reagent, used instead of DPD No.1 / DPD No.3 in case of turbidity in the water sample caused by high concentration of calcium and/or high conductivity
[f] additionally required for determination of chlorine dioxide / 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

Reagents

Test	Range	Wavelength λ / nm MD 100	MD 200	PM 600	PM 620	Method	Cuvette
Chlorine [a)] Powder reagent	0.02 - 2 mg/l 0.1 - 8 mg/l	530 530	- -	- -	530 530	DPD [1, 2]	24 mm ø 24 mm ø multy vial
Chlorine dioxide Tablets	0.02 - 11 mg/l	-	530	-	530	DPD/Glycine [1,2]	24 mm ø
Copper [a)] Tablets	0.05 - 5 mg/l	-	560	560	560	Biquinoline [4]	24 mm ø
Copper, free VARIO Powder reagent	0,05 - 5 mg/l	-	-	-	560	Bicinchoninate	24 mm ø
Cyanuric acid see Stabilizer							
Hardness, calcium Tablets	0 - 500 mg/l	560	560	560	560	Murexid [4]	24 mm ø
Hardness, total Tablets	2 - 50 mg/l 20 - 500 mg/l [i)]	- -	- -	-	560 560	Metallphthalein [3]	24 mm ø
Hydrogen peroxide Tablets	0.03 - 3 mg/l	-	-	-	530	DPD/Catalyst [5]	24 mm ø
Hydrogen peroxide Liquid reagent	1 - 50 mg/l 40 - 500 mg/l [i)]	- -	430 530	- -	- -	Peroxotitanium acid	24 mm ø
Iodine Tablets	0.05 - 3.6 mg/l	-	-	-	530	DPD [5]	24 mm ø
Iron (II, III) Tablets	0.02 - 1 mg/l	-	560	560	560	PPST [3]	24 mm ø
Oxygen, activ Tablets	0.1 - 10 mg/l	-	-	-	530	DPD	

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

For other reagent quantities please see our current price list.

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

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

Display	Reagent	Form of reagent/Quantity	Order code
Cl_2	VARIO Chlorine FREE-DPD/F10 VARIO Chlorine TOTAL-DPD/F10	Powder Pack / 100 Powder Pack / 100	53 01 00 53 01 20
ClO_2	DPD No. 1 DPD No. 3 Combi pack# DPD No.1 / No.3 Combi pack# DPD No.1 / No.3 GLYCINE [f] Combi pack# DPD No.1 / GLYCINE Combi pack# DPD No.1 / GLYCINE DPD No.1 High Calcium [e]	Tablet / 100 Tablet / 100 each 100 each 250 Tablet / 100 each 100 each 250 Tablet / 100	51 10 50 BT 51 10 80 BT 51 77 11 BT 51 77 12 BT 51 21 70 BT 51 77 31 BT 51 77 32 BT 51 57 40 BT
Cu	COPPER No. 1 COPPER No. 2 Combi pack# COPPER No.1 / No.2 Combi pack# COPPER No.1 / No.2	Tablet / 100 Tablet / 100 each 100 each 250	51 35 50 BT 51 35 60 BT 51 76 91 BT 51 76 92 BT
Cu	Vario Cu 1 F10	Powder Pack / 100	53 03 00
$CaCO_3$	Combi pack# CALCIO H No.1 / No.2 Combi pack# CALCIO H No.1 / No.2	each 100 each 250	51 77 61 BT 51 77 62 BT
$CaCO_3$	HARDCHECK P	Tablet / 100 Tablet / 250	51 56 60 BT 51 56 61 BT
H_2O_2	HYDROGENPEROXIDE LR	Tablet / 100	51 23 80 BT
H_2O_2	H_2O_2 reagent solution	Liquid reagent / 15 ml	42 49 91
I	DPD No. 1	Tablet / 100	51 10 50 BT
Fe	IRON LR (Fe^{2+} and Fe^{3+}) IRON (II) LR (Fe^{2+})	Tablet / 100 Tablet / 100	51 53 70 BT 51 54 20 BT
O_2	DPD No. 4	Tablet / 100	51 12 20 BT

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[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 chlorine dioxide / 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

Reagents

Test	Range	Wavelength λ / nm MD 100	MD 200	PM 600	PM 620	Method	Cuvette
Ozone Tablets	0.02 - 2 mg/l	-	-	530	530	DPD/Glycine [5]	24 mm ø
PHMB (Biguanide) Tablets	2 - 60 mg/l	-	-	-	560	Buffer/Indicator	24 mm ø
Phosphate LR, ortho Tablets	0.05 - 4 mg/l	-	-	-	610	Phosphomolybdic acid/ Ascorbic acid [2]	24 mm ø
pH value Tablets	5.2 - 6.8	-	-	-	560	Bromcresol purple [5]	24 mm ø
pH value Tablets	6.5 - 8.4	560	560	560	560	Phenol red [5]	24 mm ø
pH value Tablets	6.5 - 8.4	560	560	-	560	Phenol red [5]	24 mm ø
pH value Tablets	8.0 - 9.6	-	-	-	560	Thymol blue [5]	24 mm ø
Sodiumhypochlorite Tablets	0.2 - 16 %	-	-	530	530	Potassium iodide [5]	24 mm ø
Stablizer Tablets	0 - 160 mg/l [i)]	530	530	530	530	Melamine	24 mm ø
Sulphate VARIO Powder reagent	5 - 100 mg/l	-	-	-	530	Bariumsulphate Turbidity [2]	24 mm ø
Sulphate Tablets	5 - 100 mg/l	-	-	-	530	Bariumsulphate Turbidity [2]	24 mm ø
Urea Tablets / Liquid reagent	0.1 - 2.5 mg/l 0.2 - 5 mg/l [i)]	- -	610 610	- -	610 -	Urease / Indophenol	24 mm ø

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

For other reagent quantities please see our current price list.

Legend

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[4] Photometrische Analyse, Lange/Vejdelek, Verlag Chemie; 1980
[5] Colorimetric Chemical Analytical Methods, 9th Edition, Lovibond®

Display	Reagent	Form of reagent/Quantity	Order code
O_3	DPD No. 1	Tablet / 100	51 10 50 BT
	DPD No. 3	Tablet / 100	51 10 80 BT
	Combi pack# DPD No.1 / No.3	each 100	51 77 11 BT
	Combi pack# DPD No.1 / No.3	each 250	51 77 12 BT
	GLYCINE [f]	Tablet / 100	51 21 70 BT
	Combi pack# DPD No.1 / GLYCINE	each 100	51 77 31 BT
	Combi pack# DPD No.1 / GLYCINE	each 250	51 77 32 BT
PHMB	PHMB PHOTOMETER	Tablet / 100	51 61 00 BT
PO_4	PHOSPHATE No. 1 LR	Tablet / 100	51 30 40
	PHOSPHATE No. 2 LR	Tablet / 100	51 30 50 BT
	Combi pack# PHOSPHATE No.1 LR / No.2 LR	each 100	51 76 51 BT
	Combi pack# PHOSPHATE No.1 LR / No.2 LR	each 250	51 76 52 BT
pH	BROMOCRESOLPURPLE/PHOTOMETER	Tablet / 100	51 57 00 BT
pH	PHENOLRED / PHOTOMETER	Tablet / 100	51 17 70 BT
pH	PHENOLRED Solution	Liquid reagent / 15 ml	47 10 40
pH	THYMOLBLUE / PHOTOMETER	Tablet / 100	51 57 10
NaOCl	ACIDIFYING GP	Tablet / 100	51 54 80 BT
	CHLORINE HR (KI)	Tablet / 100	51 30 00
	Combi pack# CHLORINE HR (KI)/ACIDIFYING GP	each 100	51 77 21 BT
	Combi pack# CHLORINE HR (KI)/ACIDIFYING GP	each 250	51 77 22 BT
CyA	CyA-TEST	Tablet / 100	51 13 70 BT
SO_4	VARIO Sulpha 4 / F10	Powder Pack / 100	53 21 60
SO_4	SULFATE T	Tablet / 100	51 54 50 BT
CH_4N_2O	UREA Reagent 1	Liquid reagent / 15 ml	45 93 00
	UREA Reagent 2	Liquid reagent / 10 ml	45 94 00
	AMMONIA No. 1	Tablet / 100	51 25 80
	AMMONIA No. 2	Tablet / 100	51 25 90
	Combi pack# AMMONIA No.1 / No.2	each 100	51 76 11
	Combi pack# AMMONIA No.1 / No.2	each 250	51 76 12

[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 chlorine dioxide / 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

Natural Swimming Ponds

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

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

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

Chemical Requirements for fresh water - possibly after preconditioning*

Parameter	Guide Value
Alkalinity-m	≥ 100 mg/l $CaCO_3$
Ammonia	≤ 0.5 mg/l
Conductivity	≤ 1000 µS/cm at 20 °C
Hardness	≥ 1.0 mmol/l
Iron	≤ 0.2 mg/l
Manganese	≤ 0.05 mg/l
Nitrate	≤ 50.0 mg/l
pH value	6.0 - 9.0
Total Phosphate	≤ 0.01 mg/l

Chemical and physical guide values for basin water*

Parameter	Guide Value
Alkalinity-m	≥ 100 mg/l $CaCO_3$
Ammonia	≤ 0.3 mg/l
Conductivity	20 - 1000 µS/cm at 25 °C
Hardness	≥ 1.0 mmol/l
Nitrate	≤ 30.0 mg/l
Oxygen saturation	80 - 120 %
pH value	6.0 - 8.5 (Exception to pH 9.0)
Total Phosphate	≤ 0.01 mg/l
Visibility depth	to the ground or min. 1.80 m
Water temperature	≤ 25 °C, up to 5 days max. 28 °C

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

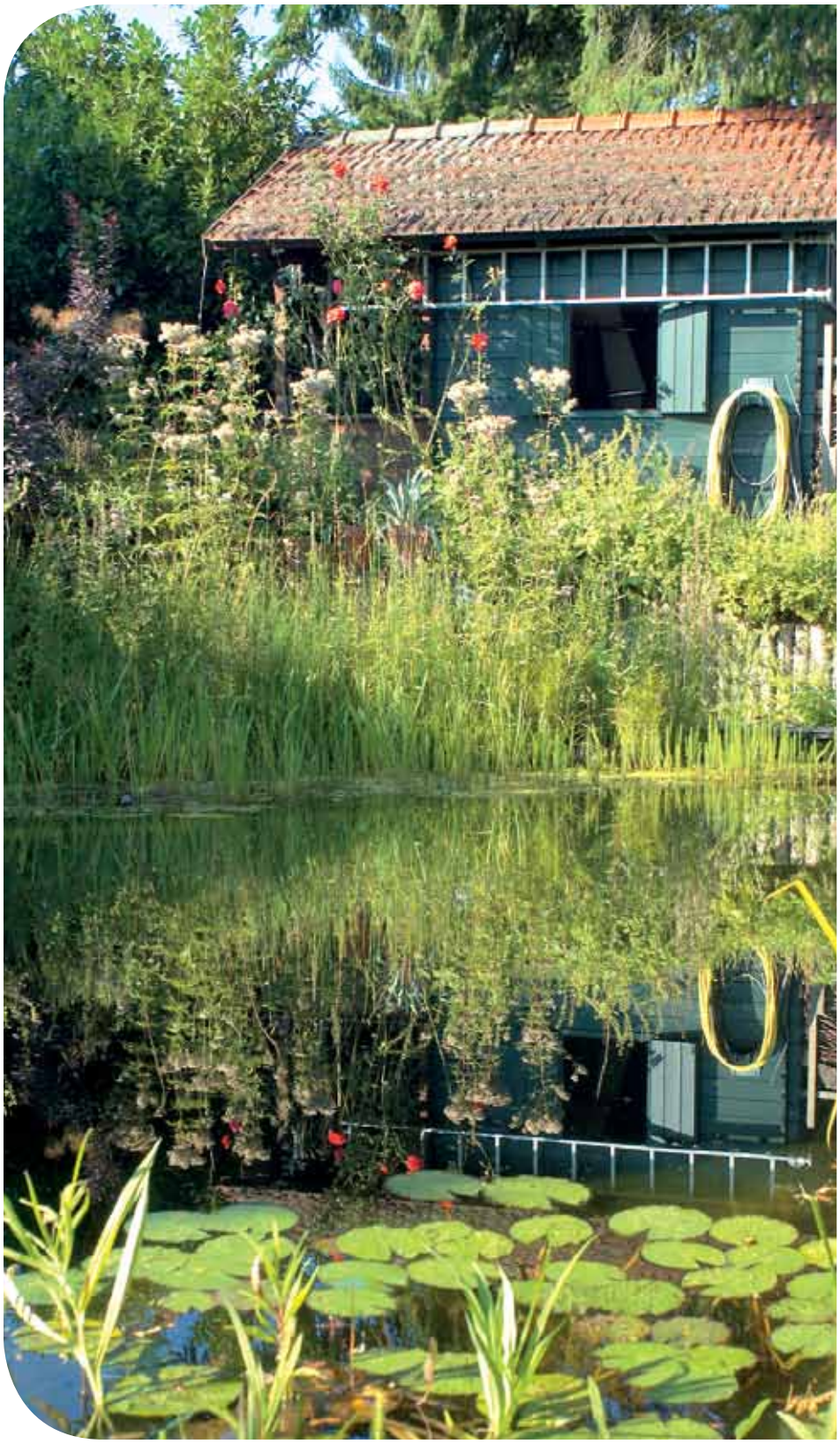


Photo: swimming-teich.com

Bathing Water

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

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

Microbiology

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

Parasites

- e.g. Cryptosporidia

Photo: Schwimmbad & Sauna / Grafinger

Chemical and physical characteristics

Dissolved Oxygen

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

pH-value

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

pH will vary depending on a number of factors. The pH may rise during the day as phytoplankton and other aquatic plants remove CO_2 from the water during photosynthesis. The pH decreases at night because of respiration and production of CO_2 by organisms. The fluctuation of pH levels will depend on algae levels as well.

Temperature

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

Ammonia

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

Nutrient levels

Nutrient levels refer to the amount of phosphorus and nitrogen that are present in the water. Increased levels of nutrients may be harmful. It can cause excessive plankton growth, potential blue-green algae and oxygen depletion.

See Lovibond® General Catalogue, no.: 938020. Order your free copy! See page 70

Turbidity

page 64

Test methods for a.m. parameter see index page 70 and 71.

Membrane filter set for sample preparation, see page 49

SD Series (IP 67 waterproof)

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

The intuitive scroll-bar functionality and backlit display enable the easy measurement and simultaneous display of

Result I Temperature I Date & Time I Other Measurement Details.

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 series can be upgraded with replaceable electrodes to ensure long-life functionality in the field.

Highlights

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

Delivery Content

- Meter in a robust plastic case with hanger
- 2 Batteries
- Lanyard
- Instruction Manual

SD 50 pH

- additionally: pH 4, 7, 10 buffer tablets (1 strip of 10 tablets each)

SD 50 pH

Range	0 - 60 °C, 0 - 14 pH
Resolution	0.01 pH
Accuracy	± 0.05 pH
Resolution temperature	0.1 °C; Accuracy: ± 1 °C, selectable °C / °F system
Selectable buffer system	pH 7.00 or pH 6.86
Calibration	1, 2, or 3 points calibration with auto-recognition (NIST / IUPAC)
Temperature compensation	Automatic
Memory	Time and date display / stamp with 25 sets of data storage (non-volatile)
Display	22 x 22 mm LCD screen, with yellow/green backlight
Power supply	2 x CR2032 batteries
Battery life	> 25 hours (continuous use, backlight OFF), low battery indicator on LCD screen
Auto-off	8 minutes non-use
Conformity	CE
Order code	19 48 00
Spare electrode	19 48 20

SD 60 ORP

Range	0 - 60 °C, -1800 ~ 1800mV
Resolution	0.1 mV (within ± 1000 mV) 1 mV (outside ± 1000 mV)
Accuracy	± 20 mV
Resolution temperature	0.1 °C; Accuracy: ± 1 °C, selectable °C / °F system
Calibration	1 point calibration with ± 150 mV adjustable ORP value
Temperature compensation	Automatic
Memory	Time and date display / stamp with 25 sets of data storage (non-volatile)
Display	22 x 22 mm LCD screen, with yellow/green backlight
Power supply	2 x CR2032 batteries
Battery life	> 25 hours (continuous use, backlight OFF), low battery indicator on LCD screen
Auto-off	20 minutes non-use
Conformity	CE
Order code	19 48 01
Spare electrode	19 48 21

SD 70 Con

Range	0 - 60 °C, < 20.00 mS [1]
Resolution	1 µS (<= 1999 µS) 0.01 mS (2.0 - 20.00 mS
Accuracy	± 3 % FS
Resolution temperature	0.1 °C; Accuracy: ± 1 °C, selectable °C / °F system
Auto switch over µS and mS	µS: 1 - 1999 mS: 2.00 - 20.00
Calibration	1 or 2 points calibration for **auto** mode Standard: 1413 µS or Standard: 12.88 mS up to 2 points calibration for **manual** mode ± 50 % adjustable value
Temperature compensation	Automatic
Memory	Time and date display / stamp with 25 sets of data storage (non-volatile)
Display	22 x 22 mm LCD screen, with yellow/green backlight
Power supply	2 x CR2032 batteries
Battery life	> 25 hours (continuous use, backlight OFF), low battery indicator on LCD screen
Auto-off	8 minutes non-use
Conformity	CE
Order code	19 48 02
Spare electrode	19 48 22

SD 80 TDS

Range	0 - 60 °C, < 10.00 ppt [2]
Resolution	1 ppm (<= 999 ppm) 0.01 ppt (1.0 - 10.00 ppt)
Accuracy	± 3 % FS
Resolution temperature	0.1 °C; Accuracy: ± 1 °C, selectable °C / °F system
Auto switch over ppm and ppt	ppm: 0 - 999 ppt: 1.00 - 10.00
Calibration	up to 2 points calibration **manual** mode ± 50 % adjustable value
Temperature compensation	Automatic
Memory	Time and date display / stamp with 25 sets of data storage (non-volatile)
Display	22 x 22 mm LCD screen, with yellow/green backlight
Power supply	2 x CR2032 batteries
Battery life	> 25 hours (continuous use, backlight OFF), low battery indicator on LCD screen
Auto-off	8 minutes non-use
Conformity	CE
Order code	19 48 03
Spare electrode	19 48 22

SD 90 Salt

Range	0 - 60 °C, < 20.00 ppt ≙ 2.00 % [3]
Resolution	0.01 % (when set to "P" % unit) 1 ppm (< 2000 ppm) 0.01 ppt (2.0 - 20.00 ppt)
Accuracy	± 3 % FS
Resolution temperature	0.1 °C; Accuracy: ± 1 °C, selectable °C / °F system
Auto switch over ppm and ppt	ppm: 0 - 1999 ppt: 2.00 - 20.00
Calibration	up to 2 points calibration **manual** mode ± 50 % adjustable value
Selectable unit system	"P" % or ppt / ppm
Temperature compensation	Automatic
Memory	Time and date display / stamp with 25 sets of data storage (non-volatile)
Display	22 x 22 mm LCD screen, with yellow/green backlight
Power supply	2 x CR2032 batteries
Battery life	> 25 hours (continuous use, backlight OFF), low battery indicator on LCD screen
Auto-off	8 minutes non-use
Conformity	CE
Order code	19 48 04
Spare electrode	19 48 22

Conversion table

[1] 0 - 20.00 mS/cm = 0 - 20,000 µS/cm

[2] 0 - 10.00 ppt TDS = 0 - 10,000 ppm TDS

[3] 0 - 20.00 ppt NaCl = 0 - 20,000 ppm NaCl
0 - 20.00 ppt NaCl = 0 - 2 % NaCl
0 - 20.00 ppt NaCl = 0 - 20 g/l NaCl

ppm = Parts per Million = mg/l
ppt = Parts per Thousand = g/l

SensoDirect 110

Determination of:

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

pH110

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

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

Technical data pH110

Range	0 - 14 pH
Resolution	0.01 pH
Temperature compensation	not necessary
Accuracy	± 0.07 pH (pH5-pH9) ± 0.1 pH (pH4-pH10) ± 0.2 pH (pH1-pH3.9) ± 0.2 pH (pH10,1-pH13) 23 ± 5 °C, after calibration
Ambient conditions	0 - 50 °C 0 - 80 % rel. humidity (non condensing)
Battery	9 V block
Dimensions	208 x 110 x 34 mm (L x W x H)
Weight	approx. 380 g
CE-Conformity	
Order Code	72 13 00

Accessories SensoDirect pH110

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

Con110

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

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

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

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

Technical data Con110

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

Accessories SensoDirect Con110

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

Salt110

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

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

The SensoDirect Salt110 includes an automatic temperature compensation feature.

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

Technical data Salt110

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

Delivery content

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

Delivery content

- SensoDirect Con110 in a sturdy plastic case
- Battery
- Conductivity sensor
- Guarantee sheet
- Instruction manual

Delivery content

- SensoDirect Salt110 in a sturdy plastic case
- Battery
- Sensor
- Guarantee sheet
- Instruction manual

SensoDirect 150

All in one Hand-held Meter

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

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

SensoDirect 150

Display	Large LCD display with contrast adjustment
Parameter	pH: 0 to 14.00 pH ORP: ± 1999 mV Conductivity: 200 µS / 2 mS / 20 mS / 200 mS TDS (Total Dissolved Solids): Dissolved Oxygen: 0 to 20.0 mg/l
Data Logger	Real time data logger
Data Memory	Auto or manual data memory, 16000 data sets
Data Hold	Max, Min
Interface	USB, RS232
Probes	pH, ORP, Conductivity/TDS, Dissolved Oxygen and Temperature
Power off	Auto shut off or manual off
Data Output	RS 232 PC serial interface
Power Supply	DC 1,5 V battery (UM3, AA) x 4 PCs or DC 9V adapter in
Software	Data acquisition software Data logger software
Dimensions	220 x 120 x 40 mm (L x B x H)
Weight	approx. 625 g (Instrument with batteries)
CE-Conformity	

pH/Redox/Temperature

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

Dissolved Oxygen/Temperature

Range	Dissolved Oxygen 0 to 20.0 mg/l (liter) Oxygen in Air 0 to 100.0 % Temperature 0 to 50 °C
Resolution	Dissolved Oxygen 0.1 mg/l 0.1 % O_2 Temperature 0.1 °C
Accuracy (23± 5 °C)	Dissolved Oxygen ± 0.4 mg/l Oxygen in Air ± 0.7% O_2 Temperature ± 0.8 °C / 1.5 °F
Salinity Correction	0 to 39 % Salt
Air Pressure Compensation	0 to 8900 meter

Conductivity/TDS/Temperature

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

Accessories

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

Delivery Content

Order code: 724200
SensoDirect 150 Set pH/Con/TDS/Oxi
instrument, batteries, pH electrode, temperature probe, conductivity probe, oxygen sensor, pH buffer set 4.00 / 7.00, electrolyte, membrane heads, instruction manual, guarantee sheet, in case

Order code: 724210
SensoDirect 150 Set pH / Con / TDS
instrument, batteries, pH electrode, temperature probe, conductivity probe, pH buffer set 4.00 / 7.00, instruction manual, guarantee sheet, in case

Order code: 724220
SensoDirect 150 Set pH / Oxi
instrument, batteries, pH electrode, temperature probe, oxygen sensor, pH buffer set 4.00 / 7.00, electrolyte, membrane heads, instruction manual, guarantee sheet, in case

Order code: 724230
SensoDirect 150 Set pH / Redox
instrument, batteries, pH electrode, temperature probe, redox electrode, pH buffer set 4.00 / 7.00, instruction manual, guarantee sheet, in case

Highlights

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

Turbidity Measurement

Photo: Schwimmbad & Sauna

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).

TurbiCheck with infra-red light source (EN ISO 7027)

The compact Lovibond® infrared turbidity meter TurbiCheck 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 0.01-1100 TE/F = NTU = FNU makes the instrument suitable for various applications, ranging from drinking water to waste water.

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

Technical data

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

Accessories

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

Set of 12 empty sample vials, 24 mm ø
Order code: 19 76 55

Delivery content

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

AquaMATE Pool Software

Highlights

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

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

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

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

Order code: 97 50 00

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

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

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

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

General configuration

The General Configuration Module enables the user to:

Select the User Interface language:
English, German, French, Italian, Spanish.

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

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

The categories are:

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

The parameter boundaries for selection are:
Free or Available Chlorine, Combined Chlorine, Total Bromine, pH and Cyanuric Acid.

Customer file

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

Product configuration

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

Data transfer from photometer

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

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

Water balance

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

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

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

In automatic mode, the software tries to restore the water balance by trying to equalise the SI to zero or a value as close as possible to zero. It takes into account the parameter boundaries set in the "General Configuration" module and the possible choice of products (chemicals) and their availability. Once the start parameters have been set, clicking on the "Restore water balance" button opens a new window with dosage instructions or information about the failure to improve the water balance.

Handy tools

Chlorine dosage

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

Acid demand

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

Phosphate removal

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

Salt chlorination

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

System requirements

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

The software has been developed using the .NET framework 2.0 that primarily runs on Microsoft® Windows® platforms. It may be necessary to update the application soon in order to make it fully compatible with Windows® Vista and Windows® 7, using .NET framework 3.5 or 4.0. The .NET Framework Client Profile is not supported on IA-64-based (Itanium)

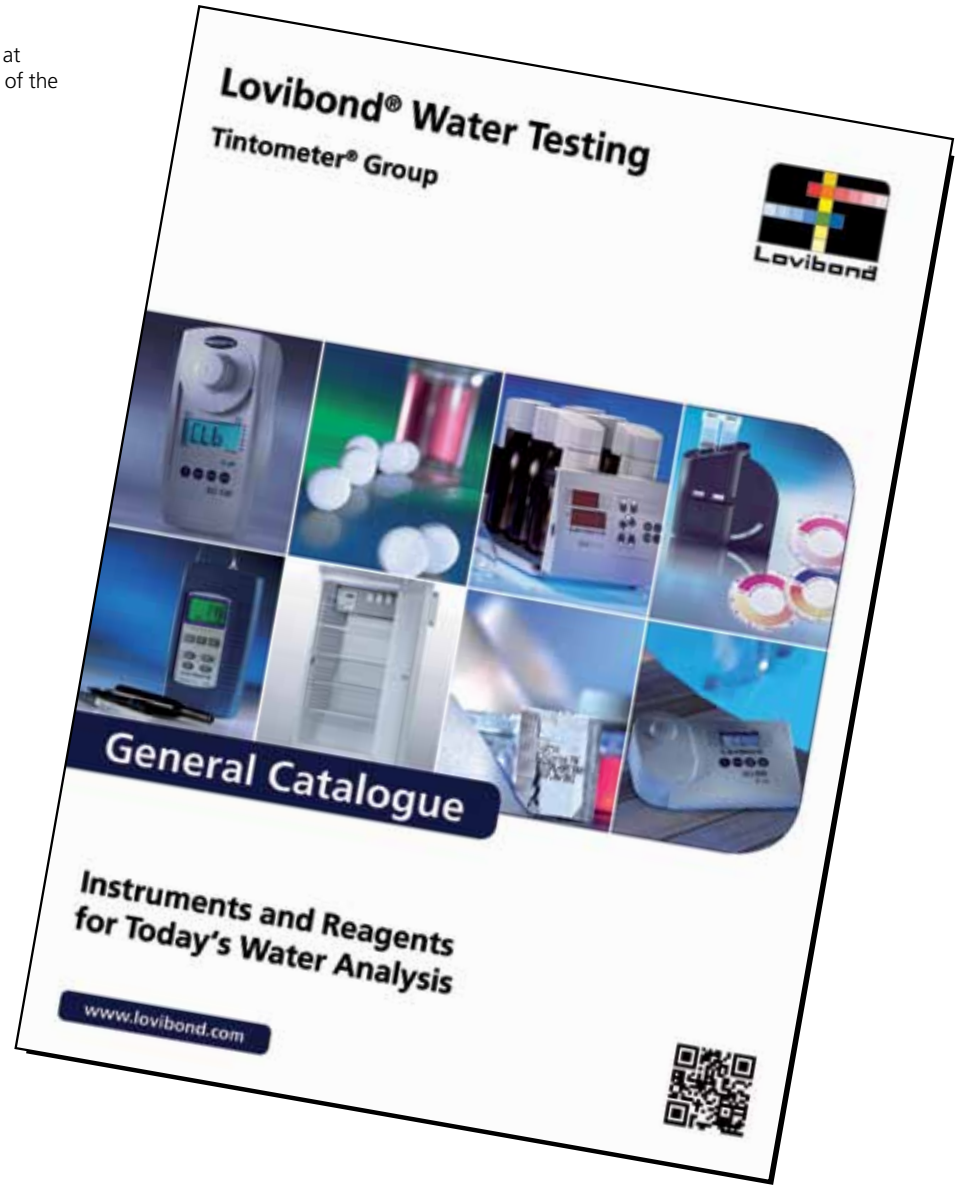
Environmental Water Analysis

Lovibond® General Catalogue

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

General Catalogue, order code: 93 80 20

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



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Tintometer GmbH
Lovibond® Water Testing
Schleefstraße 8-12
44287 Dortmund
Tel.: +49 (0)231/94510-0
Fax: +49 (0)231/94510-20
sales@tintometer.de
www.lovibond.com

Germany

The Tintometer Limited
Lovibond House / Solar Way
Solstice Park / Amesbury, SP4 7SZ
Tel.: +44 (0)1980 664800
Fax: +44 (0)1980 625412
water.sales@tintometer.com
www.lovibond.com

UK

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

Switzerland

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

China

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

Malaysia

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