

# Lovibond® Water Testing

Tintometer® Group



## General Catalogue

**Instruments and Reagents  
for Today's Water Analysis**

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





# PHILOSOPHY

*„There are very few companies which can look back over a history of more than 125 years of success. The reason we can do so lies in the world-wide appreciation of our products and the determination of our work-force to maintain this“.*

Cay-Peter Voss, CEO

Water is the basis of life. And it also provides the basis of our company and its activities. At Tintometer we have always specialized in scientific and technological products which make water analysis not just simple but also dependable and reliable.

For over 125 years we have concentrated on water testing and continue to set new standards in the market. More than 200 employees are working for our customers, meeting their requirements and achieving our vision: that research and development today will result in a better tomorrow.

Tintometer Group is one of the leading companies in the field of water analysis. Our trade-name Lovibond® is known in over 120 countries, where we offer innovative products for the precise determination of different types of water : water in swimming pools, drinking water, waste water, surface and ground water, untreated water and effluents, through to cooling water and boiler water.





All around the world the highly-qualified and dedicated Tintometer team guarantees optimum equipment for any kind of water analysis. Our research and development department works closely with institutes in Germany, England, Switzerland and the USA. Together, we are constantly developing new, user-friendly water test systems which we bring to full production level in the shortest possible time.

Outstanding quality, maintained always at the highest level, forms the basis of all our work. And this applies not only to our products, which have been certified to DIN ISO 9001:2008 since 1997, but also to our service. The best proof of this is to ask our customers.

### **Sustainability and environmental protection**



Tintometer places great importance on sustainability and the sensitive use of natural resources.

Environmental protection is one of the primary objectives of our organisation and we have therefore decided that, we shall issue our printed matter on FSC-certified paper.

Members of the Forest Stewardship Council (FSC) include environment associations, social organisations, forward-looking forestry companies and firms in the wood processing industry, working together to achieve improvements world-wide in the forestry field. The "FSC" quality seal is used to identify products manufactured from sustainably managed woods and forests.

In this way we make a further contribution to maintaining and improving our environment.



# PRODUCTION

## Dear Lovibond® Customer,

We are proud to present our general catalogue for Lovibond® water testing equipment, a comprehensive and invaluable source of information that details our full range of instruments, reagents and accessories, including separate sections for environmental monitoring and swimming pool testing. There is a detailed index that allows users to identify relevant product information by parameter and test method.

## A Single Source for Water Testing Equipment

The Lovibond® range offers users a single source for equipment for the chemical analysis of water in all environments - potable and washing water, surface, ground and raw water, wastewater and effluents, boiler and cooling water and swimming pools.

In particular the Lovibond® range presents a simple and flexible approach to routine water analysis that gives reliable results in both laboratory and field testing. It even includes the Vario range of reagents in the form of powder packs, which can be used in other manufacturers' photometers.





### **Ongoing Product Innovation and Development**

We are committed to the ongoing development and improvement of our testing equipment and reagents. This commitment is demonstrated by the latest innovations of Tintometer: The photometer system MD 600 for all requirements of modern water analysis and the electrochemical meter SD 300 pH. Both units based on a long experience in development of water testing systems and impress by origin Lovibond® quality.

### **Production Control and Assurance**

All Lovibond® instruments, reagents and accessories are manufactured under our control, employing modern technology and QA procedures. Tintometer GmbH has been certified DIN ISO 9001:2008 since 1997.

### **Web Based Back-up**

The information in this catalogue is supported and supplemented by our website – **[www.lovibond.com](http://www.lovibond.com)**.

This includes the latest information on product developments and downloads of material safety data sheets and certificates of analysis.



# Content

## Rapid Tests



- 10** MINIKIT
- 11** Arsenic Test Kit
- 12** CHECKIT®  
Comparator
- 26** Comparator  
System 2000+

## Photometry



- 54** Photometer MD 100
- 58** Photometer MD 200
- 62** COD Setups COD VARIO
- 63** Thermoreactor RD 125
- 63** Waste Water Set-Ups
- 64** Photometer MD 600
- 68** Photometer MultiDirect
- 72** Spectrophotometer  
SpectroDirect
- 76** Reagents for Photometer
- 100** Powder Dispenser PD 250
- 102** VARIO Powder Packs

## BOD



- 108** BOD System OxiDirect



**112**    Thermostatically  
            Controlled Incubators

**114**    Spark-free Cabinets



**116**    SD 300 pH & SD 320 Con

**120**    SensoDirect Oxi200

**122**    SensoDirect 150

**124**    SensoDirect 110

**126**    SD Series



**130**    TB 300 IR

**132**    TB 210 IR

**133**    TB 250 WL



**134**    Floc Tester ET 740

**134**    Floc Tester ET 750

**134**    Floc Tester ET 730



**138**    Rapid Tests

**142**    Photometer  
            PM 620 & PM 600

**144**    Applications of Reagents

**150**    Index



# RAPID TESTS





MINIKIT



CHECKIT®  
Comparator



Comparator 2000+



# MINIKIT

## Highlights

- Easy operation and exact reagent dosing
- High accuracy
- Foil-wrapped Lovibond® tablet reagents with a minimum guaranteed shelf life of 5 years
- Unrestricted shipment
- Safe storage



| Analysis                                  | Type   | Range  | Methods<br>Tablet<br>Count | Speed<br>Test | Yes/No<br>Test | Turbidity | Order<br>code |
|---|--------|--|----------------------------|---------------|----------------|-----------|---------------|
| <b>Alkalinity-M</b>                       | AF 444 | 20 - 800 mg/l $\text{CaCO}_3 \cong 0.4 - 16 \text{ mmol/l}$                                  |                            | ■             |                |           | 41 44 40      |
| <b>Alkalinity Caustic/P</b>               | AF 415 | 20 - 500 mg/l $\text{CaCO}_3$  | ■                          |               |                |           | 41 41 50      |
| <b>Alkalinity-P</b>                       | AF 414 | 20 - 500 mg/l $\text{CaCO}_3$  | ■                          |               |                |           | 41 41 40      |
| <b>Alkalinity-M</b>                       | AF 413 | 10 - 500 mg/l $\text{CaCO}_3 \cong 0.1 - 5 \text{ mmol/l}$                                   | ■                          |               |                |           | 41 41 30      |
| <b>Calcium Hardness</b>                   | AF 446 | 20- 800 mg/l $\text{CaCO}_3 \cong 0.4 - 16 \text{ mmol/l}$                                   |                            | ■             |                |           | 41 44 60      |
| <b>Calcium Hardness</b>                   | AF 416 | 10- 500 mg/l $\text{CaCO}_3 \cong 0.1 - 5 \text{ mmol/l}$                                    | ■                          |               |                |           | 41 41 60      |
| <b>Chloride</b>                           | AF 418 | 5 - 5000 mg/l Cl   | ■                          |               |                |           | 41 41 80      |
| <b>Cleaning Acid Strength</b>             | AF 410 | 0.75-10% acid  | ■                          |               |                |           | 41 41 00      |
| <b>Cyanuric Acid</b>                      | AF 422 | 20 - 200 mg/l Cyanuric Acid  |                            |               |                | ■         | 41 42 20      |
| <b>Hardness Total</b><br>(very low range) | AF 426 | 1 - 10 mg/l $\text{CaCO}_3 \cong 0.01 - 0.1 \text{ mmol/l}$                                  | ■                          |               |                |           | 41 42 60      |
| <b>Hardness Total</b><br>(low range)      | AF 425 | 1 - 50 mg/l $\text{CaCO}_3 \cong 0.01 - 0.5 \text{ mmol/l}$                                  | ■                          |               |                |           | 41 42 50      |
| <b>Hardness Total</b><br>(Yes/No)         | AF 423 | Limit 4 mg/l, 8 mg/l or 20 mg/l $\text{CaCO}_3 \cong 0.04$ or $0.08$ or $0.2 \text{ mmol/l}$ |                            |               | ■              |           | 41 42 30      |
| <b>Hardness Total</b>                     | AF 445 | 20 - 800 mg/l $\text{CaCO}_3 \cong 0.4 - 16 \text{ mmol/l}$                                  |                            | ■             |                |           | 41 44 50      |
| <b>Hardness Total</b>                     | AF 424 | 5 - 500 mg/l $\text{CaCO}_3 \cong 0.05 - 5 \text{ mmol/l}$                                   | ■                          |               |                |           | 41 42 40      |
| <b>Nitrite</b>                            | AF 427 | 70 -1500 mg/l $\text{NaNO}_2$  | ■                          |               |                |           | 41 42 70      |
| <b>Organo-Phosphonate</b>                 | AF 411 | 1 - 20 mg/l active O-P   | ■                          |               |                |           | 41 41 10      |
| <b>QAC (Quaternary Ammonium Comp.)</b>    | AF 417 | 0 - 500 mg/l active QAC<br>Limit 200 mg/l (Yes/No)   | ■                          |               | ■              |           | 41 41 70      |
| <b>Sulphate</b> (low range)               | AF 432 | 20 - 200 mg/l $\text{Na}_2\text{SO}_4$   | ■                          |               |                |           | 41 43 20      |
| <b>Sulphate</b>                           | AF 431 | 40 - 200 mg/l $\text{SO}_4$ (40 - 4000 mg/l by dilution)                                     |                            |               |                | ■         | 41 43 10      |
| <b>Sulphite</b> (low range)               | AF 434 | 2 - 50 mg/l $\text{Na}_2\text{SO}_3$   | ■                          |               |                |           | 41 43 40      |
| <b>Sulphite</b> (high range)              | AF 435 | 20 - 500 mg/l $\text{Na}_2\text{SO}_3$   | ■                          |               |                |           | 41 43 50      |
| <b>Tannin Index</b>                       | AF 436 | 2 - 20 units   | ■                          |               |                |           | 41 43 60      |

\*BW: Boiler Water



## The methods

The MINIKITS are designed for rapid water testing. Most MINIKITS are based on titrimetric methods.

### Tablet count method

In the tablet count method, the liquid titration solution and indicator are replaced by Lovibond® tablet reagents. A specific number of tablets is added to a defined sample volume until a chemically induced colour change takes place. The concentration of the parameter being measured is calculated from the number of tablets required. The measuring range can 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.

## Arsenic Test Kit (highly sensitive)

The arsenic test is due to its high sensitivity suitable for the determination of arsenic in drinking water.

### The advantages at one view

- Sensitivity is according to the requirements of the WHO for drinking water quality. This test detects 0.005 mg/l Arsenic.
- The removal of the interfering sulfide ions is integrated in the test procedure. To minimize the potential danger for the user of the test kit it doesn't use the highly toxic lead acetate for the sulfide removal.
- A solid acid substance is used in order to avoid any irritation by a corrosive acid on the user's hands.
- The unbreakable plastic reaction vessel is more convenient and safe for on-site testing.
- During the test procedure the reaction vessel is tightly closed. The developing arsine gas cannot escape and therefore does not harm the user.
- The test kit contains a water-proof colour chart which also includes the brief instruction for use in pictograms. Even if there is a lack of knowledge in foreign languages everybody can now handle the test kit.

Resolution:

0 - 0.005 - 0.01 - 0.025 - 0.05 - 0.1 - 0.25 - 0.5 mg As<sup>3+/5+</sup>/l

Kit for 100 measurements in case.

**Order code:** 40 07 00



Arsenic Test Kit, ready to use

| Reagent                                   | Order code  | Quantity |
|---|-------------|----------|
| ALK-TEST                                  | 51 55 70 BT | 100      |
| ALKALINITY-P-tablets                      | 51 51 01    | 250      |
| ALKALINITY-P (BaCl <sub>2</sub> )-tablets | 51 51 10    | 100      |
| ALKALINITY-P-Tablets                      | 51 51 01    | 250      |
| TOTAL ALKALINITY-tablets                  | 51 53 21 BT | 250      |
| ALKALINITY-P (BaCl <sub>2</sub> )-Tablets | 51 51 10    | 100      |
| CAL-TEST                                  | 51 55 80    | 100      |
| CALCIUM HARDNESS                          | 51 51 91 BT | 250      |
| CHLORIDE                                  | 51 51 31    | 250      |
| ACID CONCENTRATION                        | 50 54 20    | 100      |
| CyA-TEST                                  | 51 13 70 BT | 100      |
| HARDNESS VLR                              | 51 53 51 BT | 250      |
| HARDNESS LR (BW)*                         | 51 51 71 BT | 250      |
| HARDNESS YES / NO                         | 51 53 61 BT | 250      |
| T HARDNESS-TEST                           | 51 55 90    | 100      |
| TOTAL HARDNESS                            | 51 51 61 BT | 250      |
| NITRITE No. 1                             | 51 52 01    | 250      |
| NITRITE No. 2                             | 51 52 11 BT | 250      |
| ORGANO-PHOSPHONATE No. 2                  | 46 53 51    | 100 ml   |
| ORGANO-PHOSPHONATE No. 1                  | 51 29 61 BT | 250      |
| QAC-Test                                  | 51 54 10    | 100      |
|   | 51 54 11    | 250      |
| SULFATE No. 1                             | 51 52 21    | 250      |
| SULFATE No. 2                             | 51 52 31    | 250      |
| SULFATE                                   | 51 54 51 BT | 250      |
| SULFITE No. 1                             | 51 52 71    | 250      |
| SULFITE No. 2 HR                          | 51 52 81 BT | 250      |
| SULFITE No. 2 LR (BW)*                    | 51 53 31 BT | 250      |
| TANNIN No. 1                              | 50 35 00    | 100      |
| TANNIN No. 2                              | 50 35 11    | 250      |

# CHECKIT<sup>®</sup> Comparator



## Applications

- Water Treatment (e.g. Drinking Water)
- Pools
- Laboratory and Field Testing
- Special Applications

## Discs with continuous colour scale

- low cost
- precise
- reliable



Front view of the CHECKIT®Comparator with cells



Test Kit complete in case



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



Tablet reagents in foil blister strip



CHECKIT®Discs with continuous colour scales



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

## CHECKIT®Comparator

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

The CHECKIT®Comparator D55 enables the use of large path lengths. The mirror optics makes use of the view through the entire length of the cell.

## 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 remain colour-stability over a long period and guarantee reliable, reproducible measurement results.

Instruction manuals explaining the various stages of analysis in simple, straightforward terms, are supplied with each CHECKIT®Disc.



**Please see pages 16 onwards for tests, ranges and reagents**

## Highlights

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



# CHECKIT® Comparator

Regular  
Testing to  
observe the  
Water Quality



## Test Kits 2 in 1

Together with the CHECKIT® Comparator, each test kit includes CHECKIT® Discs, cells, stirring rod and Lovibond® reagents (for 30 tests) for the desired test.

The test kits are supplied in a sturdy and handy plastic case.

The operating instructions provide a step-by-step explanation of how to conduct the water test, ensuring that even "non-chemists" can achieve reliable and accurate measurements in the minimum of time.

| Test-Kits                                      | Code     |
|--|----------|
| <b>Chlorine</b> 0 – 1.0 mg/l Cl <sub>2</sub>   | 14 70 15 |
| <b>pH value</b> 6.5 – 8.4 pH                   |          |
| Pool version                                   | 14 70 16 |
| <b>Chlorine</b> 0.1 – 2.0 mg/l Cl <sub>2</sub> | 14 70 45 |
| <b>pH value</b> 6.5 – 8.4 pH                   |          |
| Pool version                                   | 14 70 46 |
| <b>Chlorine</b> 0 – 4.0 mg/l Cl <sub>2</sub>   | 14 70 25 |
| <b>pH value</b> 6.5 – 8.4 pH                   |          |
| Pool version                                   | 14 70 26 |
| <b>Bromine</b> 0 – 5.0 mg/l Br                 | 14 72 85 |
| <b>pH value</b> 6.5 – 8.4 pH                   |          |
| <b>Copper</b> 0 – 1.0 mg/l Cu                  | 14 72 35 |
| <b>pH value</b> 6.5 – 8.4 pH                   |          |

## Test-Kit 5 in 1

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

Disc readings see following pages.

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

\*Reagents for turbidity method and speed test (Test-Kit 5 in 1) see MINIKIT.



## Single Parameter Test Kits

| Test  | Range* (Accuracy ±5% F.S.)            | Code     |
|---|---------------------------------------|----------|
| <b>Aluminium</b>                                  | 0 - 0.3 mg/l Al                       | 14 72 00 |
| <b>Ammonia</b>                                    | 0 - 1 mg/l N                          | 14 72 10 |
| <b>Ammonia</b> , Powder Pack                      | 0 - 0.5 mg/l N                        | 14 72 11 |
| <b>Bromine</b>                                    | 0 - 5 mg/l Br                         | 14 72 80 |
| <b>Chlorine</b> (DPD)** free, combined, total     | 0.02 - 0.3 mg/l Cl <sub>2</sub>       | 14 70 00 |
| <b>Chlorine</b> (DPD) free, combined, total       | 0 - 1 mg/l Cl <sub>2</sub>            | 14 70 10 |
| <b>Chlorine</b> (DPD) free, combined, total       | 0 - 2 mg/l Cl <sub>2</sub>            | 14 70 40 |
| <b>Chlorine, free</b> (DPD), Powder Pack          | 0 - 3.5 mg/l Cl <sub>2</sub>          | 14 70 50 |
| <b>Chlorine, total</b> (DPD), Powder Pack         | 0 - 3.5 mg/l Cl <sub>2</sub>          | 14 70 51 |
| <b>Chlorine, free + total</b> (DPD), Powder Packs | 0 - 3.5 mg/l Cl <sub>2</sub>          | 14 70 52 |
| <b>Chlorine</b> (DPD) free, combined, total       | 0 - 4 mg/l Cl <sub>2</sub>            | 14 70 20 |
| <b>Chlorine KI</b>                                | 10 - 300 mg/l Cl <sub>2</sub> (total) | 14 70 30 |
| <b>Chlorine dioxide**</b>                         | 0.01 - 0.2 mg/l ClO <sub>2</sub>      | 14 73 30 |
| <b>Copper, free (Cu<sup>2+</sup>)</b>             | 0 - 1 mg/l Cu                         | 14 72 30 |
| <b>Copper HR</b> , free + total                   | 0 - 5 mg/l Cu                         | 14 74 30 |
| <b>Copper HR</b> , free, Powder Pack              | 0 - 5 mg/l Cu                         | 14 74 31 |
| <b>Copper LR**</b> , free + total                 | 0 - 1 mg/l Cu                         | 14 74 40 |
| <b>Copper LR**</b> , free, Powder Pack            | 0 - 1 mg/l Cu                         | 14 74 41 |
| <b>DEHA</b>                                       | 0 - 0.5 mg/l DEHA                     | 14 73 70 |
| <b>Fluoride</b> , Testpak available only          | 0.2 - 2 mg/l F                        |          |
| <b>Iron HR</b>                                    | 1 - 10 mg/l Fe                        | 14 73 20 |
| <b>Iron LR</b>                                    | 0.05 - 1 mg/l Fe                      | 14 72 20 |
| <b>Iron (TPTZ)</b> , Powder Pack                  | 0 - 1.8 mg/l Fe                       | 14 74 70 |
| <b>Manganese LR</b> , Testpak available only      | 0.1 - 0.7 mg/l Mn                     |          |
| <b>Manganese VLR</b> , Testpak available only     | 0.02 - 0.2 mg/l Mn                    |          |
| <b>Molybdate LR**</b>                             | 0 - 10 mg/l MoO <sub>4</sub>          | 14 72 91 |
| <b>Molybdate HR</b>                               | 0 - 100 mg/l MoO <sub>4</sub>         | 14 72 90 |
| <b>Molybdate HR</b>                               | 50 - 500 mg/l MoO <sub>4</sub>        | 14 72 95 |
| <b>Nitrate LR</b> , Testpak available only        | 0 - 1 mg/l NO <sub>3</sub>            |          |
| <b>Nitrite LR</b>                                 | 0 - 0.5 mg/l N                        | 14 73 00 |
| <b>Nitrite</b> , Powder Pack                      | 0 - 0.3 mg/l N                        | 14 73 01 |
| <b>Ozone</b> (DPD), in the presence of chlorine   | 0 - 1.0 mg/l O <sub>3</sub>           | 14 72 70 |
| <b>Ozone</b> (DPD)                                | 0 - 1.0 mg/l O <sub>3</sub>           | 14 72 75 |
| <b>pH value</b> (Phenol red)                      | 6.5 - 8.4 pH                          | 14 71 00 |
| <b>pH value</b> (Bromocresol purple)              | 5.2 - 6.8 pH                          | 14 71 10 |
| <b>pH value</b> (Bromothymol blue)                | 6.0 - 7.6 pH                          | 14 71 20 |
| <b>pH value</b> (Universal)                       | 4 - 10 pH                             | 14 71 30 |
| <b>Phosphate</b> , Powder Pack                    | 0 - 2.5 mg/l PO <sub>4</sub>          | 14 74 80 |
| <b>Phosphate HR</b>                               | 0 - 80 mg/l PO <sub>4</sub>           | 14 72 50 |
| <b>Phosphate LR</b>                               | 0 - 4 mg/l PO <sub>4</sub>            | 14 72 40 |
| <b>Silica LR</b>                                  | 0.25 - 4 mg/l SiO <sub>2</sub>        | 14 73 50 |
| <b>Silica HR</b> , Powder Pack                    | 0 - 100 mg/l SiO <sub>2</sub>         | 14 73 51 |
| <b>Silica VLR**</b>                               | 0 - 1 mg/l SiO <sub>2</sub>           | 14 73 60 |
| <b>Sodiumhypochlorite</b>                         | 2 - 18 %                              | 14 74 90 |
| <b>Sulfite LR</b>                                 | 0.5 - 10 mg/l SO <sub>3</sub>         | 14 73 80 |
| <b>Total Alkalinity</b>                           | 20 - 240 mg/l CaCO <sub>3</sub>       | 14 74 50 |
| <b>Zinc LR</b>                                    | 0 - 1 mg/l Zn                         | 14 73 40 |

\* Disc readings see following pages

\*\* Only with CHECKIT® Comparator D55 with mirror optics (path length 55 mm)

## 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.

Each Testpak contains the required CHECKIT® Disc, tablet reagents (normally for 30 tests), two cells, stirring rod and detailed instructions for the desired method.

Please contact our sales departments for further information: [sales@tintometer.de](mailto:sales@tintometer.de)

# CHECKIT® Comparator

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

| Test  | Range                           | Readings (Accuracy ± 5% Full Scale)  | Test Kit | Testpak                            |
|---|---------------------------------|--|----------|------------------------------------|
| <b>Aluminium</b>  | 0 - 0.3 mg/l Al                 | 0 / 0.01 / 0.02 / 0.03 / 0.04 / 0.05 / 0.06 / 0.07 / 0.08 / 0.09 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3   | 14 72 00 | 14 77 00                           |
| <b>Ammonia</b>  | 0 - 1 mg/l N                    | 0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.9 / 0.95 / 1.0                                       | 14 72 10 | 14 77 10                           |
| <b>Ammonia VARIO</b>                                      | 0 - 0.5 mg/l N                  | 0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5   | 14 72 11 | 14 77 11                           |
| <b>Bromine</b>  | 0 - 5 mg/l Br                   | 0 / 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2 / 1.4 / 1.6 / 1.8 / 2 / 2.5 / 3 / 3.5 / 4 / 4.5 / 5  | 14 72 80 | 14 77 80                           |
| <b>Chlorine</b><br>free, combined**, total                | 0 - 1 mg/l Cl <sub>2</sub>      | 0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.85 / 0.9 / 0.95 / 1.0                                | 14 70 10 | 14 75 10                           |
| <b>Chlorine</b><br>free, combined**, total                | 0 - 2 mg/l Cl <sub>2</sub>      | 0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0 / 1.1 / 1.2 / 1.3 / 1.4 / 1.6 / 1.8 / 2.0  | 14 70 40 | 14 75 40                           |
| <b>Chlorine</b><br>free, combined**, total                | 0 - 4 mg/l Cl <sub>2</sub>      | 0 / 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2 / 1.4 / 1.6 / 1.8 / 2.0 / 2.5 / 3.0 / 3.5 / 4.0  | 14 70 20 | 14 75 20                           |
| <b>Chlorine</b><br>free, combined**, total                | 0 - 3.5 mg/l Cl <sub>2</sub>    | 0 / 0.2 / 0.4 / 0.6 / 0.8 / 1 / 1.2 / 1.4 / 1.6 / 1.8 / 2 / 2.2 / 2.4 / 2.6 / 2.8 / 3 / 3.2 / 3.4 / 3.5  | 14 70 52 | 14 75 50, frei<br>14 75 51, gesamt |
| <b>Chlorine</b><br>free, combined**, total                | 0.02 - 0.3 mg/l Cl <sub>2</sub> | 0.02 / 0.03 / 0.04 / 0.05 / 0.06 / 0.07 / 0.08 / 0.09 / 0.1 / 0.11 / 0.12 / 0.13 / 0.14 / 0.15 / 0.16 / 0.17 / 0.18 / 0.19 / 0.2 / 0.22 / 0.24 / 0.26 / 0.28 / 0.3 | 14 70 00 | 14 75 00                           |
| ** maybe calculated by deducting free from total chlorine |                                 | only with CHECKIT® Comparator D55 with mirror optics (path length 55 mm)   |          |                                    |

\* RAPID: fast dissolving tablet  
# including stirring rod



| Disc     | Reagents                                   | Quantity                        | Code        |
|----------|--|---------------------------------|-------------|
| 14 62 00 | ALUMINIUM No.1                             | 100                             | 51 54 60 BT |
|          |  | 250                             | 51 54 61 BT |
|          | ALUMINIUM No.2                             | 100                             | 51 54 70 BT |
|          |  | 250                             | 51 54 71 BT |
|          | Combi pack <sup>#</sup>                    | each 100                        | 51 76 01 BT |
|          | ALUMINIUM No.1 / No.2                      | each 250                        | 51 76 02 BT |
| 14 62 10 | AMMONIA No.1                               | 100                             | 51 25 80 BT |
|          |  | 250                             | 51 25 81 BT |
|          | AMMONIA No.2                               | 100                             | 51 25 90 BT |
|          |  | 250                             | 51 25 91 BT |
|          | Combi pack <sup>#</sup>                    | each 100                        | 51 76 11 BT |
|          | AMMONIA No.1 / No.2                        | each 250                        | 51 76 12 BT |
| 14 62 11 | VARIO Ammonia Salicylate F10               | Powder Pack / 200               | 53 55 00    |
|          | VARIO Ammonia Cyanurate F10                | Powder Pack / 200<br><b>Set</b> |             |
| 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 60 00 | DPD No.1                                   | 100                             | 51 10 50 BT |
|          |  | 250                             | 51 10 51 BT |
|          |  | 500                             | 51 10 52 BT |
|          | DPD No.3                                   | 100                             | 51 10 80 BT |
|          |  | 250                             | 51 10 81 BT |
|          |  | 500                             | 51 10 82 BT |
|          | Combi pack <sup>#</sup><br>DPD No.1 / No.3 | each 100                        | 51 77 11 BT |
|          |  | each 250                        | 51 77 12 BT |
|          |  |                                 |             |



CHECKIT®Discs

Material Safety Data Sheets: [www.lovibond.com](http://www.lovibond.com)<sup>†</sup> additionally required for determination of chlorine dioxide / ozone in the presence of chlorine

# CHECKIT® Comparator

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

| Test   | Range                            | Readings (Accuracy ± 5% Full Scale)   | Test Kit | Testpak  |
|--|----------------------------------|---|----------|----------|
| <b>Chlorine KI</b><br>total only                 | 10 - 300 mg/l Cl <sub>2</sub>    | 10 / 20 / 30 / 40 / 50 / 60 / 70 / 80 / 90 / 100 / 110 / 120 /<br>130 / 140 / 150 / 160 / 170 / 180 / 190 / 200 / 250 / 300   | 14 70 30 | 14 75 30 |
| <b>Chlorine dioxide</b>                          | 0.01 - 0.2 mg/l ClO <sub>2</sub> | 0.01 / 0.02 / 0.03 / 0.04 / 0.05 / 0.06 / 0.07 / 0.08 / 0.09 /<br>0.1 / 0.11 / 0.12 / 0.13 / 0.14 / 0.15 / 0.16 / 0.17 / 0.18 /<br>0.19 / 0.2<br><br>only with CHECKIT® Comparator D55 with mirror optics (path length 55 mm) | 14 73 30 | 14 78 30 |
| <b>Copper, free (Cu<sup>2+</sup>)</b>            | 0 - 1 mg/l Cu                    | 0 / 0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0   | 14 72 30 | 14 77 30 |
| <b>Copper HR</b><br>free and total               | 0 - 5 mg/l Cu                    | 0 / 0.5 / 1.0 / 1.5 / 2.0 / 2.5 / 3.0 / 3.5 / 4.0 / 4.5 / 5.0   | 14 74 30 | 14 79 30 |
| <b>Copper HR, free only</b>                      | 0 - 5 mg/l Cu                    | 0 / 0.5 / 1 / 1.5 / 2 / 2.5 / 3 / 3.5 / 4 / 5   | 14 74 31 | 14 79 31 |
| <b>Copper LR</b><br>free and total               | 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<br><br>only with CHECKIT® Comparator D55 with mirror optics (path length 55 mm)   | 14 74 40 | 14 79 40 |
| <b>Copper LR, free only</b>                      | 0 - 1 mg/l Cu                    | 0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 /<br>0.6 / 0.7 / 0.8 / 0.9 / 1.0<br>only with CHECKIT® Comparator D55 with mirror optics (path length 55 mm)   | 14 74 41 | 14 79 41 |
| <b>DEHA</b>                                      | 0 - 0.5 mg/l DEHA                | 0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5  | 14 73 70 | 14 78 70 |
| <b>Fluoride</b><br><br>Testpak available<br>only | 0.2 - 2 mg/l F                   | 0.2 / 0.4 / 0.6 / 0.8 / 1.0 / 1.2 / 1.4 / 1.6 / 1.8 / 2.0   | -----    | 14 78 90 |

\* RAPID: fast dissolving tablet  
# including stirring rod

| Disc     | Reagents                       | Quantity              | Code        |
|----------|--------------------------------|-----------------------|-------------|
| 14 60 30 | 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 <sup>#</sup> | 51 77 22 BT |
| 14 63 30 | DPD No. 1                      | 100                   | 51 10 50 BT |
|          |                                | 250                   | 51 10 51 BT |
|          | DPD Glycine <sup>†)</sup>      | 100                   | 51 21 70 BT |
|          |                                | 250                   | 51 21 71 BT |
|          | Combi pack <sup>#</sup>        | each 100              | 51 77 31 BT |
|          | DPD No.1 / GLYCINE             | each 250              | 51 77 32 BT |
| 14 62 30 | COPPER/ZINC LR                 | 100                   | 51 26 20 BT |
|          |                                | 250                   | 51 26 21 BT |
| 14 64 30 | COPPER No. 1                   | 100                   | 51 35 50 BT |
|          |                                | 250                   | 51 35 51 BT |
|          | COPPER No. 2                   | 100                   | 51 35 60 BT |
|          |                                | 250                   | 51 35 61 BT |
|          | Combi pack <sup>#</sup>        | each 100              | 51 76 91 BT |
|          | COPPER No.1 / No.2             | each 250              | 51 76 92 BT |
| 14 64 31 | Vario Cu1 F10                  | 100                   | 53 03 00    |
| 14 64 40 | COPPER No. 1                   | 100                   | 51 35 50 BT |
|          |                                | 250                   | 51 35 51 BT |
|          | COPPER No. 2                   | 100                   | 51 35 60 BT |
|          |                                | 250                   | 51 35 61 BT |
|          | Combi pack <sup>#</sup>        | each 100              | 51 76 91 BT |
|          | COPPER No.1 / No.2             | each 250              | 51 76 92 BT |
| 14 64 41 | Vario Cu1 F10                  | 100                   | 53 03 00    |
| 14 63 70 | DEHA                           | 100                   | 51 32 20 BT |
|          |                                | 250                   | 51 32 21 BT |
|          | DEHA solution                  | 15 ml                 | 46 11 85    |
|          | DEHA solution                  | 100 ml                | 46 11 81    |
|          | Plastic funnel with handle     | 1                     | 47 10 07    |
| 14 63 90 | SPADNS reagent solution        | 250 ml                | 46 74 81    |
|          |                                | 500 ml                | 46 74 82    |
|          | Help for pipette               | 1                     | 36 50 55    |
|          | Pipette 2 ml                   | 1                     | 36 50 50    |



Test Kit complete in case

Material Safety Data Sheets: [www.lovibond.com](http://www.lovibond.com)<sup>†)</sup> additionally required for determination of chlorine dioxide / ozone in the presence of chlorine



# CHECKIT® Comparator

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

| Test   | Range                          | Readings (Accuracy ± 5% Full Scale)  | Test Kit | Testpak  |
|--|--------------------------------|--|----------|----------|
| <b>Iron LR</b>                                 | 0 - 1 mg/l Fe                  | 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.9 / 1.0  | 14 72 20 | 14 77 20 |
| <b>Iron HR</b>                                 | 1 - 10 mg/l Fe                 | 1 / 1.5 / 2 / 2.5 / 3 / 3.5 / 4 / 4.5 / 5 / 5.5 / 6 / 6.5 / 7 / 7.5 / 8 / 8.5 / 9 / 10   | 14 73 20 | 14 78 20 |
| <b>Iron (TPTZ)</b>                             | 0 - 1.8 mg/l Fe                | 0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1 / 1.1 / 1.2 / 1.3 / 1.4 / 1.5 / 1.6 / 1.7 / 1.8  | 14 74 70 | 14 79 70 |
| <b>Manganese LR</b><br>Testpak available only  | 0.1 - 0.7 mg/l Mn              | 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  | -----    | 14 79 10 |
| <b>Manganese VLR</b><br>Testpak available only | 0.02 - 0.2 mg/l Mn             | 0.02 / 0.03 / 0.04 / 0.05 / 0.06 / 0.07 / 0.08 / 0.09 / 0.1 / 0.11 / 0.12 / 0.13 / 0.14 / 0.15 / 0.16 / 0.18 / 0.2<br><br>only with CHECKIT® Comparator D55 with mirror optics (path length 55 mm) | -----    | 14 79 20 |
| <b>Molybdate HR</b>                            | 0 - 100 mg/l MoO <sub>4</sub>  | 0 / 5 / 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50 / 55 / 60 / 65 / 70 / 75 / 80 / 85 / 90 / 95 / 100  | 14 72 90 | 14 77 90 |
| <b>Molybdate HR</b>                            | 50 - 500 mg/l MoO <sub>4</sub> | 50 / 100 / 150 / 200 / 250 / 300 / 500   | 14 72 95 | 14 77 95 |
| <b>Molybdate LR</b>                            | 0 - 10 mg/l MoO <sub>4</sub>   | 0 / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10<br><br>only with CHECKIT® Comparator D55 with mirror optics (path length 55 mm)   | 14 72 91 | 14 77 91 |

\* RAPID: fast dissolving tablet  
# including stirring rod

| Disc     | Reagents  | Quantity | Code        |
|----------|---|----------|-------------|
| 14 62 20 | IRON LR (Fe <sup>2+</sup> and Fe <sup>3+</sup> )                        | 100      | 51 53 70 BT |
|          |   | 250      | 51 53 71 BT |
|          | IRON (II) LR (Fe <sup>2+</sup> )  | 100      | 51 54 20 BT |
| 14 63 20 | IRON HR   | 100      | 51 53 80 BT |
|          |   | 250      | 51 53 81 BT |
| 14 64 70 | Vario Iron TPTZ F10   | 100      | 53 05 50    |
| 14 64 10 | VARIO Manganese Reagent, LR F10   | 1 Set    | 53 50 90    |
|          | consists of:  |          |             |
|          | VARIO Alkaline-Cyanide Solution   | 60 ml    |             |
|          | Vario Ascorbic Acid   | 100      |             |
|          | Vario PAN Indicator Solution  | 60 ml    |             |
|          | Accessories:  |          |             |
| 14 64 20 | VARIO Rochelle Salt Solution  | 30 ml    | 53 06 40    |
|          | needs for samples with hardness values above 300 mg/l CaCO <sub>3</sub> |          |             |
| 14 64 20 | VARIO Manganese Reagent, LR F10   | 1 Set    | 53 50 90    |
|          | consists of:  |          |             |
|          | VARIO Alkaline-Cyanide Solution   | 60 ml    |             |
|          | Vario Ascorbic Acid   | 100      |             |
|          | Vario PAN Indicator Solution  | 60 ml    |             |
|          | Accessories:  |          |             |
| 14 62 90 | VARIO Rochelle Salt Solution  | 30 ml    | 53 06 40    |
|          | needs for samples with hardness values above 300 mg/l CaCO <sub>3</sub> |          |             |
| 14 62 90 | MOLYBDATE No. 1 HR  | 100      | 51 30 60 BT |
|          |   | 250      | 51 30 61 BT |
|          | MOLYBDATE No. 2 HR  | 100      | 51 30 70 BT |
|          |   | 250      | 51 30 71 BT |
|          | Combi pack <sup>#</sup>   | each 100 | 51 76 31 BT |
|          | MOLYBDATE No.1 HR / No.2 HR   | each 250 | 51 76 32 BT |
| 14 62 95 | MOLYBDATE No. 1 HR  | 100      | 51 30 60 BT |
|          |   | 250      | 51 30 61 BT |
|          | MOLYBDATE No. 2 HR  | 100      | 51 30 70 BT |
|          |   | 250      | 51 30 71 BT |
|          | Combi pack <sup>#</sup>   | each 100 | 51 76 31 BT |
|          | MOLYBDATE No.1 HR / No.2 HR   | each 250 | 51 76 32 BT |
| 14 62 91 | MOLYBDATE No. 1 HR  | 100      | 51 30 60 BT |
|          |   | 250      | 51 30 61 BT |
|          | MOLYBDATE No. 2 HR  | 100      | 51 30 70 BT |
|          |   | 250      | 51 30 71 BT |
|          | Combi pack <sup>#</sup>   | each 100 | 51 76 31 BT |
|          | MOLYBDATE No.1 HR / No.2 HR   | each 250 | 51 76 32 BT |



Plastic cells, volume 10 ml

Material Safety Data Sheets: [www.lovibond.com](http://www.lovibond.com)<sup>†</sup> additionally required for determination of chlorine dioxide / ozone in the presence of chlorine

# CHECKIT<sup>®</sup> Comparator

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

| Test  | Range  | Readings (Accuracy ± 5% Full Scale)   | Test Kit                         | Testpak                          |
|---|--|---|----------------------------------|----------------------------------|
| <b>Nitrate LR</b><br>Testpak available only       | 0 - 1 mg/l N                                 | 0 / 0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0   | -----                            | 14 78 10                         |
| <b>Nitrite LR</b>                                 | 0 - 0.5 mg/l N                               | 0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5  | 14 73 00                         | 14 78 00                         |
| <b>Nitrite VARIO</b>                              | 0 - 0.3 mg/l N                               | 0 / 0.01 / 0.02 / 0.03 / 0.04 / 0.05 / 0.06 / 0.07 / 0.08 / 0.09 / 0.10 / 0.11 / 0.12 / 0.13 / 0.14 / 0.15 / 0.16 / 0.17 / 0.18 / 0.19 / 0.20 / 0.21 / 0.22 / 0.23 / 0.24 / 0.25 / 0.26 / 0.27 / 0.28 / 0.29 / 0.30   | 14 73 01                         | 14 78 01                         |
| <b>Ozone (DPD)</b><br>in the presence of chlorine | 0 - 1.0 mg/l O <sub>3</sub>                  | 0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.9 / 1.0   | 14 72 70                         | 14 77 70                         |
| <b>Ozone (DPD)</b>                                | 0 - 1.0 mg/l O <sub>3</sub>                  | 0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.75 / 0.8 / 0.9 / 1.0   | 14 72 75                         | 14 77 75                         |
| <b>pH</b>   | 5.2 - 6.8 pH<br>6.0 - 7.6 pH<br>6.5 - 8.4 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<br>6.0 / 6.1 / 6.2 / 6.3 / 6.4 / 6.5 / 6.6 / 6.7 / 6.8 / 6.9 / 7.0 / 7.1 / 7.2 / 7.3 / 7.4 / 7.5 / 7.6<br>6.5 / 6.6 / 6.7 / 6.8 / 6.9 / 7.0 / 7.1 / 7.2 / 7.3 / 7.4 / 7.5 / 7.6 / 7.7 / 7.8 / 7.9 / 8.0 / 8.1 / 8.2 / 8.3 / 8.4 | 14 71 10<br>14 71 20<br>14 71 00 | 14 76 10<br>14 76 20<br>14 76 00 |
| <b>pH-Universal</b>                               | 4 - 10 pH                                    | 4 / 4.5 / 5 / 5.5 / 6 / 6.5 / 7 / 7.5 / 8 / 8.5 / 9 / 9.5 / 10  | 14 71 30                         | 14 76 30                         |
| <b>Phosphate HR</b>                               | 0 - 80 mg/l PO <sub>4</sub>                  | 0 / 5 / 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50 / 55 / 60 / 65 / 70 / 75 / 80  | 14 72 50                         | 14 77 50                         |
| <b>Phosphate LR</b>                               | 0 - 4 mg/l PO <sub>4</sub>                   | 0 / 0.25 / 0.5 / 0.75 / 1.0 / 1.25 / 1.5 / 1.75 / 2.0 / 2.25 / 2.5 / 2.75 / 3.0 / 3.25 / 3.5 / 3.75 / 4.0   | 14 72 40                         | 14 77 40                         |
| <b>Phosphate</b>                                  | 0 - 2.5 mg/l PO <sub>4</sub>                 | 0 / 0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1 / 1.1 / 1.2 / 1.3 / 1.4 / 1.5 / 1.6 / 1.7 / 1.8 / 1.9 / 2 / 2.1 / 2.2 / 2.3 / 2.4 / 2.5   | 14 74 80                         | 14 79 80                         |

\* RAPID: fast dissolving tablet  
# including stirring rod



| Disc     | Reagents                    | Quantity          | Code        |
|----------|-----------------------------|-------------------|-------------|
| 14 63 10 | NITRITE LR                  | 100               | 51 23 10BT  |
|          |                             | 250               | 51 23 11BT  |
|          | NITRATE-Test tablets        | 100 (bottle)      | 50 28 10    |
|          | NITRATE Test powder         | 15 g              | 46 52 30    |
|          | NITRATE Test tube           | 1                 | 36 62 20    |
| 14 63 00 | NITRITE LR                  | 100               | 51 23 10BT  |
|          |                             | 250               | 51 23 11BT  |
| 14 63 01 | VARIO Nitri 3 F10           | Powder Pack / 100 | 53 09 80    |
| 14 62 70 | DPD No. 4                   | 100               | 51 12 20 BT |
|          |                             | 250               | 51 12 21 BT |
|          | DPD Glycine <sup>†)</sup>   | 100               | 51 21 70 BT |
|          |                             | 250               | 51 21 71 BT |
| 14 62 75 | DPD No. 4                   | 100               | 51 12 20 BT |
|          |                             | 250               | 51 12 21 BT |
| 14 61 10 | BROMOCRESOL PURPLE          | 100               | 51 17 30    |
|          |                             | 250               | 51 17 31    |
| 14 61 20 | BROMOTHYMOL BLUE            | 100               | 51 16 40 BT |
|          |                             | 250               | 51 16 41 BT |
| 14 61 00 | PHENOL RED-RAPID*           | 100               | 51 17 90 BT |
|          |                             | 250               | 51 17 91 BT |
| 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 <sup>#</sup>     | each 100          | 51 76 51 BT |
|          | PHOSPHATE No.1 LR / No.2 LR | each 250          | 51 76 52 BT |
| 14 64 80 | Vario PHOS 3 F10            | 100               | 53 15 50    |



CHECKIT®Comparator with powder reagent / tablets

Material Safety Data Sheets: [www.lovibond.com](http://www.lovibond.com)<sup>†)</sup> additionally required for determination of chlorine dioxide / ozone in the presence of chlorine

# CHECKIT<sup>®</sup> Comparator

Tests, Test Kits, Testpaks, Discs, Reagents

| Test                      | Range                                       | Readings (Accuracy ± 5% Full Scale)   | Test Kit | Testpak  |
|---------------------------|---|---|----------|----------|
| <b>Silica LR</b>          | 0.25 - 4 mg/l SiO <sub>2</sub>              | 0.25 / 0.5 / 0.75 / 1.0 / 1.25 / 1.5 / 1.75 / 2.0 / 2.5 / 3.0 / 3.5 / 4   | 14 73 50 | 14 78 50 |
| <b>Silica HR VARIO</b>    | 0 - 100 mg/l SiO <sub>2</sub>               | 0 / 10 / 20 / 30 / 40 / 50 / 60 / 70 / 80 / 90 / 100  | 14 73 51 | 14 78 51 |
| <b>Silica VLR</b>         | 0 - 1 mg/l SiO <sub>2</sub>                 | 0 / 0.05 / 0.1 / 0.15 / 0.2 / 0.25 / 0.3 / 0.35 / 0.4 / 0.45 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0                    | 14 73 60 | 14 78 60 |
| <b>Sodiumhypochlorite</b> | 2 - 18 %                                    | 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15 / 16 / 18   | 14 74 90 | 14 79 90 |
| <b>Sulfite LR</b>         | 0.5 - 10 mg/l SO <sub>3</sub> <sup>2-</sup> | 0.5 / 1 / 1.5 / 2 / 2.5 / 3 / 3.5 / 4 / 4.5 / 5 / 6 / 7 / 8 / 9 / 10  | 14 73 80 | 14 78 80 |
| <b>Total Alkalinity</b>   | 20 - 240 mg/l CaCO <sub>3</sub>             | 20 / 30 / 40 / 50 / 60 / 70 / 80 / 90 / 100 / 110 / 120 / 130 / 140 / 150 / 160 / 170 / 180 / 190 / 200 / 220 / 240 | 14 74 50 | 14 79 50 |
| <b>Zinc LR</b>            | 0 - 1 mg/l Zn                               | 0 / 0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0   | 14 73 40 | 14 78 40 |

\* RAPID: fast dissolving tablet  
# including stirring rod

| Disc     | Reagents                            | Quantity          | Code        |
|----------|-------------------------------------|-------------------|-------------|
| 14 63 50 | SILICA No. 1                        | 100               | 51 31 30    |
|          |                                     | 250               | 51 31 31    |
|          | SILICA No. 2                        | 100               | 51 31 40    |
|          |                                     | 250               | 51 31 41    |
|          | Combi pack <sup>#</sup>             | each 100          | 51 76 71    |
|          | SILICA No.1 / No.2                  | each 200          | 51 76 72    |
|          | SILICA PR                           | 100               | 51 31 50    |
|          |                                     | 250               | 51 31 51    |
| 14 63 51 | Vario Silica HR Molybdate F10       | Powder Pack / 100 |             |
|          | Vario Silica HR Acid Rgt F10        | Powder Pack / 100 |             |
|          | Vario Silica HR Citric Acid F10     | Powder Pack / 100 |             |
|          | <b>Set</b>                          |                   | 53 57 00    |
| 14 63 60 | SILICA No. 1                        | 100               | 51 31 30    |
|          |                                     | 250               | 51 31 31    |
|          | SILICA No. 2                        | 100               | 51 31 40    |
|          |                                     | 250               | 51 31 41    |
|          | Combi pack <sup>#</sup>             | each 100          | 51 76 71    |
|          | SILICA No.1 / No.2                  | each 200          | 51 76 72    |
|          | SILICA PR                           | 100               | 51 31 50    |
|          |                                     | 250               | 51 31 51    |
| 14 64 90 | CHLORINE HR (KI)                    | 100               | 51 30 00 BT |
|          |                                     | 250               | 51 30 01 BT |
|          | ACIDIFYING GP                       | 100               | 51 54 80 BT |
|          |                                     | 250               | 51 54 81 BT |
|          | Combi pack <sup>#</sup>             | each 100          | 51 77 21 BT |
|          | CHLORINE HR (KI)/ACIDIFYING GP      | each 250          | 51 77 22 BT |
|          | Dilution set for sample preparation | 1                 | 41 44 70    |
| 14 63 80 | SULFITE LR                          | 100               | 51 80 20    |
| 14 64 50 | ALKACHECK                           | 100               | 51 32 00 BT |
|          |                                     | 250               | 51 32 01 BT |
| 14 63 40 | COPPER/ZINC LR                      | 100               | 51 26 20 BT |
|          |                                     | 250               | 51 26 21 BT |
|          | EDTA                                | 100               | 51 23 90 BT |
|          |                                     | 250               | 51 23 91 BT |
|          | DECHLOR                             | 100               | 51 23 50 BT |
|          |                                     | 250               | 51 23 51 BT |



CHECKIT®Discs

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

<sup>†</sup> additionally required for determination of chlorine dioxide / ozone in the presence of chlorine



# Comparator 2000+



## Applikationen

- Water Treatment (e.g. Drinking Water)
- Pool-Water
- Research Centres
- Universities
- Special Applications
- Laboratory and Field Testing

The system for  
colorimetric water analysis

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.

## Test discs

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

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

Please see the table on page 30 for information on the various test discs or refer to our **L 213 test disc catalogue**.

## Lighting unit

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

## 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.



Comparator 2000+



Test disc with colour-stable glass standards



Lighting unit TK 102



Nessleriser with lighting unit

➔ **Order codes see page 29**

## Highlights

- More than 400 different test discs available
- Compensation for coloured and turbid samples
- Guaranteed constancy of the coloured glass standards
- Integrated prism

# Comparator 2000+ Test Kits

## Complete kits for water analysis

### Scope of delivery for standard kits

Comparator test kits are supplied as a complete system in a sturdy plastic case. Together with the Comparator 2000+ and test discs, each kit includes all the necessary cells, accessories and Lovibond® tablet reagents (for 100 measurements) to achieve reliable results.

The table to the right shows a selection of the most popular standard test kits.

### Customised equipment

In addition to supplying standard test kits, we can construct customised kits to suit individual requirements.

Based on the desired test parameters and measuring ranges we will draw up a detailed offer to suit your application.

### Optional accessory

All test kit versions allow integration of the battery-operated portable lighting unit TK 102 and charger TK 102/ 1.

### Operating instructions

The operating instructions provide a step-by-step explanation of how to conduct the water test, ensuring that even "non-chemists" can achieve reliable and accurate measurements in the minimum of time.



Example of a comparator test kit, together with daylight unit

| Type         | Designation/Combi  | Test                | Range*                            | Code     |
|--------------|--|---------------------|-----------------------------------|----------|
| AF 270       | Mini Lab<br>Pool Water                                     | Aluminium           | 0 - 0.5 mg/l Al                   | 41 27 00 |
|              |  | Ammonia             | 0 - 0.4 mg/l N                    |          |
|              |  | Chlorine            | 0.1 - 1.0 mg/l Cl <sub>2</sub>    |          |
|              |  | Chloride            | 1.0 - 4.0 mg/l Cl <sub>2</sub>    |          |
|              |  | Stabilizer          | 5 - 5000 mg/l Cl                  |          |
|              |  | Iron                | 0 - 80 mg/l                       |          |
|              |  | pH-value            | 0.1 - 1.0 mg/l Fe                 |          |
|              |  |                     | 5.2 - 6.8 pH                      |          |
|              |  |                     | 6.8 - 8.4 pH                      |          |
|              |  | Alkalinity-M        | 20 - 800 mg/l CaCO <sub>3</sub>   |          |
|              |  | Sulphate            | 40 - 4000 mg/l SO <sub>4</sub>    |          |
| AF 357       | Drinking Water   | Chloride (salinity) | 0 - 5000 mg/l Cl                  | 41 35 70 |
|              |  | Chlorine            | 0.02 - 0.3 mg/l Cl <sub>2</sub>   |          |
|              |  |                     | 0.2 - 4 mg/l Cl <sub>2</sub>      |          |
|              |  | Hardness Total      | 0 - 500 mg/l CaCO <sub>3</sub>    |          |
|              |  | Fluoride            | 0 - 1.6 mg/l F                    |          |
|              |  | Hazen Colour        | 10 - 90 mg/l Pt                   |          |
|              |  | pH-value            | 6 - 8.4 pH                        |          |
| AF 358       | Sewage and<br>Domestic Effluents                           | Ammonia             | 0 - 1 mg/l N                      | 41 35 80 |
|              |  | Chlorine            | 0.1 - 1 mg/l Cl <sub>2</sub>      |          |
|              |  |                     | 1 - 10 mg/l Cl <sub>2</sub>       |          |
|              |  | Nitrite             | 0.05 - 0.5 mg/l N                 |          |
|              |  | Permanganate (BOD)  | 0 - 60 mg/l                       |          |
|              |  | pH-value            | 4 - 8 ; 8 - 9.6 pH                |          |
|              |  | Sulphide            | 0 - 0.5 mg/l S                    |          |
| AF 368       | Mini Lab<br>Heavy Metals<br>(supplied without<br>reagents) | Chromium            | 10 - 100 µg Cr                    | 41 36 80 |
|              |  | Copper              | 2.5 - 50 µg Cu                    |          |
|              |  | Cyanide             | 0.05 - 1 mg/l Cn                  |          |
|              |  | Nickel              | 1 - 10 mg/l Ni                    |          |
|              |  | Zinc                | 0 - 50 µg Zn                      |          |
|              |  |                     |                                   |          |
|              |  |                     |                                   |          |
|              |  |                     |                                   |          |
| Type         | Designation/Single   | Test                | Range*                            | Code     |
| AF 274       | Amine  | Amine               | 1 - 10 mg/l                       | 41 27 40 |
| AF 112A      | Chlorine free, comb. tot.                                  | Chlorine            | 0.1 - 1 mg/l Cl <sub>2</sub>      | 41 11 20 |
| AF 112B      | Chlorine free, comb. tot.                                  | Chlorine            | 0.2 - 4 mg/l Cl <sub>2</sub>      | 41 11 30 |
| AF 112E      | Chlorine free, comb. tot.                                  | Chlorine            | 0.02 - 0.3 mg/l Cl <sub>2</sub>   | 41 12 50 |
| AF 112E/F    | Chlorine free, comb. tot.                                  | Chlorine            | 0.02 - 0.3 mg/l Cl <sub>2</sub>   | 41 11 26 |
|              |  | Chlorine            | 0.2 - 0.8 mg/l Cl <sub>2</sub>    |          |
| AF 112J/J    | Chlorine free, comb. tot.                                  | Chlorine            | 0.1 - 2.0 mg/l Cl <sub>2</sub>    | 41 72 46 |
|              |  | pH-value            | 6.8 - 8.4 pH                      |          |
| AF 112N/T    | Chlorine free, comb. tot.                                  | Chlorine            | 0.1 - 1.0 mg/l Cl <sub>2</sub>    | 41 01 20 |
|              |  | Chlorine            | 1.1 - 2.0 mg/l Cl <sub>2</sub>    |          |
| AF 112ED     | Chlorine dioxide   | Chlorine dioxide    | 0.04 - 0.57 mg/l ClO <sub>2</sub> | 41 00 01 |
| AF 112 EF/ED | Chlorine dioxide   | Chlorine dioxide    | 0.04 - 1.52 mg/l ClO <sub>2</sub> | 41 00 07 |
| AF 116A      | Chlorine, pH   | Chlorine            | 0.1 - 1 mg/l Cl <sub>2</sub>      | 41 11 40 |
|              |  | pH-value            | 6.8 - 8.4 pH                      |          |
| AF 116B      | Chlorine, pH   | Chlorine            | 0.2 - 4 mg/l Cl <sub>2</sub>      | 41 11 60 |
|              |  | pH-value            | 6.8 - 8.4 pH                      |          |
| AF 118S      | Chlorine, pH   | Chlorine            | 0.1 - 4 mg/l Cl <sub>2</sub>      | 41 11 81 |
|              |  | pH-value            | 5.2 - 8.4 pH                      |          |
| AF 139       | Sodium hypochlorite  | Sodium hypochlorite | 2 - 18 % NaOCl                    | 41 13 90 |
| AF 129       | Water Balance  |                     |                                   | 41 12 90 |

\* Disc readings see following pages

## Comparator 2000+ and Accessories

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

## Glass Cells

| Type           | Item  | Code     |
|----------------|---|----------|
| <b>DB424/S</b> | 5 glass cells, 13.5 mm path length,<br>calibrated at 2 – 12 ml, with lids | 35 42 43 |
| <b>W680/40</b> | Glass cell 40 mm path length, calibrated at 20 ml                         | 60 68 90 |

## Plastic Cells

|  |   |          |
|--|---|----------|
|  | 5 plastic cells, frosted on two sides,<br>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 |

## Nessleriser System and Accessories

| Type            | Item   | Code     |
|-----------------|--|----------|
| <b>2150</b>     | Nessleriser 2150 with stand, daylight unit and AF 306/P      | 17 20 30 |
| <b>2150</b>     | Nessleriser 2150 with stand                                  | 17 21 50 |
| <b>2150</b>     | Nessleriser 2150 upgrade kit                                 | 17 21 60 |
| <b>2250</b>     | Nessleriser 2250 with stand, daylight unit and DB 420        | 17 20 40 |
| <b>2250</b>     | Nessleriser 2250 with stand                                  | 17 22 50 |
| <b>2250</b>     | Nessleriser 2250 upgrade kit with Nessler tubes DB 420       | 17 21 70 |
|                 | Daylight Unit for Nessleriser, mains operated                | 17 10 20 |
|                 | Stand for Nessleriser upgrade kit                            | 17 21 80 |
| <b>AF 306/S</b> | Stand for 12 Nessler tubes                                   | 17 02 90 |
| <b>AF 306</b>   | Pair Nessler tubes, 113 mm                                   | 35 30 60 |
| <b>AF 306/P</b> | Pair Nessler tubes, 113 mm with plungers                     | 35 30 80 |
|                 | Plunger for Nessler tube AF 306 and AF 306/P                 | 35 30 70 |
| <b>DB 420</b>   | Pair Nessler tubes, 250 mm with plungers                     | 35 42 00 |
|                 | Plunger for Nessler tube DB 420                              | 35 42 29 |
| <b>AF 315</b>   | Special Nessler tube (determination of oxygen with disc NOE) | 35 31 50 |



Glass cell with lid, volume 10 ml,  
calibrated 2 - 12 ml, path length 13,5 mm,  
Pack of 5, code: 35 42 43



# 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 |
| Amine     | 3/58    | 1; 2; 3; 4; 5; 6; 7; 8; 10 mg/l                    | 1.0 - 10 mg/l                | 23 58 00 |
| Amine     | 3/64    | 0; 0.25; 0.5; 1; 2 mg/l                            | 0 - 2 mg/l                   | 23 64 00 |
| Ammonia   | 3/112   | 0; 0.05; 0.1; 0.15; 0.2; 0.25; 0.3; 0.35; 0.4 mg/l | 0 - 0.4 mg/l NH <sub>4</sub> | 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 |
| Ammonia   | 3/125   | 0; 1; 2; 3; 4; 5; 6; 8; 10 mg/l                    | 0 - 10 mg/l N                | 23 01 80 |
| Ammonia   | NAA     | 1; 2; 3; 4; 5; 6; 8; 10 µg                         | 1 - 10 µg NH <sub>3</sub>    | 28 31 10 |
| Ammonia   | NAB     | 10; 12; 14; 16; 18; 20; 22; 24; 26 µg              | 10 - 26 µg NH <sub>3</sub>   | 28 31 20 |
| Ammonia   | NAC     | 28; 32; 36; 40; 44; 48; 52; 56; 60 µg              | 28 - 60 µg NH <sub>3</sub>   | 28 31 30 |
| Ammonia   | NAD     | 60; 65; 70; 75; 80; 85; 90; 95; 100 µg             | 60 - 100 µg NH <sub>3</sub>  | 28 31 40 |

# including stirring rod

| 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 <sup>#</sup>                    | each 100 | 51 76 01 BT |                       |          |
| ALUMINIUM No.1 / No.2                      | each 250 | 51 76 02 BT |                       |          |
| AMINE                                      | 100      | 51 10 10    | Extraction tube AF260 | 35 26 00 |
|  | 250      | 51 10 11    |                       |          |
| Details on request                         |          |             | 13.5 mm cell, 10ml    | 35 42 43 |
| AMMONIA No.1                               | 100      | 51 25 80 BT | 40 mm cell W680/40    | 60 68 90 |
|  | 250      | 51 25 81 BT |                       |          |
| AMMONIA No.2                               | 100      | 51 25 90 BT |                       |          |
|  | 250      | 51 25 91 BT |                       |          |
| Combi pack <sup>#</sup>                    | each 100 | 51 76 11 BT |                       |          |
| AMMONIA No.1 / No.2                        | each 250 | 51 76 12 BT |                       |          |
| AMMONIA No.1/2                             |          |             | 13.5 mm cell, 10ml    | 35 42 43 |
| AMMONIA No.1/2                             |          |             | 5 mm cell W680        | 60 67 90 |
| NESSLER reagent                            | 30 ml    | 46 52 00    | Nessler tubes 113 mm  | 35 30 60 |
|  | 100 ml   | 46 52 01    |                       |          |
| SEIGNETTE salt solution                    | 100 ml   | 46 61 01    |                       |          |
| NESSLER reagent<br>SEIGNETTE salt solution |          |             | Nessler tubes 113 mm  | 35 30 60 |
| NESSLER reagent<br>SEIGNETTE salt solution |          |             | Nessler tubes 113 mm  | 35 30 60 |
| NESSLER reagent<br>SEIGNETTE salt solution |          |             | Nessler tubes 113 mm  | 35 30 60 |



Lighting unit, mains operated

# Comparator 2000+

## Tests, Discs, Reagents, Cells

| Test                                     | Disc  | Disc Readings   | Range           | Code     |
|--|-------|---|-----------------|----------|
| <b>Bromine</b>                           | 3/53A | 0.2; 0.4 ; 0.6; 0.8; 1; 1.2; 1.4; 1.6; 2 mg/l           | 0.2 - 2.0 mg/l  | 23 53 10 |
| <b>Bromine</b>                           | 3/53B | 1; 2; 3; 4; 5; 6; 7; 8; 10 mg/l                         | 1.0 - 10 mg/l   | 23 53 20 |
| <b>Bromine</b>                           | 3/53C | 0.5; 1; 1.5; 2; 2.5; 3; 4; 5; 6 mg/l                    | 0.5 - 6 mg/l    | 23 53 30 |
| <b>Chlorine</b><br>free, combined, total | 3/40E | 0.02; 0.04 ; 0.06; 0.08; 0.1; 0.15; 0.2; 0.25; 0.3 mg/l | 0.02 - 0.3 mg/l | 23 40 60 |
| <b>Chlorine</b><br>free, combined, total |       | 0.02; 0.04 ; 0.06; 0.08; 0.1; 0.2; 0.3; 0.4; 0.5 mg/l   | 0.02 - 0.5 mg/l | 29 59 20 |
| <b>Chlorine</b><br>free, combined, total | 3/40F | 0.2; 0.25 ; 0.3; 0.35; 0.4; 0.5; 0.6; 0.7; 0.8 mg/l     | 0.2 - 0.8 mg/l  | 23 40 70 |
| <b>Chlorine</b><br>free, combined, total | 3/40G | 1.5; 1.8; 2.0; 2.3; 2.5; 2.7; 3.0; 3.2; 3.5 mg/l        | 1.5 - 3.5 mg/l  | 23 40 30 |
| <b>Chlorine</b><br>free, combined, total | 3/40A | 0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.7; 0.8; 1 mg/l          | 0.1 - 1.0 mg/l  | 23 40 10 |
| <b>Chlorine</b><br>free, combined, total | 3/40T | 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 41 10 |
| <b>Chlorine</b><br>free, combined, total | 3/40N | 1.1; 1.2; 1.3; 1.4; 1.5; 1.6; 1.7; 1.8; 2 mg/l          | 1.1 - 2.0 mg/l  | 23 39 60 |
| <b>Chlorine</b><br>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 |

# including stirring rod

| Reagents                | Quantity | Code        | Accessories        | Code     |
|-------------------------|----------|-------------|--------------------|----------|
| 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 | 40 mm cell W680/40 | 60 68 90 |
|                         | 250      | 51 10 51 BT |                    |          |
|                         | 500      | 51 10 52 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 |                    |          |
| Combi pack <sup>#</sup> | each 100 | 51 77 11 BT |                    |          |
| DPD No.1 / No.3         | each 250 | 51 77 12 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          |          |             | 40 mm cell W680/40 | 60 68 90 |
| DPD No.1/2/3/4          |          |             | 40 mm cell W680/40 | 60 68 90 |
| 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          |          |             | 25 mm cell W680/25 | 60 68 60 |
|                         |          |             | 13.5 mm cell, 10ml | 35 42 43 |
| DPD No.1/2/3/4          |          |             | 25 mm cell W680/25 | 60 68 60 |
|                         |          |             | 13.5 mm cell, 10ml | 35 42 43 |
| DPD No.1/2/3/4          |          |             | 13.5 mm cell, 10ml | 35 42 43 |



Tablet reagents in foil blister strip (BT)



# Comparator 2000+

## Tests, Discs, Reagents, Cells

| Test                                      | Disc   | Disc Readings  | Range                                    | Code     |
|---|--------|--|--|----------|
| <b>Chlorine</b><br>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 |
| <b>Chlorine</b><br>free, combined, total  | 3/40K  | 0.5; 1; 1.5; 2; 2.5; 3; 4; 5; 6 mg/l                             | 0.5 - 6.0 mg/l                           | 23 39 30 |
| <b>Chlorine</b><br>free, combined, total  | 3/40S  | 1; 1.2; 1.4; 1.6; 1.8; 2; 2.5; 3; 4 mg/l                         | 1.0 - 4.0 mg/l                           | 23 40 90 |
| <b>Chlorine</b><br>free, combined, total  | 3/40P  | 2; 2.3; 2.5; 2.7; 3; 3.2; 3.6; 4; 5 mg/l                         | 2.0 - 5.0 mg/l                           | 23 39 20 |
| <b>Chlorine</b><br>free, combined, total  | 3/40HN | 2; 3; 4; 5; 6; 7; 8; 9; 10 mg/l                                  | 2.0 - 10 mg/l                            | 23 40 81 |
| <b>Chlorine</b><br>free, combined, total  | 3/40CZ | 0.5; 1; 1.5; 2; 4 mg/l Cl <sub>2</sub><br>7; 7.4; 7.6; 8 pH      | 0.5 - 4 mg/l Cl <sub>2</sub><br>7 - 8 pH | 23 39 90 |
| <b>Chlorine</b><br>free, combined, total  | 3/2A   | 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 20 10 |
| <b>Chlorine</b><br>free, combined, total  | 3/2AB  | 0.15; 0.25; 0.5; 0.75; 1; 1.25; 1.5; 1.75; 2 mg/l                | 0.15 - 2.0 mg/l                          | 23 20 20 |
| <b>Chlorine</b><br>free, combined, total  | 3/2APC | 1; 1.5; 2; 2.5; 3; 3.5; 4; 4.5; 5 mg/l                           | 1.0 - 5.0 mg/l                           | 23 20 50 |
| <b>Chlorine HR</b><br>total chlorine only | 3/2APH | 2; 3; 4; 5; 6; 7; 8; 9; 10 mg/l total Cl <sub>2</sub>            | 2 - 10 mg/l                              | 23 20 60 |
| <b>Chlorine HR</b><br>total chlorine only | 3/2ARP | 5; 10; 15; 20; 25; 30; 35; 40; 50 mg/l total Cl <sub>2</sub>     | 5.0 - 50 mg/l                            | 23 20 70 |
| <b>Chlorine HR</b><br>total chlorine only | 3/2IOD | 5; 10; 25; 50; 75; 100; 150; 200; 250 mg/l total Cl <sub>2</sub> | 5.0 - 250 mg/l                           | 23 20 90 |

# including stirring rod

| 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  |          |             | 13.5 mm cell, 10ml | 35 42 43 |
| DPD No.1/2/3/4  |          |             | 5 mm cell W680/5   | 60 67 90 |
| DPD No.1/2/3/4<br>Phenol red tablets, see pH<br>determination |          |             | 13.5 mm cell, 10ml | 35 42 43 |
|   |          |             | 13.5 mm cell, 10ml | 35 42 43 |
| Reagents at specialized<br>chemistry dealer                   |          |             | 13.5 mm cell, 10ml | 35 42 43 |
| Reagents at specialized<br>chemistry dealer                   |          |             | 13.5 mm cell, 10ml | 35 42 43 |
| Reagents at specialized<br>chemistry dealer                   |          |             | 5 mm cell W680/5   | 60 67 90 |
| CHLORINE HR (KI)  | 100      | 51 30 00 BT | 40 mm cell W680/40 | 60 68 90 |
|   | 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)/<br>ACIDIFYING GP                            | each 250 | 51 77 22 BT |                    |          |
| CHLORINE HR (KI)<br>ACIDIFYING GP                             |          |             | 13.5 mm cell, 10ml | 35 42 43 |
| CHLORINE HR (KI)<br>ACIDIFYING GP                             |          |             | 13.5 mm cell, 10ml | 35 42 43 |



Test disc

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

# Comparator 2000+

## Tests, Discs, Reagents, Cells

| Test                                     | Disc   | Disc Readings   | Range            | Code     |
|--|--------|---|------------------|----------|
| <b>Chlorine</b><br>free, combined, total | NDPB   | 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  | 28 34 50 |
| <b>Chlorine</b><br>free, combined, total | NDPC   | 0.02; 0.04; 0.06; 0.08; 0.1; 0.12; 0.14; 0.16; 0.2 mg/l   | 0.02 - 0.2 mg/l  | 28 34 60 |
| <b>Chlorine</b><br>free, combined, total | NDP    | 0.05; 0.1; 0.15; 0.2; 0.25; 0.3; 0.35; 0.4; 0.5 mg/l      | 0.05 - 0.5 mg/l  | 28 34 40 |
| <b>Chlorine</b><br>free, combined, total | NDPD   | 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   | 28 34 70 |
| <b>Chlorine dioxide</b>                  | 3/40AD | 0.19; 0.38; 0.57; 0.76; 0.95; 1.14; 1.33; 1.52; 1.9 mg/l  | 0.19 - 1.9 mg/l  | 29 22 60 |
| <b>Chlorine dioxide</b>                  | 3/40ED | 0.04; 0.08; 0.11; 0.15; 0.19; 0.28; 0.38; 0.48; 0.57 mg/l | 0.04 - 0.57 mg/l | 29 79 70 |
| <b>Chlorine dioxide</b>                  | 3/40FD | 0.38; 0.48; 0.57; 0.66; 0.76; 0.95; 1.14; 1.33; 1.52 mg/l | 0.38 - 1.52 mg/l | 29 87 50 |
| <b>Chlorine dioxide</b>                  | 3/157  | 0.25; 0.5; 0.75; 1; 1.25; 1.5; 2; 3; 5 mg/l               | 0.25 - 5.0 mg/l  | 23 05 70 |
| <b>Chromium</b>                          | 3/59   | 10; 20; 30; 40; 50; 60; 70; 80; 100 µg                    | 10 - 100 µg      | 23 59 00 |
| <b>Copper</b>                            | 3/106  | 0; 0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.8; 1 mg/l              | 0 - 1.0 mg/l     | 23 00 50 |
| <b>Copper</b>                            | 3/110  | 0; 0.5; 1; 1.5; 2; 2.5; 3; 3.5; 4 mg/l                    | 0 - 4.0 mg/l     | 23 00 40 |

# including stirring rod

| Reagents                   | Quantity | Code        | Accessories          | Code     |
|----------------------------|----------|-------------|----------------------|----------|
| DPD No.1 NESSLERISER       | 100      | 51 12 30 BT | Nessleriser 2150     | 17 21 50 |
|                            | 250      | 51 12 31 BT | Nessler tubes 113 mm | 35 30 60 |
| DPD No.2 NESSLERISER       | 100      | 51 12 40    |                      |          |
|                            | 250      | 51 12 41    |                      |          |
| DPD No.3 NESSLERISER       | 100      | 51 12 50 BT |                      |          |
|                            | 250      | 51 12 51 BT |                      |          |
| DPD No.4 NESSLERISER       | 100      | 51 12 60 BT |                      |          |
|                            | 250      | 51 12 61 BT |                      |          |
|                            |          |             |                      |          |
| DPD No.1/2/3/4 NESSLERISER |          |             | Nessleriser 2150     | 17 21 50 |
|                            |          |             | Nessler tubes 113 mm | 35 30 60 |
|                            |          |             |                      |          |
| DPD No.1/2/3/4 NESSLERISER |          |             | Nessleriser 2150     | 17 21 50 |
|                            |          |             | Nessler tubes 113 mm | 35 30 60 |
|                            |          |             |                      |          |
| DPD No.1/2/3/4 NESSLERISER |          |             | Nessleriser 2150     | 17 21 50 |
|                            |          |             | Nessler tubes 113 mm | 35 30 60 |
|                            |          |             |                      |          |
| DPD No.1                   | 100      | 51 10 50 BT | 13.5 mm cell, 10 ml  | 35 42 43 |
|                            | 250      | 51 10 51 BT |                      |          |
|                            |          |             |                      |          |
| DPD No.1                   |          |             | 40 mm cell W680/40   | 60 68 90 |
|                            |          |             |                      |          |
| DPD No.1                   |          |             | 40 mm cell W680/40   | 60 68 90 |
|                            |          |             |                      |          |
| CHLORINE HR (KI)           | 100      | 51 30 00 BT | 40 mm cell W680/40   | 60 68 90 |
|                            | 250      | 51 30 01 BT |                      |          |
| ACIDIFYING GP              | 100      | 51 54 80 BT |                      |          |
|                            | 250      | 51 54 81 BT |                      |          |
| Combi pack <sup>#</sup>    | each 100 | 51 77 21 BT |                      |          |
| CHLORINE HR (KI)/          | each 250 | 51 77 22 BT |                      |          |
| ACIDIFYING GP              |          |             |                      |          |
|                            |          |             |                      |          |
| Details on request         |          |             | 13.5 mm cell, 10 ml  | 35 42 43 |
|                            |          |             |                      |          |
| COPPER/ZINC LR             | 100      | 51 26 20 BT | 13.5 mm cell, 10 ml  | 35 42 43 |
|                            | 250      | 51 26 21 BT |                      |          |
|                            |          |             |                      |          |
| COPPER/ZINC HR             | 100      | 51 23 40 BT | 13.5 mm cell, 10 ml  | 35 42 43 |
|                            | 250      | 51 23 41 BT |                      |          |

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



Lighting unit with comparator and discs, mains operated

# Comparator 2000+

## Tests, Discs, Reagents, Cells

| Test              | Disc   | Disc Readings   | Range                         | Code     |
|-------------------|--------|---|-------------------------------|----------|
| DEHA              | 3/150  | 8; 16; 24; 32; 40; 48; 56; 64; 80 µg/l<br>Disc reading should be multiplied by 2<br>for true DEHA concentration | 16 - 160 µg                   | 23 04 60 |
| Fluoride          | NOM    | 0; 0.2; 0.4; 0.6; 0.8; 1; 1.2; 1.4; 1.6 mg/l  | 0 - 1.6 mg/l                  | 28 37 30 |
| Hardness, total   | 4/38   | 0; 5; 10; 15; 20; 25; 30; 40; 60 mg/l   | 0 - 60 mg/l CaCO <sub>3</sub> | 23 10 70 |
| Hazen/APHA        | 4/28   | 50; 75; 100; 150; 200; 250; 300; 400; 500 mg Pt/l   | 50 - 500 mg/l Pt              | 24 28 01 |
| Hazen/APHA        | NSH    | 10; 20; 30; 40; 50; 60; 70; 80; 90 mg Pt/l  | 10 - 90 mg/l Pt               | 28 41 70 |
| Hazen/APHA        | NSB    | 70; 85; 100; 125; 150; 175; 200; 225; 250 mg Pt/l   | 70 - 250 mg/l Pt              | 28 41 20 |
| Hazen/APHA        | CAA    | 0; 2.5; 5; 7.5; 10; 15; 20; 25; 30 mg Pt/l  | 0 - 30 mg/l Pt                | 28 41 50 |
| Hazen/APHA        | CAB    | 30; 35; 40; 45; 50; 55; 60; 65; 70 mg Pt/l  | 30 - 70 mg/l Pt               | 28 41 60 |
| Hydrazine         | 3/126  | 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 01 90 |
| Hydrazine         | 3/135  | 0.02; 0.04; 0.06; 0.08; 0.1; 0.12; 0.14; 0.16; 0.2 mg/l   | 0.02 - 0.2 mg/l               | 23 02 90 |
| Hydrazine         | 3/85   | 0; 0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.8; 1 mg/l  | 0 - 1.0 mg/l                  | 23 85 00 |
| Hydrazine         | NOH    | 0; 0.5; 1; 2; 3; 4; 6; 8; 10 µg   | 0 - 10 µg/l                   | 28 37 00 |
| Hydrogen peroxide | 3/50 A | 0.05; 0.1; 0.15; 0.2; 0.25; 0.3; 0.35; 0.4; 0.5 mg/l  | 0.05 - 0.5 mg/l               | 23 50 00 |
| Hydrogen peroxide | 3/50 B | 0.1; 0.2; 0.3; 0.4; 0.6; 1; 1.5; 2; 3 mg/l  | 0.1 - 3 mg/l                  | 23 50 10 |

# including stirring rod



| Reagents                           | Quantity  | Code        | Accessories          | Code     |
|------------------------------------|-----------|-------------|----------------------|----------|
| DEHA                               | 100       | 51 32 20 BT | 40 mm cell W680/40   | 60 68 90 |
| DEHA solution                      | 250       | 51 32 21 BT |                      |          |
|                                    | 100 ml    | 46 11 81    |                      |          |
| FLUORIDE A-Z                       | 100       | 51 14 00    | Nessleriser 2150     | 17 21 50 |
|                                    | 250       | 51 14 01    | Nessler tubes 113 mm | 35 30 60 |
| FLUORIDE EXCESS AL                 | 100       | 51 14 10    |                      |          |
|                                    | 250       | 51 14 11    |                      |          |
| ERIOCHROME<br>HARDNESS powder      | 100 Tests | 46 29 50    | 13.5 mm cell, 10 ml  | 35 42 43 |
| Straight colour match to<br>sample |           |             | 40 mm cell W680/40   | 60 68 90 |
| Straight colour match to<br>sample |           |             | Nessleriser 2150     | 17 21 50 |
|                                    |           |             | Nessler tubes 113 mm | 35 30 60 |
| Straight colour match to<br>sample |           |             | Nessleriser 2150     | 17 21 50 |
|                                    |           |             | Nessler tubes 113 mm | 35 30 60 |
| Straight colour match to<br>sample |           |             | Nessleriser 2250     | 17 22 50 |
|                                    |           |             | Nessler tubes 250 mm | 35 42 00 |
| Straight colour match to<br>sample |           |             | Nessleriser 2250     | 17 22 50 |
|                                    |           |             | Nessler tubes 250 mm | 35 42 00 |
| HYDRAZINE TEST powder              | 30 g      | 46 29 10    | 13.5 mm cell, 10 ml  | 35 42 43 |
| HYDRAZINE TEST powder              | 30 g      | 46 29 10    | 40 mm cell W680/40   | 60 68 90 |
| p-DMAB reagent                     | 100 ml    | 46 12 61    | 13.5 mm cell, 10 ml  | 35 42 43 |
| p-DMAB reagent                     | 100 ml    | 46 12 61    | Nessler tubes 113 mm | 35 30 60 |
| HYDR. PEROXIDE LR                  | 100       | 51 23 80 BT | 13.5 mm cell, 10ml   | 35 42 43 |
|                                    | 250       | 51 23 81 BT |                      |          |
| HYDR. PEROXIDE LR                  |           |             | 13.5 mm cell, 10ml   | 35 42 43 |

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



Lighting unit TK 102, battery operated

# Comparator 2000+

## Tests, Discs, Reagents, Cells

| Test              | Disc   | Disc Readings   | Range                         | Code     |
|-------------------|--------|---|-------------------------------|----------|
| Hydrogen peroxide | 3/50 E | 0.01; 0.02; 0.03; 0.04; 0.05; 0.07; 0.09; 0.12; 0.15 mg/l | 0.01 - 0.15 mg/l              | 23 50 20 |
| Iodine            | 3/77A  | 0.4; 0.7; 1.1; 1.4; 1.8; 2.2; 2.5; 2.9; 3.6 mg/l          | 0.4 - 3.6 mg/l                | 23 77 10 |
| Iodine            | 3/77B  | 0.7; 1.4; 2.2; 3.6; 5.4; 7.2; 9.0; 11; 14 mg/l            | 0.7 - 14 mg/l                 | 23 77 20 |
| Iron,<br>total    | 3/144  | 0.02; 0.04; 0.06; 0.08; 0.1; 0.15; 0.2; 0.25; 0.3 mg/l    | 0.02 - 0.3 mg/l               | 23 03 80 |
| Iron,<br>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,<br>total    | 3/117  | 1; 2; 3; 4; 5; 6; 7; 8; 10 mg/l                           | 1.0 - 10 mg/l                 | 23 01 10 |
| Iron,<br>total    | NOL    | 0.01; 0.02; 0.03; 0.04; 0.05; 0.06; 0.07; 0.08; 0.10 mg/l | 0.01 - 0.1 mg/l               | 28 37 20 |
| 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 |
| Molybdate         | 3/162  | 0; 1; 2; 3; 4; 5; 6; 8; 10 mg/l                           | 0 -10 mg/l MoO <sub>4</sub>   | 23 06 20 |
| Molybdate         | 3/137  | 5; 10; 15; 20; 25; 30; 35; 40; 50 mg/l                    | 5.0 -50 mg/l MoO <sub>4</sub> | 23 03 20 |
| Molybdate         | 3/138  | 10; 20; 30; 40; 60; 80; 100; 120; 150 mg/l                | 10 -150 mg/l MoO <sub>4</sub> | 23 03 30 |

# including stirring rod

| Reagents  | Quantity             | Code                       | Accessories                              | Code                 |
|---|----------------------|----------------------------|--|----------------------|
| HYDR. PEROXIDE LR   |                      |                            | 40 mm cell W680/40                       | 60 68 90             |
| DPD No.1  | 100<br>250           | 51 10 50 BT<br>51 10 51 BT | 13.5 mm cell, 10 ml                      | 35 42 43             |
| DPD No.1  |                      |                            | 13.5 mm cell, 10 ml                      | 35 42 43             |
| IRON LR (Fe <sup>2+</sup> and Fe <sup>3+</sup> )                    | 100<br>250           | 51 53 70 BT<br>51 53 71 BT | 40 mm cell W680/40                       | 60 68 90             |
| IRON LR (Fe <sup>2+</sup> and Fe <sup>3+</sup> )                    | 100<br>250           | 51 53 70 BT<br>51 53 71 BT | 13.5 mm cell, 10 ml                      | 35 42 43             |
| IRON (II) LR (Fe <sup>2+</sup> )                                    | 100                  | 51 54 20 BT                |  |                      |
| IRON HR   | 100<br>250           | 51 53 80<br>51 53 81       | 13.5 mm cell, 10 ml                      | 35 42 43             |
| IRON LR + IRON (II) LR  |                      |                            | Nessleriser 2150<br>Nessler tubes 113 mm | 17 21 50<br>35 30 60 |
| MANGANESE LR 1  | 100<br>250           | 51 60 80 BT<br>51 60 81 BT | 13.5 mm cell, 10 ml                      | 35 42 43             |
| MANGANESE LR 2  | 100<br>250           | 51 60 90 BT<br>51 60 91 BT |  |                      |
| Combi pack <sup>#</sup><br>MANGANESE LR 1/<br>MANGANESE LR 2        | each 100<br>each 250 | 51 76 21 BT<br>51 76 22 BT |  |                      |
| Details on request  |                      |                            | 40 mm cell W680/40                       | 60 68 90             |
| MOLYBDATE No.1 HR   | 100<br>250           | 51 30 60 BT<br>51 30 61 BT | 40 mm cell W680/40                       | 60 68 90             |
| MOLYBDATE No.2 HR   | 100<br>250           | 51 30 70 BT<br>51 30 71 BT |  |                      |
| Combi pack <sup>#</sup><br>MOLYBDATE No.1 HR /<br>MOLYBDATE No.2 HR | each 100<br>each 250 | 51 76 31 BT<br>51 76 32 BT |  |                      |
| MOLYBDATE No.1 HR<br>MOLYBDATE No.2 HR                              |                      |                            | 13.5 mm cell, 10 ml                      | 35 42 43             |



Tablet reagents in foil blister strip (BT)

# Comparator 2000+

## Tests, Discs, Reagents, Cells

| Test    | Disc  | Disc Readings   | Range                          | Code     |
|---------|-------|---|--------------------------------|----------|
| Nitrate | 3/124 | 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 NO <sub>3</sub> | 23 01 70 |
| Nitrate | 3/142 | 10; 20; 30; 40; 50; 60; 70; 80; 100 mg/l                      | 10 - 100 mg/l NO <sub>3</sub>  | 23 03 60 |
| Nitrite | 3/103 | 0.05; 0.1; 0.15; 0.2; 0.25; 0.3; 0.35; 0.4; 0.5 mg/l          | 0.05 - 0.5 mg/l N              | 23 00 30 |
| Nitrite | NJP   | 0.002; 0.004; 0.006; 0.01; 0.015; 0.02; 0.03; 0.04; 0.05 mg/l | 0.002 - 0.05 mg/l N            | 28 39 60 |
| Nitrite | NJ    | 0.05; 0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.8; 1 µg/l               | 0.05 - 1.0 µg/l N              | 28 35 80 |
| Oxygen  | 3/165 | 2; 3; 4; 5; 6; 7; 8; 10; 12 mg/l                              | 2.0 - 12 mg/l                  | 23 06 50 |
| Ozone   | 3/67  | 0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.7; 0.8; 1 mg/l                | 0.1 - 1.0 mg/l                 | 23 67 00 |
| Ozone   | 3/67A | 0.01; 0.02; 0.03; 0.04; 0.05; 0.06; 0.07; 0.08; 0.1 mg/l      | 0.01 - 0.1 mg/l                | 23 67 10 |
| Ozone   | 3/67S | 0.05; 0.1; 0.15; 0.2; 0.25; 0.3; 0.35; 0.4; 0.45 mg/l         | 0.05 - 0.45 mg/l               | 23 67 70 |
| Ozone   | 3/148 | 0; 0.05; 0.1; 0.15; 0.2; 0.25; 0.3; 0.4; 0.5 mg/l             | 0 - 0.5 mg/l                   | 23 04 40 |

# including stirring rod

| Reagents                | Quantity     | Code        | Accessories          | Code     |
|-------------------------|--------------|-------------|----------------------|----------|
| NITRATE-TEST tablets    | 100 (bottle) | 50 28 10    | 13.5 mm cell, 10 ml  | 35 42 43 |
| NITRATE TEST powder     | 15 g         | 46 52 30    | Nitrate-Test tubes   | 36 62 20 |
| NITRITE LR              | 100          | 51 23 10BT  |                      |          |
|                         | 250          | 51 23 11BT  |                      |          |
| 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 <sup>#</sup> | each 100     | 51 76 41    |                      |          |
| Nitrate No.1 / No.2     | each 250     | 51 76 42    |                      |          |
| NITRITE LR              | 100          | 51 23 10BT  | 13.5 mm cell, 10 ml  | 35 42 43 |
|                         | 250          | 51 23 11BT  |                      |          |
| NITRITE LR              | 100          | 51 23 10BT  | Nessler tubes 113 mm | 35 30 60 |
|                         | 250          | 51 23 11BT  |                      |          |
| NITRITE ACIDIFYING      | 250 (bottle) | 50 23 71    |                      |          |
| Details on request      |              |             | Nessler tubes 113 mm | 35 30 60 |
| DO reagent No.1         | 100 Tests    | 46 11 50    | 13.5 mm cell, 10 ml  | 35 42 43 |
| DO reagent No.2         | 100 Tests    | 46 11 60    |                      |          |
| DO reagent No.3         | 90 Tests     | 46 11 70    |                      |          |
| 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 |                      |          |
| DPD No.4                | 100          | 51 12 20 BT | 13.5 mm cell, 10 ml  | 35 42 43 |
|                         | 250          | 51 12 21 BT |                      |          |
| OZONE-INDIGO            | 100          | 51 31 70    | 40 mm cell W680/40   | 60 68 90 |
|                         | 250          | 51 31 71    |                      |          |



Tablet reagents in foil blister strip (BT)



# Comparator 2000+

## Tests, Discs, Reagents, Cells

| Test | Disc | Disc Readings                               | Range        | Code     |
|------|------|---|--------------|----------|
| pH   | 2/1A | 1.2; 1.4; 1.6; 1.8; 2.0; 2.2; 2.4; 2.6; 2.8 | 1.2 - 2.8 pH | 22 10 10 |
| pH   | 2/1B | 2.8; 3; 3.2; 3.4; 3.6; 3.8; 4; 4.2; 4.4     | 2.8 - 4.4 pH | 22 10 30 |
| pH   | 2/1C | 3.6; 3.8; 4; 4.2; 4.4; 4.6; 4.8; 5; 5.2     | 3.6 - 5.2 pH | 22 10 50 |
| pH   | 2/1E | 4.4; 4.6; 4.8; 5; 5.2; 5.4; 5.6; 5.8; 6     | 4.4 - 6.0 pH | 22 10 80 |
| 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   | 2/1H | 6; 6.2; 6.4; 6.6; 6.8; 7; 7.2; 7.4; 7.6     | 6.0 - 7.6 pH | 22 11 10 |
| 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   | 2/1K | 7.2; 7.4; 7.6; 7.8; 8; 8.2; 8.4; 8.6; 8.8   | 7.2 - 8.8 pH | 22 11 40 |
| pH   | 2/1L | 8; 8.2; 8.4; 8.6; 8.8; 9; 9.2; 9.4; 9.6     | 8.0 - 9.6 pH | 22 11 90 |
| pH   | 2/1P | 4; 5; 6; 7; 8; 9; 9.4; 10; 11               | 4.0 - 11 pH  | 22 12 20 |
| pH   | NLC  | 6; 6.2; 6.4; 6.6; 6.8; 7; 7.2; 7.4; 7.6     | 6.0 - 7.6 pH | 28 10 30 |
| pH   | NLF  | 8; 8.2; 8.4; 8.6; 8.8; 9; 9.2; 9.4; 9.6     | 8.0 - 9.6 pH | 28 10 60 |

# including stirring rod

| Reagents                      | Quantity                            | Code   | Accessories          | Code     |
|-------------------------------|-------------------------------------|--|----------------------|----------|
| THYMOL BLUE                   | 100<br>250                          | 51 16 50<br>51 16 51                         | 13.5 mm cell, 10 ml  | 35 42 43 |
| BROMOPHENOL BLUE              | 100<br>250                          | 51 16 20<br>51 16 21                         | 13.5 mm cell, 10 ml  | 35 42 43 |
| BROMOCRESOL GREEN             | 100<br>250                          | 51 17 60<br>51 17 61                         | 13.5 mm cell, 10 ml  | 35 42 43 |
| METHYL RED                    | 100 ml                              | 45 16 31                                     | 13.5 mm cell, 10 ml  | 35 42 43 |
| BROMOCRESOL PURPLE            | 100<br>250                          | 51 17 30<br>51 17 31                         | 13.5 mm cell, 10 ml  | 35 42 43 |
| BROMOTHYMOL BLUE              | 100<br>250                          | 51 16 40 BT<br>51 16 41 BT                   | 13.5 mm cell, 10 ml  | 35 42 43 |
| PHENOL RED                    | 100<br>250                          | 51 17 50 BT<br>51 17 51 BT                   | 13.5 mm cell, 10 ml  | 35 42 43 |
| CRESOL RED                    | 100<br>250                          | 51 16 00<br>51 16 01                         | 13.5 mm cell, 10 ml  | 35 42 43 |
| THYMOL BLUE                   | 100<br>250                          | 51 16 50<br>51 16 51                         | 13.5 mm cell, 10 ml  | 35 42 43 |
| UNIVERSAL PH Indicator        | 25 ml<br>100 ml<br>250 ml<br>500 ml | 45 17 70<br>45 17 71<br>45 17 72<br>45 17 73 | 13.5 mm cell, 10 ml  | 35 42 43 |
| BROMOTHYMOL BLUE PH Indicator | 25 ml<br>100 ml<br>250 ml<br>500 ml | 45 16 20<br>45 16 21<br>45 16 22<br>45 16 23 | Nessler tubes 113 mm | 35 30 60 |
| THYMOL BLAU PH Indicator      | 25 ml<br>100 ml<br>250 ml<br>500 ml | 45 16 50<br>45 16 51<br>45 16 52<br>45 16 53 | Nessler tubes 113 mm | 35 30 60 |



Test disc

# Comparator 2000+

## Tests, Discs, Reagents, Cells

| Test                               | Disc  | Disc Readings                                    | Range                           | Code     |
|------------------------------------|-------|--|---------------------------------|----------|
| Phosphate                          | 3/133 | 0; 0.25; 0.5; 1; 1.5; 2; 2.5; 3; 4 mg/l          | 0 - 4.0 mg/l PO <sub>4</sub>    | 23 02 70 |
| Phosphate                          | 3/136 | 0; 5; 10; 15; 20; 25; 30; 35; 40 mg/l            | 0 - 40 mg/l PO <sub>4</sub>     | 23 03 10 |
| Phosphate                          | 3/12  | 0; 10; 20; 30; 40; 50; 60; 70; 80 mg/l           | 0 - 80 mg/l PO <sub>4</sub>     | 23 12 00 |
| Phosphate                          | 3/70  | 0; 10; 20; 30; 40; 50; 60; 70; 80; 100 mg/l      | 0 - 100 mg/l PO <sub>4</sub>    | 23 70 00 |
| Phosphate                          | 3/60  | 10; 20; 30; 40; 50; 60; 70; 80; 100 mg/l         | 10 - 100 mg/l PO <sub>4</sub>   | 23 60 00 |
| Phosphate                          | NMD   | 10; 20; 30; 40; 50; 60; 70; 80; 100 µg/l         | 10 - 100 µg/l PO <sub>4</sub>   | 28 39 50 |
| 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 |
| Silica                             | 3/139 | 0.4; 0.6; 1; 1.5; 2; 2.5; 3; 3.5; 4 mg/l         | 0.4 - 4.0 mg/l SiO <sub>2</sub> | 23 03 40 |
| Silica                             | 3/147 | 1; 2; 3; 4; 5; 6; 7; 8; 10 mg/l                  | 1.0 - 10 mg/l SiO <sub>2</sub>  | 23 04 20 |
| Silica                             | 3/140 | 0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.7; 0.8; 1.0 mg/l | 0.1 - 1.0 mg/l SiO <sub>2</sub> | 23 02 50 |
| Silica                             | 3/13  | 2.5; 5; 7.5; 10; 12.5; 15; 17.5; 20; 25 mg/l     | 2.5 - 25 mg/l SiO <sub>2</sub>  | 23 13 00 |
| Silica                             | NN    | 1; 2; 4; 6; 8; 10; 12; 16; 20 mg/l               | 1.0 - 20 mg/l SiO <sub>2</sub>  | 28 36 30 |

# including stirring rod

| Reagents                    | Quantity | Code        | Accessories          | Code     |
|-----------------------------|----------|-------------|----------------------|----------|
| PHOSPHATE No.1 LR           | 100      | 51 30 40    | 13.5 mm cell, 10 ml  | 35 42 43 |
|                             | 250      | 51 30 41    |                      |          |
| PHOSPHATE No.2 LR           | 100      | 51 30 50 BT |                      |          |
|                             | 250      | 51 30 51 BT |                      |          |
| Combi pack <sup>#</sup>     | each 100 | 51 76 51 BT |                      |          |
| PHOSPHATE No.1 LR / No.2 LR | each 250 | 51 76 52 BT |                      |          |
| PHOSPHATE HR                | 100      | 51 19 80    | 13.5 mm cell, 10 ml  | 35 42 43 |
|                             | 250      | 51 19 81    |                      |          |
| Details on request          |          |             | 13.5 mm cell, 10 ml  | 35 42 43 |
| PHOSPHATE HR                | 100      | 51 19 80    | 13.5 mm cell, 10 ml  | 35 42 43 |
|                             | 250      | 51 19 81    |                      |          |
| Vanadomolybdat-reagent      | 1 litre  | 46 84 04    | 13.5 mm cell, 10 ml  | 35 42 43 |
| Details on request          |          |             | Nessler tubes 113 mm | 35 30 60 |
| 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    |                      |          |
| SILICA No.1                 | 100      | 51 31 30    | 13.5 mm cell, 10 ml  | 35 42 43 |
|                             | 250      | 51 31 31    |                      |          |
| SILICA No.2                 | 100      | 51 31 40    |                      |          |
|                             | 250      | 51 31 41    |                      |          |
| Combi pack <sup>#</sup>     | each 100 | 51 76 71    |                      |          |
| SILICA No.1 / No.2          | each 200 | 51 76 72    |                      |          |
| SILICA No.1/No.2            |          |             | 13.5 mm cell, 10 ml  | 35 42 43 |
| Details on request          |          |             | 40 mm cell W680/40   | 60 68 90 |
| Ammonia molybdate           | 100 ml   | 46 02 41    | 40 mm cell W680/40   | 60 68 90 |
| Ammonia molybdate           | 100 ml   | 46 02 41    | Nessleriser 2150     | 17 21 50 |
|                             |          |             | Nessler tubes 113 mm | 35 30 60 |

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



Test disc

# Comparator 2000+

## Tests, Discs, Reagents, Cells

| Test               | Disc     | Disc Readings                                     | Range                           | Code     |
|--------------------|----------|---|---------------------------------|----------|
| Silica             | NV       | 0.2; 0.3; 0.4; 0.5; 0.6; 0.7; 0.8; 0.9; 1.0 mg/l  | 0.2 - 1.0 mg/l SiO <sub>2</sub> | 28 38 80 |
| Sodiumhypochlorite | 3/2 Hypo | 2; 4; 6; 8; 10; 12; 14; 16 %                      | 2 - 16 %                        | 23 21 10 |
| Sugar              | 3/29A    | 0; 5; 10; 15; 30; 45; 60; 75; 100 mg/l            | 0 - 100 mg/l                    | 23 29 10 |
| Sulphide           | 3/128    | 0; 0.05; 0.1; 0.15; 0.2; 0.25; 0.3; 0.4; 0.5 mg/l | 0 - 0.5 mg/l S                  | 23 02 10 |
| Zinc               | 3/151    | 0; 0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.8; 1 mg/l      | 0 - 1.0 mg/l                    | 23 04 70 |
| Zinc               | 3/102    | 0; 0.5; 1; 1.5; 2; 2.5; 3; 3.5; 4 mg/l            | 0 - 4.0 mg/l                    | 23 00 20 |

# including stirring rod



### Certification for Comparator 2000+ Discs

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

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



| Reagents                               | Quantity     | Code        | Accessories          | Code     |
|--|--------------|-------------|----------------------|----------|
| Details on request                     |              |             | Nessler tubes 113 mm | 35 30 60 |
| 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 <sup>#</sup>                | each 100     | 51 77 21 BT |                      |          |
| CHLORINE HR (KI)/                      | each 250     | 51 77 22 BT |                      |          |
| ACIDIFYING GP                          |              |             |                      |          |
| Dilution set for<br>sample preparation | 1            | 41 44 70    |                      |          |
| Details on request                     |              |             | 5 mm cell W680/5     | 60 67 90 |
| SULPHIDE No.1                          | 100 (bottle) | 50 29 30    | 13.5 mm cell, 10 ml  | 35 42 43 |
| SULPHIDE No.2                          | 100 (bottle) | 50 29 40    |                      |          |
| COPPER/ZINC LR                         | 100          | 51 26 20 BT | 13.5 mm cell, 10 ml  | 35 42 43 |
| COPPER/ZINC LR                         | 250          | 51 26 21 BT |                      |          |
| COPPER/ZINC HR                         | 100          | 51 23 40    | 13.5 mm cell, 10 ml  | 35 42 43 |
| COPPER/ZINC HR                         | 250          | 51 23 41    |                      |          |

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



Tablet reagents in foil blister strip (BT)

# PHOTOMETRY



MD 100



MD 200



CSB Set-ups



MD 600



MultiDirect



SpectroDirect

# Photometry

## History

More than three decades have passed since the appearance of the first 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 to the **SpectroDirect** spectrophotometer for laboratories.

The multi-functional **PM 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.

The **MultiDirect** offers a wide variety of pre-programmed methods and is therefore suitable for the demands of modern water and drinking water analysis.

A modern, mobile photometer for rapid, reliable water testing is the **MD 600**.

The latest development involves the multi parameter photometer **MD 200** as desktop model.

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 system.

| Parameter  | MD 100 | MD 200 | MD 600 | MultiDirect | PM 620 | PM 600 | SpectroDirect | also compatible to HACH® devices * |
|--|--------|--------|--------|-------------|--------|--------|---------------|------------------------------------|
| Alkalinity-M   | ■      | ■      | ■      | ■           | ■      | ■      | ■             |                                    |
| Alkalinity-P   |        |        | ■      | ■           |        |        | ■             |                                    |
| Aluminium  | ■      |        | ■      | ■           | ■      |        | ■             | see page 102                       |
| Ammonia  | ■      |        | ■      | ■           | ■      |        | ■             | see page 102                       |
| Ammonia, free  | ■      |        | ■      | ■           |        |        | ■             | see page 102                       |
| Arsenic  |        |        |        |             |        |        | ■             |                                    |
| Boron  |        |        | ■      | ■           |        |        | ■             |                                    |
| Bromine  | ■      | ■      | ■      | ■           | ■      | ■      | ■             | see page 102                       |
| Cadmium  |        |        |        |             |        |        | ■             |                                    |
| Calcium Hardness                                     | ■      | ■      | ■      | ■           | ■      | ■      |               |                                    |
| Chloride   | ■      |        | ■      | ■           |        |        | ■             |                                    |
| Chlorine   | ■      | ■      | ■      | ■           | ■      | ■      | ■             | see page 102                       |
| Chlorine Dioxide                                     | ■      | ■      | ■      | ■           | ■      |        | ■             | see page 102                       |
| Chromium   |        |        | ■      |             |        |        | ■             |                                    |
| COD  | ■      | ■      | ■      | ■           |        |        | ■             | see page 102                       |
| Copper   | ■      | ■      | ■      | ■           | ■      | ■      | ■             | see page 102                       |
| Cyanide  |        |        | ■      | ■           |        |        | ■             |                                    |
| Cyanuric acid  | ■      | ■      | ■      | ■           | ■      | ■      | ■             |                                    |
| DEHA   | ■      |        | ■      | ■           |        |        | ■             | see page 102                       |
| Fluoride   | ■      |        | ■      | ■           |        |        | ■             |                                    |
| Formaldehyde   |        |        |        |             |        |        | ■             |                                    |
| Hazen (Pt-Co-Units ; APHA)                           | ■      |        | ■      | ■           |        |        | ■             |                                    |
| Hydrazine  | ■      |        | ■      | ■           |        |        | ■             | see page 104                       |
| Hydrogen Peroxide                                    |        | ■      | ■      | ■           | ■      |        | ■             |                                    |
| Iodine   |        |        | ■      | ■           | ■      |        | ■             |                                    |
| Iron (Fe <sup>2+</sup> , Fe <sup>3+</sup> ), soluble | ■      | ■      | ■      | ■           | ■      | ■      | ■             | see page 104                       |
| Langelier Water Balance System                       |        |        | ■      | ■           | ■      | ■      |               |                                    |
| Lead   |        |        |        |             |        |        | ■             |                                    |
| Manganese  | ■      |        | ■      | ■           |        |        | ■             | see page 104                       |
| Molybdate / Molybdenum                               | ■      |        | ■      | ■           |        |        | ■             | see page 104                       |



MD 100



MD 200



MD 600

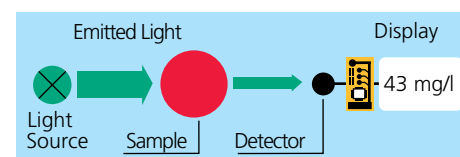


| Parameter  | MD 100 | MD 200 | MD 600 | MultiDirect | PM 620 | PM 600 | SpectroDirect | also compatible<br>to Hach® devices * |
|--|--------|--------|--------|-------------|--------|--------|---------------|---------------------------------------|
| Monochloramine                                     | ■      |        | ■      | ■           |        |        | ■             | see page 104                          |
| Nickel   |        |        | ■      | ■           |        |        | ■             |                                       |
| Nitrate  |        |        | ■      | ■           |        |        | ■             | see page 104                          |
| Nitrite  |        |        | ■      | ■           |        |        | ■             | see page 106                          |
| Oxygen, active                                     |        |        | ■      | ■           | ■      |        |               |                                       |
| Oxygen, dissolved                                  | ■      |        | ■      | ■           |        |        |               |                                       |
| Ozone  | ■      |        | ■      | ■           | ■      | ■      | ■             |                                       |
| pH-value   | ■      | ■      | ■      | ■           | ■      | ■      | ■             |                                       |
| Phenols  |        |        |        |             |        |        | ■             |                                       |
| PHMB (Biguanide)                                   |        |        | ■      | ■           | ■      |        |               |                                       |
| Phosphate  | ■      |        | ■      | ■           | ■      | ■      | ■             | see page 106                          |
| Phosphonate  |        |        | ■      | ■           |        |        | ■             | see page 106                          |
| Polyacrylates                                      | ■      |        | ■      |             |        |        |               |                                       |
| Potassium  |        |        | ■      | ■           |        |        | ■             |                                       |
| Silica   | ■      |        | ■      | ■           |        |        | ■             | see page 106                          |
| Sodiumhypochlorite                                 |        |        | ■      | ■           | ■      | ■      |               |                                       |
| Spectral Absorption-Coefficient                    |        |        |        |             |        |        | ■             |                                       |
| Sulphate   | ■      |        | ■      | ■           | ■      |        | ■             | see page 106                          |
| Sulphide   |        |        | ■      | ■           |        |        | ■             |                                       |
| Sulphite   |        |        | ■      | ■           |        |        | ■             |                                       |
| Surfactants (anionic)                              |        |        |        |             |        |        | ■             |                                       |
| Suspended Solids                                   | ■      |        | ■      | ■           |        |        | ■             |                                       |
| TOC  |        |        |        |             |        |        | ■             |                                       |
| Total Hardness                                     | ■      |        | ■      | ■           | ■      |        | ■             |                                       |
| Total Nitrogen                                     |        |        | ■      | ■           |        |        | ■             | see page 104                          |
| Triazoles  | ■      |        | ■      |             |        |        |               |                                       |
| Turbidity (nephelometric), see TB 210 IR, page 132 |        |        |        |             |        |        |               |                                       |
| Turbidity (attenuated radiation method)            |        |        | ■      | ■           |        |        | ■             |                                       |
| Urea   | ■      | ■      | ■      | ■           | ■      |        | ■             |                                       |
| Zinc   | ■      |        | ■      | ■           |        |        | ■             |                                       |

## The principle of photometry

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

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



Mode of operation of the photometer



MultiDirect



SpectroDirect



TB 210 IR

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# MD 100 Photometer

## Precise Water Analysis in High-Quality Design

### Small | Mobile | Rapid

The MD 100 uses high quality interference filters with long-life LEDs as a light source without any moving parts 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.

The calibration and software-based adjustment options mean that the MD 100 is also suitable for use as a testing instrument.

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.

➡ Please see pages 78 onwards for reagents (order codes)

## Highlights

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

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



## Single-Parameter

| Test  | Code                 |
|---|----------------------|
| <b>Aluminium</b> , tablet reagents<br>0.01 - 0.3 mg/l Al  | 27 62 00             |
| <b>Aluminium</b> , powder reagents<br>0.01 - 0.25 mg/l Al   | 27 62 05             |
| <b>Ammonia</b> , tablet reagents<br>0.02 - 1.0 mg/l N   | 27 60 60             |
| <b>Ammonium</b> , powder reagents<br>0.01 - 0.8 mg/l N  | 27 60 65             |
| <b>Ammonia, free</b> powder reagents<br>0.01 - 0.5 mg/l N   | 27 60 70             |
| <b>Monochloramine</b><br>0.04 - 4.5 mg/l Cl <sub>2</sub>  |                      |
| <b>Chlorine</b> , tablet reagents (OTZ)<br>0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> *  | 27 60 00             |
| <b>Chlorine</b> , liquid reagent (OTZ)<br>0.02 - 4 mg/l Cl <sub>2</sub>   | 27 60 05             |
| <b>Chlorine DUO</b> , for 2 types of reagents<br>1) Tablet reagents<br>0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> *<br>2) Powder reagents<br>0.02 - 2.0 mg/l Cl <sub>2</sub> (ø 24 mm glass vial)<br>0.1 - 8.0 mg/l Cl <sub>2</sub> (ø 10 mm <b>multi vial-2</b> ) | 27 60 20<br>27 60 25 |
| <b>Chlorine</b> , powder reagents<br>0.02 - 2.0 mg/l Cl <sub>2</sub> (ø 24 mm glass vial)<br>0.1 - 8.0 mg/l Cl <sub>2</sub> (ø 10 mm <b>multi vial-2</b> )  | 27 60 10             |
| <b>Chlorine HR (Potassium iodide)</b> tablet reagents<br>5 - 200 mg/l Cl <sub>2</sub> (ø 16 mm round vial & adapter)  | 27 61 70             |
| <b>Chlorine dioxide</b> , tablet reagents<br>0.02 - 11 mg/l ClO <sub>2</sub>  | 27 60 30             |
| <b>Chlorine dioxide</b> , powder reagents<br>0.04 - 3.8 mg/l ClO <sub>2</sub>   | 27 60 35             |
| <b>COD</b> , tube tests, without reagents<br>0 - 150 mg/l O <sub>2</sub> (ø 16 mm)<br>0 - 1500 mg/l O <sub>2</sub> (ø 16 mm)<br>0 - 15000 mg/l O <sub>2</sub> (ø 16 mm)   | 27 61 20             |
| <b>Copper</b> , tablet reagents<br>0.05 - 5.0 mg/l Cu   | 27 60 80             |
| <b>Copper</b> , powder reagents<br>0.05 - 5.0 mg/l Cu   | 27 60 85             |
| <b>Hardness, total</b> , tablet reagents<br>2 - 50 mg/l CaCO <sub>3</sub><br>20 - 500 mg/l CaCO <sub>3</sub> (by dilution)  | 27 61 90             |
| <b>Hazen</b> , no reagents required<br>0 - 500 mg/l Pt-Co   | 27 61 60             |
| <b>Iron</b> , tablet reagents<br>0.02 - 1.0 mg/l Fe   | 27 60 50             |
| <b>Iron TPTZ</b> , powder reagents<br>0.02 - 1.8 mg/l Fe  | 27 60 55             |
| <b>Iron</b> , powder reagents<br>0.02 - 3.0 mg/l Fe   | 27 60 56             |
| <b>Fluoride</b> , without reagents<br>0.05 - 2.0 mg/l F <sup>-</sup>  | 27 60 90             |
| <b>Manganese LR</b> , tablet reagents<br>0.2 - 4.0 mg/l Mn  | 27 61 00             |
| <b>Manganese LR</b> , powder reagents<br>0.01 - 0.7 mg/l Mn   | 27 61 05             |
| <b>Manganese HR</b> , powder reagents<br>0.1 - 18 mg/l Mn   | 27 61 06             |
| <b>Molybdenum LR</b><br>Powder reagents / reagent solution<br>0.03 - 3.0 mg/l Mo (mixing cylinder required, not included)   | 27 61 40             |
| <b>Molybdenum HR</b> , powder reagents<br>0.3 - 40 mg/l Mo  | 27 61 41             |
| <b>Molybdenum</b> , tablet reagents<br>0.6 - 30 mg/l Mo   | 27 61 42             |

## Single-Parameter

| Test  | Code     |
|---|----------|
| <b>Monochloramine</b> powder reagents<br>0.04 - 4.5 mg/l Cl <sub>2</sub>                | 27 60 70 |
| <b>Phosphate</b> , tablet reagents<br>0.05 - 4.0 mg/l PO <sub>4</sub>                   | 27 60 40 |
| <b>Phosphate</b> , powder reagents<br>0.06 - 2.5 mg/l PO <sub>4</sub>                   | 27 60 45 |
| <b>Silica</b> , tablet reagents<br>0.05 - 4.0 mg/l SiO <sub>2</sub>                     | 27 61 10 |
| <b>Silica LR</b> , powder reagents<br>0.1 - 1.6 mg/l SiO <sub>2</sub>                   | 27 61 15 |
| <b>Silica HR</b> , powder reagents<br>1 - 90 mg/l SiO <sub>2</sub>                      | 27 61 16 |
| <b>Suspended solids</b><br>no reagents required<br>0 - 750 mg/l TSS                     | 27 61 50 |
| <b>Urea</b> , tablet reagents<br>0.1 - 2.5 mg/l Urea<br>0.2 - 5 mg/l Urea (by dilution) | 27 62 10 |

## 2in1

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

## 3in1

|  |          |
|--|----------|
| <b>Chlorine, pH, Cyanuric acid</b> tablet reagents (OTZ)<br>0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> *<br>6.5 - 8.4 pH ; 0 - 160 mg/l cyanuric acid                                 | 27 80 10 |
| <b>Chlorine, pH, Cyanuric acid</b> liquid reagent for chlorine and pH (OTZ)<br>0.02 - 4 mg/l Cl <sub>2</sub> / 6.5 - 8.4 pH<br>2 - 160 mg/l cyanuric acid  | 27 80 15 |
| <b>Chlorine, pH, Alkalinity-M</b> tablet reagents (OTZ)<br>0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> *<br>6.5 - 8.4 pH ; 5 - 200 mg/l CaCO <sub>3</sub> (TA)                         | 27 80 60 |
| <b>Chlorine, pH, Alkalinity-M (total)</b> liquid reagent for chlorine and pH (OTZ)<br>0.02 - 4 mg/l Cl <sub>2</sub> / 6.5 - 8.4 pH<br>5 - 200 mg/l CaCO <sub>3</sub> (TA)                                  | 27 80 65 |
| <b>Chlorine LR, Chlorine HR, Chlorine dioxide<sup>#</sup></b> , tablet reagents<br>0.01 - 6.0 mg/l Cl <sub>2</sub><br>5 - 200 mg/l Cl <sub>2</sub> (ø 16 mm round vial)<br>0.02 - 11 mg/l ClO <sub>2</sub> | 27 80 00 |

## 4in1

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

## 5in1

|  |          |
|--|----------|
| <b>Chlorine, pH, Cyanuric acid, Alkalinity-M, Calcium hardness</b> tablet reagents (OTZ)<br>0.02 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> *<br>6.5 - 8.4 pH ; 0 - 160 mg/l cyanuric acid<br>5 - 200 mg/l CaCO <sub>3</sub> (TA) ; 0 - 500 mg/l CaCO <sub>3</sub> (CaH) | 27 80 80 |
|--|----------|

## 6in1

|  |          |
|--|----------|
| <b>Chlorine, Bromine, pH, Cyanuric acid, Alkalinity-M, Calcium hardness</b> , tablet reagents (OTZ)<br>0.02 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> *<br>0.05 - 13 mg/l Br ; 6.5 - 8.4 pH<br>0 - 160 mg/l cyanuric acid ; 5 - 200 mg/l CaCO <sub>3</sub> (TA)<br>0 - 500 mg/l CaCO <sub>3</sub> (CaH) | 27 80 90 |
|--|----------|

## MD 100 Boiler Water

|  |          |
|--|----------|
| <b>Aluminium, Chloride, Copper, DEHA, Hydrazine, Iron, Oxygen (dissolved), Phosphate, Polyacrylate, Silica</b> | 27 62 30 |
|--|----------|

## MD 100 Cooling Water

|  |          |
|--|----------|
| <b>Aluminium, Bromine, Chlorine, Chlorine HR, Chlorine dioxide, Copper, Iron, Molybdate LR, Molybdate HR, Ozone, Polyacrylate, Sulphate, Triazoles, Zinc</b> | 27 62 40 |
|--|----------|

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

# Where chlorine and chlorine dioxide are present together, they may be determined quantitatively as a single figure.

# MD 100 Photometer



## Scroll Memory (SM)

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

## Zero Setting (OTZ)

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

## 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.

## N.I.S.T Traceability

The instrument has a factory calibration, which is related to international standards which are not N.I.S.T traceable. The instrument may be calibrated by the user in a "user calibration mode" with N.I.S.T traceable standards.

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

## Technical Data

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

## CE-Conformity

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



## Delivery Content

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

## Accessories

| Item  | Code        |
|---|-------------|
| Set of 12 round vials with lid<br>Height 48 mm, Ø 24 mm   | 19 76 20    |
| Set of 5 round vials with lid<br>Height 48 mm, Ø 24 mm  | 19 76 29    |
| Set of 10 round vials with lid<br>Height 90 mm, Ø 16 mm   | 19 76 65    |
| Adapter for round vials Ø 16 mm   | 19 80 21 90 |
| Set of 12 plastic vials (PC), with lid<br><b>"Multi"-Type 2</b> , Ø 10 mm                                 | 19 76 00    |
| Vial stand for 6 round vials<br>Ø 24 mm, acrylic glass  | 41 89 51    |
| Vial stand for 10 vials<br>(Ø 16 mm or □ 13,5 mm), acrylic glass  | 41 89 57    |
| Mixing cylinder, 25 ml, with stopper<br>required accessory for molybdenum LR test<br>with MD 100 (276140) | 19 80 26 50 |
| Membrane filter set for use when<br>preparing samples, 25 membrane filters,<br>0,45 µm, 2 syringes 20 ml  | 36 61 50    |
| Cleaning cloth for vials  | 19 76 35    |
| Set of 12 sealing rings<br>for round vial Ø 24 mm   | 19 76 26    |
| 4 micro batteries (AAA)   | 19 50 026   |
| Measuring beaker, volume 100 ml   | 38 48 01    |
| Plastic funnel with handle  | 47 10 07    |
| Plastic stirring rod, 13 cm length  | 36 41 00    |
| Plastic stirring rod, 13 cm length, (10 pc.)  | 36 41 20    |
| Plastic stirring rod, 10 cm length  | 36 41 09    |
| Plastic stirring rod, 10 cm length, (10 pc.)  | 36 41 30    |
| Infra-red data transfer module IRiM   | 21 40 50    |



Please see pages 78 onwards for reagents (order codes)



### Data transfer

The optional available IRiM (infra-red interface module) uses modern 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<sup>1)</sup> or alternatively a serial printer<sup>2)</sup>.

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

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

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

<sup>1)</sup> USB printer: HP Deskjet 6940 ; <sup>2)</sup> 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 related to the integrated wave lengths.

The kit contains one zero standard, 6 different vials for checking 6 different wave lengths and allows 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.

**Verification Standard Kit**

21 56 70



### Reference Standard Kit for MD 100

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





# 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

## Single Parameter

| Test  | Code      |
|---|-----------|
| <b>COD</b> , tube tests, without reagents<br>0 - 150 mg/l O <sub>2</sub> (ø 16 mm)<br>0 - 1500 mg/l O <sub>2</sub> (ø 16 mm)<br>0 - 15000 mg/l O <sub>2</sub> (ø 16 mm) | 28 92 502 |

## 4in1

| Test   | Code      |
|--|-----------|
| <b>Chlorine, pH, Cyanuric acid, Alkalinity-M</b><br>tablet reagents<br>0.01 - 6.0 mg/l Cl <sub>2</sub> / 0.1 - 10 mg/l Cl <sub>2</sub> *<br>6.5 - 8.4 pH / 0 - 160 mg/l cyanuric acid<br>5 - 200 mg/l CaCO <sub>3</sub> (TA) | 28 60 502 |
| <b>Chlorine, pH, Cyanuric acid, Alkalinity-M</b><br>liquid reagents for chlorine and pH<br>0.02 - 4 mg/l Cl <sub>2</sub> / 6.5 - 8.4 pH<br>0 - 160 mg/l cyanuric acid / 5 - 200 mg/l CaCO <sub>3</sub> (TA)                  | 28 60 542 |

## 6in1

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

## 2in1

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

## 5in1

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

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

## 3in1

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

## Delivery Content

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





# MD 200 Photometer

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

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

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

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

## Scroll Memory (SM)

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

## Zero Setting (OTZ)

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

## Technical Data

|  |   |
|--|---|
| <b>Optics</b>                            | LEDs, interference filters (IF) and photo sensor in transparent sample chamber. Depending on the version, up to 3 different interference filters are used. Wavelength specifications of interference filters:<br>430 nm $\Delta\lambda = 5$ nm<br>530 nm $\Delta\lambda = 5$ nm<br>560 nm $\Delta\lambda = 5$ nm<br>580 nm $\Delta\lambda = 5$ nm<br>610 nm $\Delta\lambda = 6$ nm<br>660 nm $\Delta\lambda = 5$ nm |
| <b>Wavelength Accuracy</b>               | $\pm 1$ nm  |
| <b>Photometric Accuracy<sup>4)</sup></b> | 3% FS (T = 20°C – 25°C)   |
| <b>Photometric Resolution</b>            | 0.01 A  |
| <b>Power Supply</b>                      | 4 batteries (AA), capacity approx. 53 hours or 15000 tests (continuous operation without display lighting)  |
| <b>Auto - OFF</b>                        | automatic switch-off  |
| <b>Display</b>                           | backlit LCD (on keypress)   |
| <b>Storage</b>                           | internal ring memory for 16 data sets   |
| <b>Interface</b>                         | infrared interface for test data transfer to IRiM   |
| <b>Additional feature</b>                | real time clock and date  |
| <b>Calibration</b>                       | factory calibration and user calibration. Reset to factory calibration possible   |
| <b>Dimensions</b>                        | 190 x 110 x 55 mm (L x W x H)   |
| <b>Weight</b>                            | basic unit approx. 455 g (with batteries)   |
| <b>Environmental conditions</b>          | temperature: 5 – 40 °C<br>rel. humidity: 30 – 90% (non condensing)  |

## CE-Conformity

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

## Accessories

| Item   | Code        |
|--|-------------|
| Set of 12 round vials with lid<br>Height 48 mm, Ø 24 mm  | 19 76 20    |
| Set of 5 round vials with lid<br>Height 48 mm, Ø 24 mm   | 19 76 29    |
| Adapter for round vials ø 16 mm  | 19 80 21 90 |
| Membrane filter set for use when preparing samples, 25 membrane filters, 0,45 µm, 2 syringes 20 ml | 36 61 50    |
| Vial stand for 6 round vials<br>Ø 24 mm, acrylic glass   | 41 89 51    |
| Vial stand for 10 vials<br>(Ø 16 mm or □ 13,5 mm), acrylic glass                                   | 41 89 57    |
| Cleaning cloth for vials   | 19 76 35    |
| Set of 12 sealing rings<br>for round vial ø 24 mm  | 19 76 26    |
| 4 batteries (AA)   | 19 50 025   |
| Battery lid  | 19 80 22 41 |
| Measuring beaker, volume 100 ml  | 38 48 01    |
| Plastic stirring rod, 13 cm length   | 36 41 00    |
| Plastic stirring rod, 13 cm length, (10 pc.)   | 36 41 20    |
| Plastic stirring rod, 10 cm length   | 36 41 09    |
| Plastic stirring rod, 10 cm length, (10 pc.)   | 36 41 30    |
| Infra-red data transfer module IRiM  | 21 40 50    |



➔ Please see pages 78 onwards for reagents (order codes)



## Data Transfer

The optional available IRiM (infra-red interface module) uses modern 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<sup>1)</sup> or alternatively a serial printer<sup>2)</sup>.

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

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

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

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

## Manufacturers Test Certificate M

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

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

## Verification Standard Kit

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

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

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

Measurements are taken in mAbs.

**Verification Standard Kit** 21 56 70

## Reference Standard Kits

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

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

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

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

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

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

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

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



➔ Please see pages 78 onwards for reagents (order codes)

# COD Setups COD VARIO (ISO 15705:2002) COD Photometer

## Determination of the chemical oxygen demand index (ST-COD)

Small-scale sealed-tube  
Total range 0 - 15000 mg/l



## Waste water parameter COD

The chemical oxygen demand, ST-COD value (ST = small scale sealed tube), of water as determined by this dichromate method can be considered as an estimate of the theoretical oxygen demand, i.e. the amount of oxygen consumed in total chemical oxidation of the organic constituents present in the water.

## COD VARIO Photometers

With a measuring range from 0 to 15,000 mg/l O<sub>2</sub>, the Lovibond® COD VARIO photometers are suitable for waste water testing.

Two LEDs light sources with long-term stability ( $\lambda_1 = 610 \text{ nm}$ ;  $\lambda_2 = 430 \text{ nm}$ , according to ISO 15705:2002), a waterproof sample chamber, a large digital display, and the user-friendly keypad ensure maximum operating reliability and convenience.

**MD 100 COD VARIO** Order code: 27 61 20  
(MD 100 photometer only in case)

**MD 200 COD VARIO** Order code: 289 25 02  
(MD 200 photometer only in case)

## Setups COD VARIO

The Lovibond® COD VARIO setups allow highly sensitive and precise water testing with minimum effort. They measure the ST-COD concentration by photometric detection employing a linear relationship between absorbance and concentration.

After adding the sample to a Lovibond® COD VARIO tube test (LR, MR according to ISO 15705:2002), it is heated in the reactor and then analysed in the photometer.

The COD setups comprise the photometer, 25 tube tests for each of the two lower measuring ranges, a reactor for sample digestion, and a vial stand.

**COD Setup MD 100 COD VARIO** Order code: 27 61 30  
Instrument in carrying case, 4 batteries (AAA), adapter for round vials  $\varnothing 16 \text{ mm}$ , 2 sets of tube tests 0-150 mg/l, 0-1500 mg/l, thermoreactor RD 125, tube stand, 2 syringes 1 ml, 2 ml, warranty information, certificate (COC), instruction manual

**COD Setup MD 200 COD VARIO** Order code: 289 26 02  
Instrument in carrying case, 4 batteries (AA), adapter for round vials  $\varnothing 16 \text{ mm}$ , 2 sets of tube tests 0-150 mg/l, 0-1500 mg/l, thermoreactor RD 125, tube stand, 2 syringes 1 ml, 2 ml, warranty information, certificate (COC), instruction manual

## Ranges

0 – 150 mg/l O<sub>2</sub>  $\pm 3,5\%$  FS  
0 – 1500 mg/l O<sub>2</sub>  $\pm 3,5\%$  FS  
0 – 15000 mg/l O<sub>2</sub>  $\pm 3,5\%$  FS

\* tolerance based on the use of potassium-hydrogenepthalate standards (DIN 38409)

## COD VARIO tube tests

The Lovibond® COD VARIO tube tests are available for the measuring ranges 0-150 mg/l O<sub>2</sub>, 0-1500 mg/l O<sub>2</sub> and 0-15000 mg/l O<sub>2</sub>. Their chemical properties and a 16 mm tube diameter make them compatible to Hach® devices.\*

| Tube tests                        | Order code |
|-----------------------------------|------------|
| <b>0-150 mg/l O<sub>2</sub></b>   |            |
| (25 pc.), mercury free**          | 2 42 07 10 |
| (25 pc.)                          | 2 42 07 20 |
| (150 pc.)                         | 2 42 07 25 |
| <b>0-1500 mg/l O<sub>2</sub></b>  |            |
| (25 pc.), mercury free**          | 2 42 07 11 |
| (150 pc.), mercury free**         | 2 42 07 16 |
| (25 pc.)                          | 2 42 07 21 |
| (150 pc.)                         | 2 42 07 26 |
| <b>0-15000 mg/l O<sub>2</sub></b> |            |
| (25 pc.), mercury free**          | 2 42 07 12 |
| (25 pc.)                          | 2 42 07 22 |
| (150 pc.)                         | 2 42 07 27 |

\*\* without chloride removal

## Standard solutions

Standard solutions are solutions with a defined concentration and are provided to check the operation methods and devices of the cuvette tests as well as the condition of optical filters and the instrument.

| Standard solution    | Quantity | Code       |
|----------------------|----------|------------|
| <b>100 mg/l COD</b>  | 30 ml    | 2 42 08 03 |
| <b>500 mg/l COD</b>  | 30 ml    | 2 42 08 04 |
| <b>5000 mg/l COD</b> | 10 ml    | 2 42 08 05 |

## Highlights

- ST-COD sealed tubes ready for use
- Suppression of chloride interference up to 1000 mg/l (LR & MR) up to 10000 mg/l (HR)
- Mercury free tube tests, in absence of chloride interference
- 3 ranges:  
Low range:  
0 - 150 mg/l, meets ISO 15705:2002  
Middle range:  
0 - 1500 mg/l, meets ISO 15705:2002  
High range:  
0 - 15000 mg/l

# Thermoreactor RD 125

For the Tube test digestion of:

**COD (150°C)**

**TOC (120°C)**

**Total Chromium (100°C)**

**Total Nitrogen (100°C)**

**Total Phosphate (100°C)**



Chemical digestion of samples is required for the photometric determination of COD, TOC, total phosphate and total nitrogen.

The required temperatures and reaction time can be selected by using the membrane keypad of the reactor RD 125. The unit works at three different temperatures (100 / 120 / 150 °C) and three pre-set reaction times 30 / 60 / 120 minutes). When digestion is complete, the reactor automatically switches off and gives a corresponding LED indication with short beep alarm.

The RD 125 reactor is fitted with 24 holes for 16 mm diameter vials.

With the voltage switch on the back 230 V and 115 V are selectable.

**COD Reactor RD 125** Order code: 2 41 89 40

## Technical data RD 125

|                                       |   |
|---------------------------------------|---|
| <b>Power supply</b>                   | 230 V / 50-60 Hz or 115 V / 50-60 Hz (switchable) |
| <b>Power</b>                          | 550 W   |
| <b>Dimensions</b>                     | 248 x 219 x 171 mm                                |
| <b>Weight</b>                         | 3.9 kg  |
| <b>Materials, housing</b>             | ABS   |
| <b>Protection grid</b>                | PPS   |
| <b>Lid</b>                            | PC  |
| <b>Block insert</b>                   | PBT   |
| <b>Heating block</b>                  | Aluminium   |
| <b>Holes in the aluminium block</b>   | 24 holes, 16.2 mm ± 0.2 mm                        |
| <b>Selectable temp.</b>               | 100 / 120 / 150 °C                                |
| <b>Probe type</b>                     | Pt100 A class                                     |
| <b>Temperature stability</b>          | ± 1 °C at the Pt100                               |
| <b>Selected time</b>                  | 30 / 60 / 120 / min. and continuous operation (∞) |
| <b>Heating up</b>                     | from 20°C to 150°C in 12 min.                     |
| <b>Regulation</b>                     | Microprocessor                                    |
| <b>Protection against overheating</b> | at the alu block at 190 °C                        |
| <b>Beeper</b>                         | max. 88 dB (piezo buzzer)                         |
| <b>Environmental conditions</b>       | 10 – 40 °C<br>max. 85 % rel. humidity             |

**CE-Conformity**

Photometry

## Waste Water Set-Ups

### Waste Water Set-Up MD 600 21 41 00

Photometer MD 600 with standard accessory, thermo reactor RD 125, Infra-red data transmission module IRiM, tube stand, membrane filter set, instruction manual, warranty information  
COD 0 - 150 mg/l and 0 - 1500 mg/l,  
Ammonia 1 - 50 mg/l N,  
Nitrate 1 - 30 mg/l N  
Nitrite LR 0,01 - 0,3 mg/l N  
Nitrogen 5 - 150 mg/l N  
Phosphate 0.02 - 1 mg/l P / 0.06 - 3.5 mg/l PO<sub>4</sub>

### Waste Water Set-Up SpectroDirect 71 21 00

Spectrophotometer SpectroDirect, thermo reactor RD 125, 5 round vials ø 24 mm, tube stand, membrane filter set, instruction manual, warranty information  
COD 0 - 150 mg/l and 0 - 1500 mg/l,  
Ammonia 1 - 50 mg/l N,  
Nitrate 1 - 30 mg/l N  
Nitrite LR 0,01 - 0,3 mg/l N  
Nitrogen 5 - 150 mg/l N  
Phosphate 0.02 - 1 mg/l P / 0.06 - 3.5 mg/l PO<sub>4</sub>

### Reagents

|   |            |
|---|------------|
| COD 0-150 mg/l O <sub>2</sub> (25 pc.), mercury free **   | 2 42 07 10 |
| (25 pc.)  | 2 42 07 20 |
| (150 pc.)   | 2 42 07 25 |
| CSB 0-1500 mg/l O <sub>2</sub> (25 pc.), mercury free **  | 2 42 07 11 |
| (150 pc.), mercury free **                                | 2 42 07 16 |
| (25 pc.)  | 2 42 07 21 |
| (150 pc.)   | 2 42 07 26 |
| CSB 0-15000 mg/l O <sub>2</sub> (25 pc.), mercury free ** | 2 42 07 12 |
| (25 pc.)  | 2 42 07 22 |
| (150 pc.)   | 2 42 07 27 |
| ** without chloride removal                               |            |
| Ammonia VARIO HR tube test                                | 53 56 50   |
| Nitrate VARIO tube test                                   | 53 55 80   |
| Nitrite LR VARIO powder pack                              | 53 09 80   |
| Nitrogen VARIO Total HR tube test                         | 53 55 60   |
| Phosphate VARIO Total HR tube test                        | 53 52 10   |

### Accessories

|   |          |
|---|----------|
| Set of round vials with lids Height 48 mm, Ø 24 mm  | 19 76 29 |
| Membrane filter set for use when preparing samples, 25 membrane filters 0.45 µm, 2 syringes 20 ml | 36 61 50 |
| 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 |
| Automatic pipette*, 1 - 5 ml  | 41 90 76 |
| Pipette tips*, 1 - 5 ml (white), 100 pc.  | 41 90 66 |
| Automatic pipette**, 0.1 - 1 ml   | 41 90 77 |
| Pipette tips**, 0.1 - 1 ml (white), 1000 pc.  | 41 90 73 |

\* 0 - 150 mg/l and 0 - 1500mg/l ; \*\* 0 - 15000 mg/l

# MD 600 Photometer



Modern, mobile photometer  
for rapid, reliable water testing

## Highlights

- Automatic wavelength selection
- Easy handling
- Backlit display
- User interface in German, English, French, Spanish, Italian, Portuguese (BR), Polish & Indonesian
- Storage
- More than 120 methods
- 35 user defined methods
- Infrared interface
- Waterproof\*)
- Mobile

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

With the modern design of the MD 600 we have succeeded in combining the mobility of a portable photometer with the characteristics of a modern laboratory photometer.

This unit covers all the important parameters of water analysis, from aluminium to zinc. The high level of accuracy of Lovibond® reagents and the user-friendly nature of the instrument guarantee rapid and reliable analysis of your water samples. Depending on the application, the unit will operate with tablet reagents, powder packs, liquid reagents or tube tests (16 / 13 mm).

The MD 600 operates with 6 interference filters and uses long-life LEDs as a light-source. No moving parts are involved.

The illuminated display allows comfortably reading of the measurement results even in low light conditions.

Of course, the MD 600 has a memory, in which up to 1000 data sets can be stored. The infra-red interface\* enables data to be transmitted to a computer or printer (RS 232 / USB).

\* available as an option : IRI-M (infra-red interface module)



## N.I.S.T. Traceability

The instrument has a factory calibration, which is related to international standards, which are not N.I.S.T. traceable. The instrument may be calibrated by the user in a "user calibration mode" with N.I.S.T. traceable standards.

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

## New methods

Test methods are regularly updated to suit market requirements. You can find software updates for new methods and additional languages on our website at [www.lovibond.com](http://www.lovibond.com).

## Polynomials

With the help of an external mathematical program, the corresponding polynomial is created from data pairs (concentration/absorption). A known polynomial may also be used. 25 order polynomials ( $y = A+Bx+Cx^2+Dx^3+Ex^4+Fx^5$ ) can be stored together with user-specific parameters such as wavelength, measuring range, unit and number of decimals.

## Concentration

This function can be used to measure 2 to 14 known standards. On the basis of the concentrations/absorption pairs obtained, the photometer will calculate a linear interpolation between the measured points. Up to 10 methods can be stored for further sample measurements.



## Applications

- Waste Water
- Drinking Water
- Industrial Process Water
- Science & Research
- Governmental and Private Laboratories
- Mobile Applications

 Please see pages 78 onwards for reagents (order codes)

# Infra-red data transmission modul IRiM



The IRiM (infra-red interface modul) uses modern infra-red technology to transmit measurement data from the MD 600 photometer to one of 3 optional interfaces. These interfaces can be used to connect to a PC, a USB printer<sup>1)</sup> or alternatively a serial printer<sup>2)</sup>. The interface which is selected is displayed by an LED function indicator. The user can switch between the interfaces using the „Select“ button.

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

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

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

<sup>1)</sup> USB printer: HP Deskjet 6940 ; 2) each ASCII printer

## Delivery content

The IRiM is delivered ready for use, with the following accessories :

USB cable, 4 batteries, screwdriver, CD-ROM, operating instructions and guarantee certificate

**Order code: 21 40 50**



# MD 600 Photometer



## Delivery Content

- Instrument in carrying case
  - 4 batteries
  - 3 Round vials each 24 and 16 mm ø
  - 1 adapter each for 16 mm and 13 mm vials
  - Plastic stirring rod 13 cm, Brush 11 cm, screw driver
  - Warranty information
  - Certificate of Compliance
  - Instruction Manual
- but without reagents**
- Order code: 21 40 20**

## Accessories

| Item   | Code        |
|--|-------------|
| Set of 12 round vials with lid<br>Height 48 mm, Ø 24 mm  | 19 76 20    |
| Set of 10 round vials with lid<br>Height 90 mm, Ø 16 mm  | 19 76 65    |
| Adapter for round vials Ø 16 mm  | 19 80 21 90 |
| Adapter for round vials Ø 13 mm  | 19 80 21 92 |
| Set of <b>multy vials-3</b> with lids<br>path length 10 mm, 10 ml volume<br>Height 48 mm, Ø 24 mm (12 pc.) | 19 76 05    |
| Vial stand for 6 round vials<br>Ø 24 mm, acrylic glass   | 41 89 51    |
| Vial stand for 10 vials<br>(Ø 16 mm or □ 13,5 mm), acrylic glass   | 41 89 57    |
| Sealing ring for vial Ø 24 mm (12 pc.)   | 19 76 26    |
| Battery, 1.5 V, AA-Alkali-Mangan (4 pc.)   | 19 50 025   |
| Cleaning cloth for vials   | 19 76 35    |
| Plastic funnel with handle   | 47 10 07    |
| Plastic stirring rod, 13 cm length   | 36 41 00    |
| Plastic stirring rod, 13 cm length, (10 pc.)   | 36 41 20    |
| Plastic stirring rod, 10 cm length   | 36 41 09    |
| Plastic stirring rod, 10 cm length, (10 pc.)   | 36 41 30    |
| Cleaning brush, 10 cm  | 38 02 30    |
| Verification Standard Kit  | 21 56 40    |
| Cable for update<br>for connection to a PC   | 21 40 30    |
| Infra-red data transmission modul IRiM   | 21 40 50    |



## Verification Standard Kit

The verification standard kit for the MD 600 is designed to assure the user of the accuracy and the reliability of the results related to the integrated wave lengths.

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

**Verification Standard Kit 21 56 40**

Please specify the reagents or parameters required at time of order.

You can find updated information on parameters and measuring ranges on our website at [www.lovibond.com](http://www.lovibond.com)

Please see pages 78 onwards for reagents (order codes)



## Technical Data

|                            |   |
|----------------------------|---|
| <b>Display</b>             | Backlit graphic-display   |
| <b>Interfaces</b>          | Infrared interface for test data transfer <sup>1</sup> , RJ45 socket for Internet updates <sup>2</sup>  |
| <b>Optics</b>              | LEDs, interference filters (IF) and photo sensor in transparent sample chamber<br>Wavelength range:<br>430 nm IF $\Delta\lambda = 5$ nm<br>530 nm IF $\Delta\lambda = 5$ nm<br>560 nm IF $\Delta\lambda = 5$ nm<br>580 nm IF $\Delta\lambda = 5$ nm<br>610 nm IF $\Delta\lambda = 6$ nm<br>660 nm IF $\Delta\lambda = 5$ nm<br>IF = interference filter |
| <b>Wavelength Accuracy</b> | $\pm 1$ nm  |

|                               |  |
|-------------------------------|--|
| <b>Photometric Accuracy*</b>  | 2 % FS (T = 20°C – 25°C)   |
| <b>Photometric Resolution</b> | 0.005 A  |
| <b>Operation</b>              | Acid and solvent resistant, touch-sensitive keypad with audible feedback via integrated beeper     |
| <b>Power Supply</b>           | 4 batteries (Mignon AA/LR6);<br>Operation time:<br>approx. 26 h continuous operation or 3500 tests |
| <b>Auto-Off</b>               | approx. 20 minutes after last keypress with audible signal   |
| <b>Dimensions</b>             | approx. 210 x 95 x 45 mm (unit)<br>approx. 395 x 295 x 106 mm (case)                               |

|                           |  |
|---------------------------|--|
| <b>Weight (unit)</b>      | approx. 450 g  |
| <b>Ambient Conditions</b> | 5–40°C at max. 30–90% rel. humidity (non condensing)   |
| <b>Language Selection</b> | German, English, French, Spanish, Italian, Portuguese, Polish, Indonesian ; additional languages via Internet update |
| <b>Memory Capacity</b>    | approx. 1000 data sets   |
| <b>CE-Conformity</b>      |  |

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

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

\* tested with standard solutions

# MultiDirect Photometer



The MultiDirect is a contemporary, microprocessor-controlled photometer with ergonomically designed keypad and large-format graphic display. It is equipped with a wide range of pre-programmed methods based on the proven range of Lovibond® tablet reagents, liquid reagents, tube tests and powder reagents (VARIO Powder Packs). Users can also store their own methods.

The MultiDirect is a filter photometer using interference filters at 6 different wavelengths. The unique design of the optics allows the automatic selection of the required wavelength without any moving parts. This and the dual beam technology utilizing an internal reference channel, guarantees the highest accuracy.

For portable use, the instrument operates with seven standard rechargeable batteries (supplied). These batteries are available all over the world and are easily changed. The integrated intelligent charge controller allows simultaneous operation of the unit and battery charging (using the supplied power pack). The MultiDirect also operates without a power pack by using alkaline manganese batteries.

The entire instrument, including sample chamber (the most critical component of any photometer) and battery compartment, is waterproof, ensuring that no water comes in contact with the electronic components.



## N.I.S.T. Traceability

The instrument has a factory calibration, which is related to international standards, which are not N.I.S.T. traceable. The instrument may be calibrated by the user in a "user calibration mode" with N.I.S.T. traceable standards.

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

## New methods

Test methods are regularly updated to suit market requirements. You can find software updates for new methods and additional languages on our website at [www.lovibond.com](http://www.lovibond.com).

## Polynomials

With the help of an external mathematical program, the corresponding polynomial is created from data pairs (concentration/absorption). A known polynomial may also be used. 25 order polynomials ( $y = A+Bx+Cx^2 + Dx^3 + Ex^4 + Fx^5$ ) can be stored together with user-specific parameters such as wavelength, measuring range, unit and number of decimals.

## Concentration

This function can be used to measure 2 to 14 known standards. On the basis of the concentrations/absorption pairs obtained, the photometer will calculate a linear interpolation between the measured points. Up to 10 methods can be stored for further sample measurements.

## Highlights

- Dual Beam Technology and Interference Filters for highest accuracy
- A wide range of pre-programmed methods
- Long-term stable LEDs as light sources
- Update of new methods and languages via Internet (free of charge)
- Interface
- Memory for 1000 data sets
- Mobile



Photometry

## Applications

- Waste Water
- Drinking Water
- Industrial Process Water
- Science & Research
- Governmental and Private Laboratories
- Mobile Applications

➔ Please see pages 78 onwards for reagents (order codes)

# MultiDirect Photometer



## Delivery Content

- Instrument in carrying case
  - 7 rechargeable batteries
  - Mains charger, 100-240 V
  - PC connection cable
  - 3 round vials each 24 and 16 mm ø
  - 1 adapter for 16 mm ø vials
  - 3 syringes
  - 1 plastic beaker 100 ml
  - Warranty information
  - Certificate of Compliance
  - Instruction Manual
- but without reagents

Order code: 21 00 00

Please specify the reagents or parameters required at time of order.

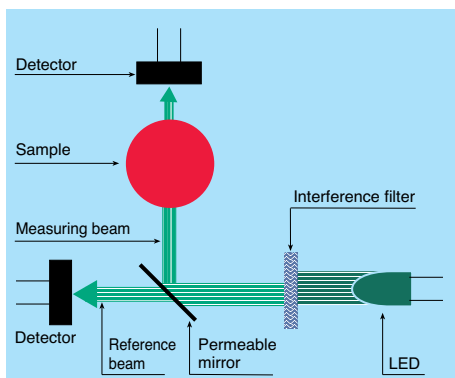
You can find updated information on parameters and measuring ranges on our website at [www.lovibond.com](http://www.lovibond.com)

 Please see pages 78 onwards for reagents (order codes)

## Technical Data

|                               |   |
|-------------------------------|---|
| <b>Display</b>                | Graphic-display   |
| <b>Optics</b>                 | 6 temperature compensating LED, internal reference channel, photodiode in protected sample chamber  |
| <b>Wavelengths</b>            | 6 interference filters in one unit,<br>$\lambda_1 = 430 \text{ nm IF } \Delta \lambda \text{ (nm)} = 5$ ,<br>$\lambda_2 = 530 \text{ nm IF } \Delta \lambda \text{ (nm)} = 5$ ,<br>$\lambda_3 = 560 \text{ nm IF } \Delta \lambda \text{ (nm)} = 5$ ,<br>$\lambda_4 = 580 \text{ nm IF } \Delta \lambda \text{ (nm)} = 5$ ,<br>$\lambda_5 = 610 \text{ nm IF } \Delta \lambda \text{ (nm)} = 6$ ,<br>$\lambda_6 = 660 \text{ nm IF } \Delta \lambda \text{ (nm)} = 5$<br>IF = interference filter |
| <b>Interface</b>              | RS232 for printer and PC-connection   |
| <b>Download</b>               | Software and methods up-date by means of the internet   |
| <b>Operation</b>              | Acid and solvent resistant, touch-sensitive keypad with audible feedback  |
| <b>Power Supply</b>           | 7 Ni-MH-battery pack (AA/Mignon), charged whilst in the unit with external mains charger, integrated overload cut-out   |
| <b>Dimensions (L x W x H)</b> | 265 x 195 x 70 mm   |
| <b>Weight (unit)</b>          | approx. 1000 g with rechargeable batteries  |
| <b>Ambient Conditions</b>     | up to max. 90 % humidity (non condensing)<br>approx. 5–40 °C  |
| <b>Auto-Off</b>               | approx. 20 minutes after last keypress with no loss of data   |
| <b>Auto-Check</b>             | By pressing ON/OFF-key  |
| <b>Memory Capacity</b>        | approx. 1000 data sets with date, time and registration number  |
| <b>Approval</b>               | CE  |

## Dual Beam Technologie



## Verification Standard Kit

The verification standard kit for the MultiDirect is designed to assure the user of 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.

**Verification Standard Kit 21 56 50**



## Accessories

| Item   | Code        | Item   | Code        |
|--|-------------|--|-------------|
| Set of 12 round vials with lid<br>Height 48 mm, Ø 24 mm          | 19 76 20    | Cleaning brush, 10 cm  | 38 02 30    |
| Set of 10 round vials with lid<br>Height 90 mm, Ø 16 mm          | 19 76 65    | Syringe, plastic, 2 ml   | 36 90 80    |
| Adapter for round vials Ø 16 mm                                  | 19 80 10 94 | Syringe, plastic, 5 ml   | 36 61 20    |
| Lid for adapter  | 19 80 11 00 | Syringe, plastic, 10 ml  | 36 90 90    |
| Vial stand for 6 round vials<br>Ø 24 mm, acrylic glass           | 41 89 51    | Rubber seal cap  | 19 80 15 01 |
| Vial stand for 10 vials<br>(Ø 16 mm or □ 13,5 mm), acrylic glass | 41 89 57    | Mains charger, 100-240 V, 50-60 Hz,<br>with international adapters | 19 30 10    |
| Sealing ring for vial Ø 24 mm (12 pc.)                           | 19 76 26    | Universal adapter for socket,<br>international                     | 19 20 65    |
| Cleaning cloth for vials   | 19 76 35    | Cable for connection to PC,<br>serial 9-pins                       | 19 81 98    |
| Adapter for Vacu-vial®   | 19 20 75    | AA Ni-MH, 1100 mAh (7 pc.)   | 19 50 02 0  |
| Plastic beaker, 100 ml   | 38 48 01    | Lithium battery  | 19 50 01 7  |
| Plastic funnel with handle                                       | 47 10 07    | Paper printer DPN 2335   | 19 80 75    |
| Plastic stirring rod, 13 cm length                               | 36 41 00    | Verification Standard Kit  | 21 56 50    |
| Plastic stirring rod, 13 cm length, (10 pc.)                     | 36 41 20    |  |             |
| Plastic stirring rod, 10 cm length                               | 36 41 09    |  |             |
| Plastic stirring rod, 10 cm length, (10 pc.)                     | 36 41 30    |  |             |



# Spectrophotometer SpectroDirect

For water and  
waste water testing  
330 - 900 nm

## Highlights

- 330 to 900 nm
- Interface RS232
- Large illuminated display
- Touch-sensitive film keypad with logical layout
- Use of round vials and rectangular cells of different sizes without adapter
- 35 user-specific methods
- Fast, easy lamp change
- Update via Internet



The SpectroDirect is a modern single-beam spectrophotometer with an excellent price/performance ratio that is specifically designed for water testing.

The instrument is equipped with a wide range of pre-programmed methods based on the proven range of Lovibond® tube tests, tablet reagents, liquid reagents and powder reagents (Vario Powder Packs).

## Optics

The SpectroDirect is a single-beam spectral photometer (see illustration).

The light source is a tungsten halogen lamp with flash function. The lamp is switched on only momentarily during of the measurement process<sup>1)</sup>, so there is no need for a warm-up period. The SpectroDirect is ready to perform a self-test as soon as it is switched on.

The light passes through an entry slot to the monochromator, where it is split into spectral ranges. The monochromator is a holographically produced, transparent grating. The movable mirror ensures that light of the desired wavelength is focused automatically so that it passes through the exit slot, into the sample chamber and therefore through the water sample. The light that is not absorbed by the sample travels to the silicon photodiode detector. This signal is then evaluated by a microprocessor and shown as a result in the display.

1) (Exception: permanent light is used for a wavelength scan).

## Multifunctional sample chamber

Round vials measuring 16 mm and 24 mm in diameter and rectangular cells with pathlengths from 10 to 50 mm may be used without an adapter. Only the 10 mm cell will be fixed by a little holder that must be inserted into the sample chamber.

## New methods

Test methods are continuously updated to suit market requirements.

You can find updates for new methods and additional languages on our website at [www.lovibond.com](http://www.lovibond.com).

➡ Please see pages 78 onwards for reagents (order codes)

## Functions

- Pre-programmed Lovibond® methods
- Absorption
- Transmission
- Spectral data recording
- User calibration (polynomials)
- Concentration (linear)
- Kinetics

## Self-test

After it is switched on, the SpectroDirect automatically performs a self-test – beginning with a function test of the stepper motor and the halogen lamp, followed by an optics test. For this purpose, the unit has a built-in didymium glass filter. This filter checks the correct wavelength setting. If the wavelengths are incorrect, the optical system is automatically adjusted during the self-test.

## Maintenance

Thanks to the design of the SpectroDirect, the only maintenance that is required is replacement of the light source. The lamp is situated at the back of the photometer in an easily accessible position. Changing the lamp is fast and simple and does not require any tools. The positioning of the assembly ensures optimum focusing of the halogen lamp.

## Power supply

The required input voltage is 12 V. The SpectroDirect is connected to an external power pack as standard. Battery operation is also possible by using an external energy station (see accessories).

## Choice of language

The user prompt in the display can be switched to German, English, French, Italian, Spanish or Portuguese. If further languages are available they can be updated via internet.

## N.I.S.T. Traceability

This spectrophotometer can be tested using a Secondary Standard Filter Set (order code 711160) which is N.I.S.T. traceable. Furthermore the instrument may be calibrated for each method in a "user calibration mode" with N.I.S.T. traceable standards.

## Applications

- Waste Water
- Drinking Water
- Industrial Process Water
- Science & Research
- Governmental and Private Laboratories





## User prompt

The user prompt is a convenient and easy to understand feature that guides the user step by step all the way through to the test result.

## Zero calibration and measurements

The user chooses the desired method either from the method list in alphabetical order or by entering a numerical code. If desired additional information like the required vial, the reagent type and the measuring range can be displayed using the functional keys. The date and time are shown in the display by pressing the "clock key". The SpectroDirect automatically selects the correct wavelength.

Zero calibration is performed with the water sample by pressing the ZERO key.

A characteristic coloration develops when you add the indicator to the water sample. Press the [Test] key to initiate the measurement (which starts either immediately or after the time required for colour development).

## Countdown function

With some methods, after adding the indicator to the water sample, the user has to wait for a predefined colour reaction time. This time interval is shown in the display. The remaining time is displayed continuously. An alarm sounds during the last 10 seconds of the time period. Measurement then starts automatically, and the result is shown in the display. The countdown function can be switched off to allow rapid processing of a series of samples.

## Differentiation of results

The SpectroDirect allows differentiated tests for certain methods. With the Chlorine method, for example, differentiated measurement is possible for free, combined and total chlorine.

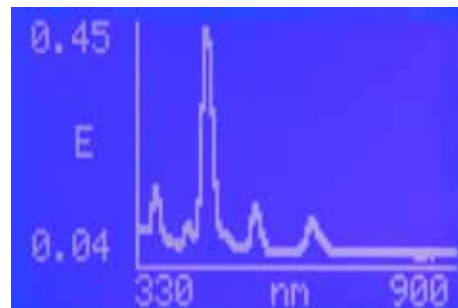
## Functions

The SpectroDirect is ideal for routine laboratory use and is equipped with additional functions for user-specific applications. One example is the creation of a user-defined method for a routine check.

## Spectral data

A wavelength scan is performed over the user-defined interval between 330 and 900 nm.

The display shows the graph of the spectrum; if the user presses a key, the display also shows a data list with the corresponding maximum and minimum absorption levels.



## Printer/PC connection

On the back of the SpectroDirect photometer, there is an RS232 interface with a 9-pin D-Sub connector for connection of a PC or a printer with serial interface (see accessories).

## Printing data

Every result is printed with date, time, reg. no, code no., measuring range and method number.

## Storing data

You can store results of programmed and user-specific methods (polynomials) in a memory with a capacity of 1000 data sets. Alongside the result, the data sets contain information on method, date and time of the test.



## Absorption/Transmission

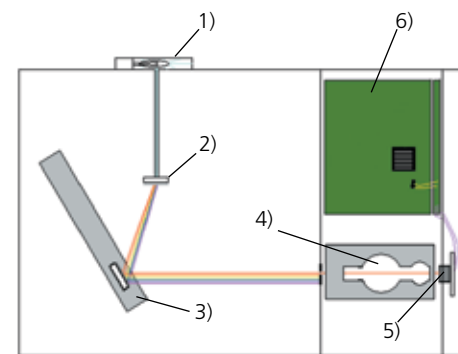
Using this function, the operator can, for example, carry out measurement of standards with different concentrations using the user-selected wavelength in order to obtain the data pairs required for a polynomial. Result output is in Abs and % Transmission.

## Polynomials

With the help of an external mathematical program, the corresponding polynomial is created from data pairs (concentration/absorption). A known polynomial may also be used. 25 order polynomials ( $y = A+Bx+Cx^2 + Dx^3 + Ex^4 + Fx^5$ ) can be stored together with user-specific parameters such as wavelength, measuring range, unit and number of decimals.

## Concentration

This function can be used to measure 2 to 14 known standards. On the basis of the concentrations/absorption pairs obtained, the photometer will calculate a linear interpolation between the measured points. Up to 10 methods can be stored for further sample measurements.



- 1) Tungsten halogen lamp
- 2) Monochromator
- 3) Movable mirror
- 4) Sample chamber
- 5) Silicon photodiode
- 6) Microprocessor unit

## Technical data

|  |  |
|--|--|
| <b>Wavelength range:</b>                   | 330 to 900 nm  |
| <b>Photometric range:</b>                  | -0.3 to 2.5 Abs  |
| <b>Spectral bandwidth:</b>                 | 10 nm  |
| <b>Wavelength accuracy:</b>                | ±2 nm  |
| <b>Wavelength reproducibility:</b>         | ±1 nm  |
| <b>Light source:</b>                       | Pre-adjusted tungsten halogen lamp                                 |
| <b>Monochromator:</b>                      | Holographic grating  |
| <b>Detector:</b>                           | Silicon photodiode   |
| <b>Multifunctional sample chamber for:</b> | Round vials<br>24 and 16 mm Ø,<br>Rectangular cells<br>10-50 mm    |
| <b>Display:</b>                            | Backlit LCD<br>graphic display                                     |
| <b>Language options:</b>                   | German, English,<br>French, Italian, Spanish,<br>Portuguese        |
| <b>Storage capacity:</b>                   | 1000 test data sets  |
| <b>Serial interface:</b>                   | RS232  |
| <b>Dimensions:</b><br>(L x W x H)          | 270 x 275 x 150 mm   |
| <b>Weight:</b>                             | approx. 3.2 kg   |
| <b>Power supply unit:</b>                  | Input: 100 - 240 V ~<br>1.0 A 50 - 60 Hz<br>Output: 12 V .... 30 W |

## CE-Conformity



## Accessories

| Item  | Code        |
|---|-------------|
| Replacement halogen lamp  | 71 10 00    |
| Magnetical pin (for updates)  | 19 80 16 87 |
| Connection cable to a PC  | 19 81 97    |
| Connection to a 12 V plug   | 71 10 40    |
| Case for transport  | 71 20 50    |
| Universal adapter for sockets   | 19 20 65    |
| Secondary standard set  | 71 11 60    |
| Plastic funnel with handle  | 47 10 07    |
| Cleaning cloth for vials  | 19 76 35    |
| Power supply unit<br>100-240 V / 50-60 Hz   | 71 10 90    |
| Power station,<br>230 V / 50 Hz<br>with cable for connection                                    | 71 10 50    |
| 12 round vials with lid<br>Height 48 mm, 24 mm Ø  | 19 76 20    |
| 5 round vials with lid<br>Height 48 mm, 24 mm Ø   | 19 76 29    |
| 10 round vials with lid<br>Height 90 mm, 16 mm Ø  | 19 76 65    |
| Vial stand for 6 round vials<br>Ø 24 mm, acrylic glass  | 41 89 51    |
| Vial stand for 10 vials<br>(Ø 16 mm or □ 13,5 mm), acrylic glass                                | 41 89 57    |
| W 100, rectangular cell<br>optical glass OG,<br>10 mm path length                               | 60 10 40    |
| W 100, rectangular cell<br>optical glass OG,<br>50 mm path length                               | 60 10 70    |
| W 110, rectangular cell<br>Quartz-UV-glass,<br>10 mm path length                                | 66 11 30    |
| Paper printer DPN 2335<br>with power pack (230 V, 50 Hz)<br>connection cable and one paper roll | 19 80 75    |

## Arsenic glass apparatus

delivery content:

|                  |          |
|------------------|----------|
| Erlenmeyer flask | 37 05 01 |
| Glass stopper    | 37 05 02 |
| Absorption tube  | 37 05 03 |

additionally required (**not** included, please order separately):

|   |          |
|---|----------|
| W 100, cell, Optical-Glass-OG,<br>20 mm path length | 60 10 50 |
|---|----------|

## Delivery Content

### SpectroDirect (standard equipment)

- SpectroDirect (basic unit)
- Power supply unit 100 - 240 V
- Serial cable for connection to a PC
- Magnetic pin
- 2 batteries (AA)
- Manufacturers test certificate M
- Warranty information
- Instruction manual

**Order code: 71 20 00**

### SpectroDirect (advanced features)

- SpectroDirect in aluminium case
- Power supply unit 100 - 240 V
- Serial cable for connection to a PC
- Magnetic pin
- 2 batteries (AA)
- Energy station
- Replacement lamp
- 12 round vials with lids, 24 mm Ø
- 10 round vials with lids, 16 mm Ø
- 2 rectangular cells, 10 mm path length
- 2 rectangular cells, 50 mm path length
- Plastic stirring rod, 13 cm
- Manufacturers test certificate M
- Warranty information
- Instruction manual

**Order code: 71 20 05**

We would be pleased to quote a ready to use spectrophotometer unit for the parameters and required accessories.

➔ **Please see pages 78 onwards for reagents (order codes)**



# Reagents

## Development

For more than thirty years, Tintometer in Dortmund 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.

## Tablet reagents

Our test tablets are manufactured in Germany under tightly controlled conditions on most modern 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 within an individual aluminium foil pocket, 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 (10 tablets in each blister) 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.

## Specifications and Certificate of Analysis

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

## Tube tests

Lovibond® tube tests enable the user to easily perform highly sensitive and precise water testing.

When using tube tests measurement is considerably faster and easier, particularly in the case of standard and serial tests.

The tube tests contain a precisely measured amount of reagent, thereby avoiding the presence of superfluous chemicals and optimising test safety.

Up to six different measuring ranges are available for the various tests.

The tubes are made of special optical glass with a 16 mm in diameter. They are supplied in a storage and dispatch box together with the digestion or auxiliary reagents. This packaging unit contains 24 or 25 reaction vials and up to 2 zero vials for photometer system calibration.



## Liquid reagents

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 shelf 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 make them compatible to Hach® devices.\*

➔ Detailed information see pages 100 - 107



## Membrane filter set

For use when preparing samples for photometric measurements

### Advantages

- removes turbid materials from samples
- differentiates between dissolved and total substances
- 0.45 µm mesh meets the requirements of the official German unitary procedure for water testing

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

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

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



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



# Reagents

| Test  | Range            | Wave lengths $\lambda$ / nm |        |        |             |        |        |               | Method                            | Cuvette |
|---|------------------|-----------------------------|--------|--------|-------------|--------|--------|---------------|-----------------------------------|---------|
|   |                  | MD 100                      | MD 200 | MD 600 | MultiDirect | PM 620 | PM 600 | SpectroDirect |                                   |         |
| <b>Alkalinity-M</b>   | 5 - 200 mg/l     | 610                         | 610    | 610    | 610         | 610    | 610    | 615           | Acid/Indicator <sup>1, 2, 5</sup> | 24 mm ø |
| <b>Alkalinity-M HR</b>  | 5 - 500 mg/l     | -                           | -      | 610    | 610         | 610    | 610    | 615           | Acid/Indicator <sup>1, 2, 5</sup> | 24 mm ø |
| <b>Alkalinity-P</b>   | 5 - 300 mg/l     | -                           | -      | 560    | 560         | -      | -      | 551           | Acid/Indicator <sup>1, 2, 5</sup> | 24 mm ø |
| <b>Aluminium VARIO</b>  | 0.01 - 0.25 mg/l | 530                         | -      | 530    | 530         | 530    | -      | 535           | Eriochrome cyanine R <sup>2</sup> | 24 mm ø |
| <b>Aluminium</b>  | 0.01 - 0.3 mg/l  | 530                         | -      | 530    | 530         | 530    | -      | 535           | Eriochrome cyanine R <sup>2</sup> | 24 mm ø |
| <b>Ammonia</b>  | 0.02 - 1 mg/l    | 610                         | -      | 610    | 610         | 610    | -      | 676           | Indophenole blue <sup>2, 3</sup>  | 24 mm ø |
| <b>Ammonia VARIO</b>  | 0.01 - 0.8 mg/l  | 660                         | -      | 660    | 660         | -      | -      | 655           | Salicylate <sup>2</sup>           | 24 mm ø |
| <b>Ammonia VARIO LR</b>                                       | 0.02 - 2.5 mg/l  | -                           | -      | 660    | 660         | -      | -      | 655           | Salicylate <sup>2</sup>           | 16 mm ø |
| <b>Ammonia VARIO HR</b>                                       | 1 - 50 mg/l      | -                           | -      | 660    | 660         | -      | -      | 655           | Salicylate <sup>2</sup>           | 16 mm ø |
| <b>Ammonia, free VARIO</b><br>(Part of method monochloramine) | 0.01 - 0.5 mg/l  | 660                         | -      | 660    | 660         | -      | -      | 655           | Indophenol                        | 24 mm ø |

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

For other reagent quantities please see our current price list.

Legend

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

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

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

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

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

| Display           | Reagent  | Form of reagent/Quantity   | Order code   |
|-------------------|--|--|--|
| CaCO <sub>3</sub> | ALKA-M-PHOTOMETER  | Tablet / 100   | 51 32 10 BT  |
| CaCO <sub>3</sub> | ALKA-M-HR-PHOTOMETER   | Tablet / 100   | 51 32 40 BT  |
| CaCO <sub>3</sub> | ALKA-P-PHOTOMETER  | Tablet / 100   | 51 32 30 BT  |
| Al                | VARIO Aluminum ECR/F20<br>VARIO Aluminum Hexamine/F20<br>VARIO Aluminum ECR Masking Reagent  | Powder Pack / 100<br>Powder Pack / 100<br>Liquid reagent / 25 ml<br><b>Set</b>                         | 53 50 00   |
| Al                | ALUMINIUM No. 1<br>ALUMINIUM No. 2<br>Combi pack# ALUMINIUM No.1 / No.2<br>Combi pack# ALUMINIUM No.1 / No.2                                       | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250   | 51 54 60 BT<br>51 54 70 BT<br>51 76 01 BT<br>51 76 02 BT             |
| N                 | AMMONIA No. 1<br>AMMONIA No. 2<br>Combi pack# AMMONIA No.1 / No.2<br>Combi pack# AMMONIA No.1 / No.2<br>Ammonia conditioning powder (for seawater) | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250<br>Powder / 15 g / 100 Tests                      | 51 25 80 BT<br>51 25 90 BT<br>51 76 11 BT<br>51 76 12 BT<br>46 01 70 |
| N                 | VARIO Ammonia Salicylate F10<br>VARIO Ammonia Cyanurate F10  | Powder Pack / 100<br>Powder Pack / 100<br><b>Set</b>   | 53 55 00   |
| N                 | VARIO Ammonia Salicylate F5<br>VARIO Ammonia Cyanurate F5<br>VARIO Am Diluent Reagent LR<br>VARIO Deionised Water (for Zero)                       | Powder Pack / 50<br>Powder Pack / 50<br>Reaction tube / 50<br>Bottle, 100 ml<br><b>Set</b> (Tube test) | 53 56 00   |
| N                 | VARIO Ammonia Salicylate F5<br>VARIO Ammonia Cyanurate F5<br>VARIO Am Diluent Reagent HR<br>VARIO Deionised Water (for Zero)                       | Powder Pack / 50<br>Powder Pack / 50<br>Reaction tube / 50<br>Bottle, 100 ml<br><b>Set</b> (Tube test) | 53 56 50   |
| N                 | VARIO Free Ammonia Reagent Solution<br>VARIO Monochlor FRGT  | Bottle 4 ml<br>Powder Pack / 100<br><b>Set</b>   | 53 58 00   |

a) determination of free, combined and total

b) Thermoreactor is necessary for COD (150°C), TOC (120°C) and total -chromium, - phosphate, -nitrogen, (100°C)

c) MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75)

d) Spectroquant® is a Merck KGaA Trademark

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

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

g) Reagent recovers most insoluble iron oxides without digestion

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

i) high range by dilution

j) Vacu-vials® is a Chemetrics Trademark

# including stirring rod

# Reagents

| Test                                  | Range                      | Wave lengths $\lambda$ / nm |        |        |             |        |        |               | Method                                     | Cuvette |
|---------------------------------------|----------------------------|-----------------------------|--------|--------|-------------|--------|--------|---------------|--|---------|
|                                       |                            | MD 100                      | MD 200 | MD 600 | MultiDirect | PM 620 | PM 600 | SpectroDirect |  |         |
| <b>Arsenic (III, IV)</b>              | 0.02 - 0.6 mg/l            | -                           | -      | -      | -           | -      | -      | 507           | Silver diethyldithiocarbamate <sup>1</sup> | 20 mm □ |
| <b>Biguanide</b> (see PHMB)           |                            |                             |        |        |             |        |        |               |  |         |
| <b>Boron</b>                          | 0.1 - 2 mg/l               | -                           | -      | 430    | 430         | -      | -      | 450           | Azomethine <sup>3</sup>                    | 24 mm ø |
| <b>Bromine</b>                        | 0.05 - 13 mg/l             | 530                         | 530    | 530    | 530         | 530    | 530    | -             | DPD <sup>5</sup>                           | 24 mm ø |
|                                       | 0.05 - 1 mg/l              | -                           | -      | -      | -           | -      | -      | 510           |  | 50 mm □ |
|                                       | 0.1 - 3 mg/l               | -                           | -      | -      | -           | -      | -      | 510           |  | 10 mm □ |
|                                       | 0.05 - 6.5 mg/l            | -                           | -      | -      | -           | -      | -      | 510           |  | 24 mm ø |
| <b>Bromine VARIO</b>                  | 0.05 - 4.5 mg/l            | -                           | -      | 530    | 530         | -      | -      | -             | DPD <sup>1,2</sup>                         | 24 mm ø |
| <b>Cadmium (Cd<sup>2+</sup>)</b>      | 0.025 - 0.75 mg/l          | -                           | -      | -      | -           | -      | -      | 525           | Cadion                                     | 16 mm ø |
| <b>Chloride</b>                       | 0.5 - 25 mg/l              | 530                         | -      | 530    | 530         | -      | -      | 450           | Silver nitrate/turbidity                   | 24 mm ø |
|                                       | 5 - 250 mg/l <sup>1)</sup> | 530                         | -      | -      | -           | -      | -      | -             |  |         |
| <b>Chloride</b>                       | 5 - 60 mg/l                | -                           | -      | -      | -           | -      | -      | 455           | Iron (III)-thiocyanate <sup>4</sup>        | 24 mm ø |
| <b>Chloride</b>                       | 0.5 - 20 mg/l              | 430                         | -      | 430    | -           | -      | -      | -             | Mercury thiocyanate / Iron nitrate         | 24 mm ø |
| <b>Chlorine<sup>a)</sup></b>          | 0.01 - 6 mg/l              | 530                         | 530    | 530    | 530         | 530    | 530    | -             | DPD <sup>1,2</sup>                         | 24 mm ø |
|                                       | 0.02 - 0.5 mg/l            | -                           | -      | -      | -           | -      | -      | 510           |  | 50 mm □ |
|                                       | 0.1 - 6 mg/l               | -                           | -      | -      | -           | -      | -      | 510           |  | 10 mm □ |
|                                       | 0.02 - 3 mg/l              | -                           | -      | -      | -           | -      | -      | 510           |  | 24 mm ø |
| <b>Chlorine HR (DPD)<sup>a)</sup></b> | 0.1 - 10 mg/l              | 530                         | 530    | 530    | 530         | 530    | 530    | 510           | DPD <sup>1,2</sup>                         | 24 mm ø |

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

For other reagent quantities please see our current price list.

Legend

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

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

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

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

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

| Display         | Reagent  | Form of reagent/Quantity   | Order code  |
|-----------------|--|--|---|
| As              | for chemicals see manual,<br>reagents at specialized chemistry dealer  |  |   |
| B               | BORON No. 1<br>BORON No. 2<br>Combi pack# BORON No.1 / No.2<br>Combi pack# BORON No.1 / No.2   | Tablet / 100<br>Tablet / 100<br>each 100<br>each 200   | 51 57 90<br>51 58 00<br>51 76 81<br>51 76 82  |
| Br              | DPD No. 1<br>DPD No. 3<br>Combi Pack# DPD No.1 / No.3<br>Combi Pack# DPD No.1 / No.3<br>DPD No. 1 HIGH CALCIUM <sup>e)</sup><br>DPD No. 3 HIGH CALCIUM <sup>e)</sup><br>Combi Pack# DPD No.1 / No.3 HIGH CALCIUM <sup>e)</sup><br>Combi Pack# DPD No.1 / No.3 HIGH CALCIUM <sup>e)</sup><br>DPD Nitrite<br>GLYCINE <sup>f)</sup><br>Combi pack# DPD No.1 / GLYCINE<br>Combi pack# DPD No.1 / GLYCINE | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250<br>Tablet / 100<br>Tablet / 100<br>each 100<br>each 250<br>Tablet / 100<br>Tablet / 100<br>each 100<br>each 250 | 51 10 50 BT<br>51 10 80 BT<br>51 77 11 BT<br>51 77 12 BT<br>51 57 40 BT<br>51 57 30 BT<br>51 77 81 BT<br>51 77 82 BT<br>50 26 91<br>51 21 70 BT<br>51 77 31 BT<br>51 77 32 BT |
| Br              | VARIO Chlorine TOTAL-DPD/F10   | Powder Pack / 100  | 53 01 20  |
| Cd              | Spectroquant® 1.14834.0001 <sup>d)</sup>   | Tube test / 25   | 42 07 50  |
| Cl              | CHLORIDE T1<br>CHLORIDE T2<br>Combi pack# CHLORIDE T1 / T2<br>Combi pack# CHLORIDE T1 / T2   | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250   | 51 59 10 BT<br>51 59 20 BT<br>51 77 41 BT<br>51 77 42 BT  |
| Cl              | Chlorid-51 / Chlorid-52  | Reagent test (Liquid reagent)<br>approx. 50-75 Tests   | 2 41 90 31  |
| Cl <sup>-</sup> | KS251 (Chloride Reagent A)<br>KS253 (Chloride Reagent B)   | Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br><b>Set</b>   | 56L025165<br>56L025365<br>56R018490   |
| Cl <sub>2</sub> | DPD No. 1<br>DPD No. 3<br>Combi pack# DPD No.1 / No.3<br>Combi pack# DPD No.1 / No.3<br>DPD No. 1 HIGH CALCIUM <sup>e)</sup><br>DPD No. 3 HIGH CALCIUM <sup>e)</sup><br>Combi Pack# DPD No.1 / No.3 HIGH CALCIUM <sup>e)</sup><br>Combi Pack# DPD No.1 / No.3 HIGH CALCIUM <sup>e)</sup>   | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250<br>Tablet / 100<br>Tablet / 100<br>each 100<br>each 250   | 51 10 50 BT<br>51 10 80 BT<br>51 77 11 BT<br>51 77 12 BT<br>51 57 40 BT<br>51 57 30 BT<br>51 77 81 BT<br>51 77 82 BT  |
| Cl <sub>2</sub> | DPD No. 1 HR<br>DPD No. 3 HR   | Tablet / 100<br>Tablet / 100   | 51 15 00 BT<br>51 15 90 BT  |

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

<sup>b)</sup> Thermoreactor is necessary for COD (150°C), TOC (120°C) and total -chromium, - phosphate, -nitrogen, (100°C)

<sup>c)</sup> MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75)

<sup>d)</sup> Spectroquant® is a Merck KGaA Trademark

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

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

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

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

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

<sup>j)</sup> Vacu-vials® is a Chemetrics Trademark

# including stirring rod

# Reagents

| Test   | Range  | Wave lengths $\lambda$ / nm |                    |                    |                    |                    |                    |                      | Method   | Cuvette                                  |
|--|--|-----------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------------------|--|--|
|  |  | MD 100                      | MD 200             | MD 600             | MultiDirect        | PM 620             | PM 600             | SpectroDirect        |  |  |
| <b>Chlorine</b> <sup>a)</sup>                | 0.02 - 4 mg/l<br>0.02 - 3 mg/l                                 | 530<br>-                    | 530<br>-           | 530<br>-           | 530<br>-           | 530<br>-           | -<br>-             | -<br>510             | DPD <sup>1,2</sup>   | 24 mm ø<br>24 mm ø                       |
| <b>Chlorine VARIO</b> <sup>a)</sup>          | 0.02 - 2 mg/l<br>0.1 - 8 mg/l                                  | 530<br>530                  | -<br>-             | 530<br>530         | 530<br>-           | 530<br>530         | -<br>-             | 510<br>-             | DPD <sup>1,2</sup>   | 24 mm ø<br>24 mm ø multy vial            |
| <b>Chlorine HR (KI)</b>                      | 5 - 200 mg/l   | 530                         | -                  | 530                | 530                | -                  | -                  | 470                  | KI / Acid <sup>5</sup>                                     | 16 mm ø                                  |
| <b>Chlorine dioxide</b>                      | 0.02 - 11 mg/l<br>0.05 - 1 mg/l<br>0.05 - 2.5 mg/l             | 530<br>-<br>-               | 530<br>-<br>-      | 530<br>-<br>-      | 530<br>-<br>-      | 530<br>-<br>-      | -<br>-<br>-        | -<br>510<br>510      | DPD/Glycine <sup>1,2</sup>                                 | 24 mm ø<br>50 mm □<br>24 mm ø            |
| <b>Chlorine dioxide VARIO</b>                | 0.04 - 3.8 mg/l  | 530                         | -                  | 530                | 530                | -                  | -                  | -                    | DPD <sup>1,2</sup>   | 24 mm ø                                  |
| <b>Chromium</b> <sup>a) b)</sup>             | 0.005 - 0.5 mg/l<br>0.02 - 2 mg/l                              | -<br>-                      | -<br>-             | -<br>530           | -<br>-             | -<br>-             | -<br>-             | 542<br>542           | 1,5-Diphenylcarbozide <sup>1,2</sup>                       | 50 mm □<br>16 mm ø                       |
| <b>COD LR</b> (ISO 15705:2002) <sup>b)</sup> | 0 - 150 mg/l   | 430                         | 430                | 430                | 430                | -                  | -                  | 420                  | Dichromate / H <sub>2</sub> SO <sub>4</sub> <sup>1,2</sup> | 16 mm ø                                  |
| <b>COD MR</b> (ISO 15705:2002) <sup>b)</sup> | 0 - 1500 mg/l  | 610                         | 610                | 610                | 610                | -                  | -                  | 620                  | Dichromate / H <sub>2</sub> SO <sub>4</sub> <sup>1,2</sup> | 16 mm ø                                  |
| <b>COD HR</b> <sup>b)</sup>                  | 0 - 15000 mg/l   | 610                         | 610                | 610                | 610                | -                  | -                  | 620                  | Dichromate / H <sub>2</sub> SO <sub>4</sub> <sup>1,2</sup> | 16 mm ø                                  |
| <b>Copper</b> <sup>a)</sup>                  | 0.05 - 5 mg/l<br>0.05 - 1 mg/l<br>0.3 - 5 mg/l<br>0.5 - 5 mg/l | 560<br>-<br>559<br>-        | 560<br>-<br>-<br>- | 560<br>-<br>-<br>- | 560<br>-<br>-<br>- | 560<br>-<br>-<br>- | 560<br>-<br>-<br>- | -<br>559<br>-<br>559 | Biquinoline <sup>4</sup>                                   | 24 mm ø<br>50 mm o<br>24 mm ø<br>24 mm ø |

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

For other reagent quantities please see our current price list.

Legend

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

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

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

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

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

| Display          | Reagent   | Form of reagent/Quantity   | Order code  |
|------------------|---|--|---|
| Cl <sub>2</sub>  | DPD 1 Buffer solution<br>DPD 1 Reagent solution<br>DPD 3 Solution   | Liquid reagent / 15 ml<br>Liquid reagent / 15 ml<br>Liquid reagent / 15 ml<br><b>Set</b>   | 47 10 10<br>47 10 20<br>47 10 30<br>47 10 56  |
| Cl <sub>2</sub>  | VARIO Chlorine FREE-DPD/F10<br>VARIO Chlorine TOTAL-DPD/F10   | Powder Pack / 100<br>Powder Pack / 100   | 53 01 00<br>53 01 20  |
| Cl <sub>2</sub>  | ACIDIFYING GP<br>CHLORINE HR (KI)<br>Combi pack CHLORINE HR (KI)/ACIDIFYING GP<br>Combi pack# CHLORINE HR (KI)/ACIDIFYING GP  | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250   | 51 54 80 BT<br>51 30 00 BT<br>51 77 21 BT<br>51 77 22 BT  |
| ClO <sub>2</sub> | DPD No. 1<br>DPD No. 3<br>Combi pack# DPD No.1 / No.3<br>Combi pack# DPD No.1 / No.3<br>GLYCINE <sup>f)</sup><br>Combi pack# DPD No.1 / GLYCINE<br>Combi pack# DPD No.1 / GLYCINE<br>DPD No. 1 HIGH CALCIUM <sup>e)</sup><br>DPD No. 3 HIGH CALCIUM <sup>e)</sup><br>Combi Pack# DPD No.1 / No.3 HIGH CALCIUM <sup>e)</sup><br>Combi Pack# DPD No.1 / No.3 HIGH CALCIUM <sup>e)</sup> | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250<br>Tablet / 100<br>each 100<br>each 250<br>Tablet / 100<br>Tablet / 100<br>each 100<br>each 250 | 51 10 50 BT<br>51 10 80 BT<br>51 77 11 BT<br>51 77 12 BT<br>51 21 70 BT<br>51 77 31 BT<br>51 77 32 BT<br>51 57 40 BT<br>51 57 30 BT<br>51 77 81 BT<br>51 77 82 BT |
| ClO <sub>2</sub> | VARIO Chlorine FREE-DPD/F10   | Powder Pack / 100  | 53 01 00  |
| Cr               | PERSULF. RTG FOR CR<br>Chromium Hexavalent  | Powder Pack / 100<br>Powder Pack / 100   | 53 73 00<br>53 73 10  |
| O <sub>2</sub>   | Reaction tube 0-150 mg/l<br>Reaction tube 0-150 mg/l, mercury free*<br>*without chloride removal  | Tube test / 25<br>Tube test / 25   | 2 42 07 20<br>2 42 07 10  |
| O <sub>2</sub>   | Reaction tube 0-1500 mg/l<br>Reaction tube 0-1500 mg/l, mercury free*<br>*without chloride removal  | Tube test / 25<br>Tube test / 25   | 2 42 07 21<br>2 42 07 11  |
| O <sub>2</sub>   | Reaction tube 0-15000 mg/l<br>Reaction tube 0-15000 mg/l, mercury free*<br>*without chloride removal  | Tube test / 25<br>Tube test / 25   | 2 42 07 22<br>2 42 07 12  |
| Cu               | COPPER No. 1<br>COPPER No. 2<br>Combi pack# COPPER No.1 / No.2<br>Combi pack# COPPER No.1 / No.2  | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250   | 51 35 50 BT<br>51 35 60 BT<br>51 76 91 BT<br>51 76 92 BT  |

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

<sup>b)</sup> Thermoreactor is necessary for COD (150°C), TOC (120°C) and total -chromium, - phosphate, -nitrogen, (100°C)

<sup>c)</sup> MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75)

<sup>d)</sup> Spectroquant® is a Merck KGaA Trademark

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

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

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

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

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

<sup>j)</sup> Vacu-vials® is a Chemetrics Trademark

# including stirring rod



# Reagents

| Test                                 | Range                                      | Wave lengths $\lambda$ / nm |        |            |             |            |        |               | Method   | Cuvette            |
|--------------------------------------|--|-----------------------------|--------|------------|-------------|------------|--------|---------------|--|--------------------|
|                                      |  | MD 100                      | MD 200 | MD 600     | MultiDirect | PM 620     | PM 600 | SpectroDirect |  |                    |
| <b>Copper</b> <sup>a)</sup>          | 0.05 - 4 mg/l                              | -                           | -      | 560        | -           | -          | -      | -             | Bicinchoninate                                     | 24 mm ø            |
| <b>Copper, free VARIO</b>            | 0.05 - 5 mg/l                              | 560                         | -      | 560        | 560         | 560        | -      | 560           | Bicinchoninate                                     | 24 mm ø            |
| <b>Cyanide</b>                       | 0.01 - 0.5 mg/l<br>0.005 - 0.2 mg/l        | -<br>-                      | -<br>- | 580<br>-   | 580<br>-    | -<br>-     | -<br>- | 585<br>585    | Pyridine-barbituric acid <sup>1</sup>              | 24 mm ø<br>50 mm □ |
| <b>Cyanuric acid</b>                 | 0 - 160 mg/l                               | 530                         | 530    | 530        | 530         | 530        | 530    | 530           | Melamine   | 24 mm ø            |
| <b>DEHA</b>                          | 20 - 500 µg/l                              | -                           | -      | 560        | 560         | -          | -      | 562           | PPST <sup>3</sup>                                  | 24 mm ø            |
| <b>DEHA VARIO</b>                    | 20 - 500 µg/l                              | 560                         | -      | 560        | 560         | -          | -      | 562           | PPST <sup>3</sup>                                  | 24 mm ø            |
| <b>Fluoride</b>                      | 0.05 - 2 mg/l<br>0.05 - 1.5 mg/l           | 580<br>-                    | -<br>- | 580<br>-   | 580<br>-    | -<br>-     | -<br>- | -<br>580      | SPADNS <sup>2</sup>                                | 24 mm ø            |
| <b>Formaldehyde</b>                  | 1 - 5 mg/l<br>0.02 - 1 mg/l                | -<br>-                      | -<br>- | -<br>-     | -<br>-      | -<br>-     | -<br>- | 585<br>585    | H <sub>2</sub> SO <sub>4</sub> / Chromotropic acid | 10 mm □<br>50 mm □ |
| <b>Formaldehyde</b>                  | 0.1 - 5 mg/l                               | -                           | -      | -          | -           | -          | -      | 575           | H <sub>2</sub> SO <sub>4</sub> / Chromotropic acid | 16 mm ø            |
| <b>Hardness, calcium</b>             | 50 - 900 mg/l                              | -                           | -      | 560        | 560         | -          | -      | -             | Murexide <sup>4</sup>                              | 24 mm ø            |
| <b>Hardness, calcium</b>             | 0 - 500 mg/l                               | 560                         | 560    | 560        | 560         | 560        | 560    | -             | Murexide <sup>4</sup>                              | 24 mm ø            |
| <b>Hardness, total</b>               | 2 - 50 mg/l<br>20 - 500 mg/l <sup>5)</sup> | 560<br>560                  | -<br>- | 560<br>560 | 560<br>560  | 560<br>560 | -<br>- | 571<br>571    | Metallphthalein <sup>3</sup>                       | 24 mm ø            |
| <b>Hazen</b><br>(Pt-Co-units ; APHA) | 0 - 500 mg/l<br>0 - 500 mg/l               | 430<br>-                    | -<br>- | 430<br>-   | 430<br>-    | -<br>-     | -<br>- | -<br>455      | Direct reading <sup>1,2</sup>                      | 24 mm ø<br>50 mm □ |
| <b>Hydrazine</b>                     | 0.05 - 0.5 mg/l                            | 430                         | -      | 430        | 430         | -          | -      | 455           | Dimethylamino-benzaldehyde <sup>3</sup>            | 24 mm ø            |

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

For other reagent quantities please see our current price list.

Legend

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

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

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

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

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

| Display                       | Reagent  | Form of reagent/Quantity  | Order code  |
|-------------------------------|--|---|---|
| Cu                            | KS240 (Coppercol Reagent 1)<br>KS241 (Coppercol Reagent 2)<br>KS242 (Coppercol Reagent 3)<br>COPPER No.2 | Liquid reagent / 30 ml<br>Liquid reagent / 30 ml<br>Powder / 10 g<br>Tablet / 100<br><b>Set</b> | 56L024030<br>56L024130<br>56L024210<br>51 35 60 BT<br>56R023355 |
| Cu                            | Vario Cu 1 F10   | Powder Pack / 100   | 53 03 00  |
| CN                            | Cyanid-11 / Cyanid-12 / Cyanid-13  | Reagent test (Powder,<br>Liquid reagent) / 200 Tests  | 2 41 88 75  |
| Cys                           | CyA-TEST   | Tablet / 100  | 51 13 70 BT   |
| DEHA                          | DEHA Solution<br>DEHA  | Liquid reagent / 100 ml<br>Tablet / 100   | 46 11 81<br>51 32 20 BT   |
| DEHA                          | VARIO OXYSCAV 1 RGT<br>VARIO DEHA 2 RGT  | Powder Pack / 200<br>Solution / 100 ml<br><b>Set</b>  | 53 60 00  |
| F                             | SPADNS Reagent<br><br>Fluoride Standard<br>Reagent solution and standard required                        | Liquid reagent / 250 ml<br>Liquid reagent / 500 ml<br>Solution / 30 ml                          | 46 74 81<br>46 74 82<br>20 56 30                                |
| HCHO                          | Spectroquant® 1.14678.0001 <sup>d)</sup>   | Reagent test / ca. 50-75 Tests  | 42 07 51  |
| HCHO                          | Spectroquant® 1.14500.0001 <sup>d)</sup>   | Tube test / 25  | 42 07 52  |
| CaCO <sub>3</sub>             | CALCHECK   | Tablet / 100  | 51 56 50  |
| CaCO <sub>3</sub>             | Combi pack <sup>#</sup> CALCIO H No.1 / No.2<br>Combi pack <sup>#</sup> CALCIO H No.1 / No.2             | each 100<br>each 250  | 51 77 61 BT<br>51 77 62 BT                                      |
| CaCO <sub>3</sub>             | HARDCHECK P  | Tablet / 100<br>Tablet / 250  | 51 56 60 BT<br>51 56 61 BT                                      |
| Pt-Co-units                   | no reagents required   | -   | -   |
| N <sub>2</sub> H <sub>4</sub> | Hydrazine Test Powder<br>Spoon   | Powder / 30 g   | 46 29 10<br>38 49 30  |

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

<sup>b)</sup> Thermoreactor is necessary for COD (150°C), TOC (120°C) and total -chromium, - phosphate, -nitrogen, (100°C)

<sup>c)</sup> MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75)

<sup>d)</sup> Spectroquant® is a Merck KGaA Trademark

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

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

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

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

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

<sup>j)</sup> Vacu-vials® is a Chemetrics Trademark

<sup>#</sup> including stirring rod

# Reagents

| Test                                    | Range   | Wave lengths $\lambda$ / nm |            |            |             |          |        |                 | Method                                      | Cuvette                       |
|---|---|-----------------------------|------------|------------|-------------|----------|--------|-----------------|---|-------------------------------|
|   |   | MD 100                      | MD 200     | MD 600     | MultiDirect | PM 620   | PM 600 | SpectroDirect   |   |                               |
| <b>Hydrazine</b>                        | 0.01 - 0.6 mg/l<br>0.005 - 0.6 mg/l                 | -                           | -          | 430        | 430         | -        | -      | -<br>455        | Dimethylamino-<br>benzaldehyde <sup>3</sup> | 24 mm ø                       |
| <b>Hydrazine</b> <sup>1)</sup>          | 0.01 - 0.7 mg/l                                     | -                           | -          | 430        | 430         | -        | -      | -               | PDMAB                                       | 24 mm ø                       |
| <b>Hydrogen peroxide</b>                | 0.03 - 3 mg/l<br>0.01 - 0.5 mg/l<br>0.03 - 1.5 mg/l | -                           | -          | 530        | 530         | 530      | -      | -<br>510<br>510 | DPD/Catalyst <sup>5</sup>                   | 24 mm ø<br>50 mm □<br>24 mm ø |
| <b>Hydrogen peroxide</b>                | 1 - 50 mg/l<br>40 - 500 mg/l <sup>1)</sup>          | -                           | 430<br>530 | 430<br>530 | 430<br>530  | -<br>530 | -      | -               | Peroxotitanium acid                         | 24 mm ø                       |
| <b>Iodine</b>                           | 0.05 - 3.6 mg/l                                     | -                           | -          | 530        | 530         | 530      | -      | 510             | DPD <sup>5</sup>                            | 24 mm ø                       |
| <b>Iron (II, III)<br/>soluble</b>       | 0.02 - 1 mg/l<br>0.01 - 0.5 mg/l<br>0.1 - 1 mg/l    | 560                         | 560        | 560        | 560         | 560      | 560    | -<br>562<br>562 | PPST <sup>3</sup>                           | 24 mm ø<br>50 mm □<br>10 mm □ |
| <b>Iron VARIO (II, III)<br/>soluble</b> | 0.02 - 3 mg/l<br>0.1 - 3 mg/l                       | 530                         | -          | 530        | 530         | -        | -      | -<br>510        | 1,10-Phenanthroline <sup>2</sup>            | 24 mm ø                       |
| <b>Iron VARIO, total</b> <sup>9)</sup>  | 0.02 - 1.8 mg/l<br>0.1 - 1.8 mg/l                   | 580                         | -          | 580        | 580         | -        | -      | -<br>590        | TPTZ <sup>9)</sup>                          | 24 mm ø                       |
| <b>Iron LR</b>                          | 0.03 - 2.0 mg/l                                     | 560                         | -          | 560        | -           | -        | -      | -               | Ferrozine / Thioglycolate                   | 24 mm ø                       |
| <b>Iron LR 2</b>                        | 0.03 - 2.0 mg/l                                     | -                           | -          | 560        | -           | -        | -      | -               | Ferrozine / Thioglycolate                   | 24 mm ø                       |
| <b>Iron HR 2</b>                        | 0.1 - 10 mg/l                                       | -                           | -          | 530        | -           | -        | -      | -               | Thioglycolate                               | 24 mm ø                       |
| <b>Lead (Pb<sup>2+</sup>)</b>           | 0.1 - 5 mg/l  | -                           | -          | -          | -           | -        | -      | 520             | 4-(2-Pyridylazo)-resorcine                  | 10 mm □                       |
| <b>Lead (Pb<sup>2+</sup>)</b>           | 0.1 - 5 mg/l  | -                           | -          | -          | -           | -        | -      | 515             | 4-(2-Pyridylazo)-resorcine                  | 16 mm ø                       |

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

For other reagent quantities please see our current price list.

Legend

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

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

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

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

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

| Display                       | Reagent   | Form of reagent/Quantity  | Order code   |
|-------------------------------|---|---|--|
| N <sub>2</sub> H <sub>4</sub> | VARIO Hydra 2 Rgt Solution  | Solution / 100 ml   | 53 12 00   |
| N <sub>2</sub> H <sub>4</sub> | Vacu-vial® <sup>j)</sup>  | Test Kit / 30<br>Adapter for Vacu-vials® <sup>j)</sup>  | 38 04 70<br>19 20 75   |
| H <sub>2</sub> O <sub>2</sub> | HYDROGENPEROXIDE LR   | Tablet / 100  | 51 23 80 BT  |
| H <sub>2</sub> O <sub>2</sub> | H <sub>2</sub> O <sub>2</sub> reagent solution  | Liquid reagent / 15 ml  | 42 49 91   |
| I                             | DPD No. 1   | Tablet / 100  | 51 10 50 BT  |
| Fe                            | IRON LR (Fe <sup>2+</sup> and Fe <sup>3+</sup> )<br>IRON (II) LR (Fe <sup>2+</sup> )  | Tablet / 100<br>Tablet / 100  | 51 53 70 BT<br>51 54 20 BT   |
| Fe                            | VARIO Ferro F10   | Powder Pack / 100   | 53 05 60   |
| Fe                            | VARIO IRON TPTZ F10   | Powder Pack / 100   | 53 05 50   |
| Fe                            | KS61 (Ferrozine / Thioglycolate)<br>KS63 (Thioglycolate)<br>KT274 (Ammonia / Persulphate)<br>KT135 (Phenolphthalein / Indicator)<br>KS144 (Calcium Hardness Buffer) | Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br>Tablet / 50<br>Liquid reagent / 65 ml<br><b>Set</b> | 56L006165<br>56L006365<br>56T027450<br>56L013565<br>56L014465<br>56R018990 |
| Fe                            | KS60 FE1 (Acetate Buffer)<br>KS63 FE6 (Thioglycolate Reagent)<br>KS65 FE7 (Ferrozine Reagent)   | Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br><b>Set</b>                | 56L006065<br>56L006365<br>56L006565<br>56R023490                           |
| Fe                            | KS160 TH2 FE8 (Total Hardness Buffer)<br>KS63 FE6 (Thioglycolate Reagent)   | Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br><b>Set</b>  | 56L016065<br>56L006365<br>56R023590  |
| Pb                            | Spectroquant® 1.09717.0001 <sup>d)</sup>  | Reagent test / 50 Tests   | 42 07 53   |
| Pb                            | Spectroquant® 1.14833.0001 <sup>d)</sup>  | Tube test / 25  | 42 07 54   |

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

<sup>b)</sup> Thermoreactor is necessary for COD (150°C), TOC (120°C) and total -chromium, - phosphate, -nitrogen, (100°C)

<sup>c)</sup> MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75)

<sup>d)</sup> Spectroquant® is a Merck KGaA Trademark

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

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

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

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

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

<sup>j)</sup> Vacu-vials® is a Chemetrics Trademark

# including stirring rod

# Reagents

| Test                                   | Range                          | Wave lengths $\lambda$ / nm |        |          |             |        |        |               | Method                           | Cuvette            |
|--|--------------------------------|-----------------------------|--------|----------|-------------|--------|--------|---------------|----------------------------------|--------------------|
|  |                                | MD 100                      | MD 200 | MD 600   | MultiDirect | PM 620 | PM 600 | SpectroDirect |                                  |                    |
| <b>Manganese</b>                       | 0.2 - 4 mg/l                   | 530                         | -      | 530      | 530         | -      | -      | 450           | Formaldehyde                     | 24 mm ø            |
| <b>Manganese VARIO LR</b>              | 0.01 - 0.7 mg/l                | 560                         | -      | 560      | 560         | -      | -      | 558           | PAN                              | 24 mm ø            |
| <b>Manganese VARIO HR</b>              | 0.1 - 18 mg/l                  | 530                         | -      | 530      | 530         | -      | -      | 525           | Periodate oxidation <sup>2</sup> | 24 mm ø            |
| <b>Manganese</b>                       | 0.05 - 5 mg/l                  | -                           | -      | 430      | -           | -      | -      | -             | Formaldehyde                     | 24 mm ø            |
| <b>Molybdate / Molybdenum</b>          | 1 - 50 mg/l                    | -                           | -      | 430      | 430         | -      | -      | -             | Thioglycolate <sup>4</sup>       | 24 mm ø            |
|  | 1 - 30 mg/l                    | -                           | -      | -        | -           | -      | -      | 366           |                                  |                    |
|  | 0.6 - 30 mg/l                  | 430                         | -      | -        | -           | -      | -      | -             |                                  |                    |
| <b>Molybdate / Molybdenum VARIO LR</b> | 0.5 - 5 mg/l<br>0.03 - 3 mg/l  | -<br>610                    | -<br>- | 610<br>- | 610<br>-    | -<br>- | -<br>- | 610<br>-      | Mercaptoacetic acid              | 24 mm ø            |
| <b>Molybdate / Molybdenum VARIO HR</b> | 0.5 - 66 mg/l<br>0.3 - 40 mg/l | -<br>430                    | -<br>- | 430<br>- | 430<br>-    | -<br>- | -<br>- | 420<br>-      | Mercaptoacetic acid              | 24 mm ø            |
| <b>Molybdate / Molybdenum HR</b>       | 1 - 100 mg/l<br>0.6 - 60 mg/l  | -<br>430                    | -<br>- | 430<br>- | -<br>-      | -<br>- | -<br>- | -<br>-        | Thioglycolate <sup>4</sup>       | 24 mm ø            |
| <b>Monochloramine VARIO</b>            | 0.04 - 4.5 mg/l                | 660                         | -      | 660      | 660         | -      | -      | 655           | Indophenol                       | 24 mm ø            |
| <b>Nickel</b>                          | 0.02 - 1 mg/l<br>0.2 - 7 mg/l  | -<br>-                      | -<br>- | -<br>-   | -<br>-      | -<br>- | -<br>- | 443<br>443    | Dimethylglyoxime <sup>2, 3</sup> | 50 mm □<br>24 mm ø |
| <b>Nickel</b>                          | 0.1 - 10 mg/l                  | -                           | -      | 560      | 560         | -      | -      | -             | Nioxime                          | 24 mm ø            |

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

For other reagent quantities please see our current price list.

Legend

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

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

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

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

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



| Display                                    | Reagent  | Form of reagent/Quantity   | Order code   |
|--|--|--|--|
| Mn   | MANGANESE LR 1<br>MANGANESE LR 2<br>Combi pack# MANGANESE LR 1 / LR 2<br>Combi pack# MANGANESE LR 1 / LR 2                   | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250   | 51 60 80 BT<br>51 60 90 BT<br>51 76 21 BT<br>51 76 22 BT |
| Mn   | VARIO Ascorbic Acid<br>VARIO Alkaline-Cyanide<br>VARIO PAN Indicator<br><br>VARIO Rochelle Salt Solution <sup>h)</sup>       | Powder Pack / 100<br>Liquid reagent / 60 ml<br>Liquid reagent / 60 ml<br><b>Set</b><br>30 ml | <br><br><br>53 50 90<br>53 06 40                         |
| Mn   | VARIO Manganese Citrate Puffer F10<br>VARIO Sodiumperiodate F10  | Powder Pack / 100<br>Powder Pack / 100<br><b>Set</b>   | <br><br>53 51 00   |
| Mn   | KS265 Manganese Reagent A<br>KS266 Manganese Reagent B<br>KS267 Manganese Reagent C  | Liquid reagent / 30 ml<br>Liquid reagent / 30 ml<br>Liquid reagent / 30 ml<br><b>Set</b>     | 56L026530<br>56L026630<br>56L030430<br>56R024055         |
| MoO <sub>4</sub><br>MoO <sub>4</sub><br>Mo | MOLYBDATE No.1 HR<br>MOLYBDATE No.2 HR<br>Combi pack# MOLYBDATE No.1 HR / No.2 HR<br>Combi pack# MOLYBDATE No.1 HR / No.2 HR | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250   | 51 30 60 BT<br>51 30 70 BT<br>51 76 31 BT<br>51 76 32 BT |
| MoO <sub>4</sub><br>Mo                     | VARIO Molybdenum 1 LR F20<br>VARIO Molybdenum 2 LR<br>required accessory:<br>mixing cylinder (not included)                  | Powder Pack / 100<br>Liquid reagent/ 50 ml<br><b>Set</b>                                     | <br><br>53 54 50   |
| MoO <sub>4</sub><br>Mo                     | VARIO Molybdenum HR1 F10<br>VARIO Molybdenum HR2 F10<br>VARIO Molybdenum HR3 F10   | Powder Pack / 100<br>Powder Pack / 100<br>Powder Pack / 100<br><b>Set</b>                    | <br><br><br>53 53 00                                     |
| MoO <sub>4</sub>                           | KS63 (Thioglycolate Reagent)   | Liquid reagent / 65 ml   | 56L006365  |
| Cl <sub>2</sub>                            | VARIO Monochlor FRGT   | Powder Pack / 100  | 53 18 10   |
| Ni   | Nickel-51, Nickel-52   | Reagent test (Powder,<br>Liquid reagent) / 50 Tests  | 2 41 90 33   |
| Ni   | NICKEL No. 1<br>NICKEL No. 2   | Tablet / 100<br>Tablet / 100   | 51 56 30 BT<br>51 56 40 BT                               |

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

<sup>b)</sup> Thermoreactor is necessary for COD (150°C), TOC (120°C) and total -chromium, - phosphate, -nitrogen, (100°C)

<sup>c)</sup> MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75)

<sup>d)</sup> Spectroquant® is a Merck KGaA Trademark

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

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

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

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

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

<sup>j)</sup> Vacu-vials® is a Chemetrics Trademark

# including stirring rod

# Reagents

| Test                                      | Range                                       | Wave lengths $\lambda$ / nm |        |        |             |        |        |               | Method  | Cuvette |
|---|---|-----------------------------|--------|--------|-------------|--------|--------|---------------|---|---------|
|   |   | MD 100                      | MD 200 | MD 600 | MultiDirect | PM 620 | PM 600 | SpectroDirect |   |         |
| Nitrate                                   | 0.08 - 1 mg/l                               | -                           | -      | 530    | -           | -      | -      | -             | Zinc reduction / NED                          | 24 mm ø |
| Nitrate VARIO                             | 1 - 30 mg/l                                 | -                           | -      | 430    | 430         | -      | -      | 410           | Chromotropic acid                             | 16 mm ø |
| Nitrate                                   | 0.5 - 14 mg/l                               | -                           | -      | -      | -           | -      | -      | 340           | 2,6-Dimethylphenole <sup>3</sup>              | 16 mm ø |
| Nitrite                                   | 0.01 - 0.5 mg/l                             | -                           | -      | 560    | 560         | -      | -      | 545           | N-(1-Naphthyl)-ethylenediamine <sup>2,3</sup> | 24 mm ø |
| Nitrite                                   | 0.03 - 0.6 mg/l<br>0.3 - 3 mg/l             | -                           | -      | -      | -           | -      | -      | 545<br>545    | Sulfanilic/Naphthylamine <sup>1</sup>         | 16 mm ø |
| Nitrite LR VARIO                          | 0.01 - 0.3 mg/l                             | -                           | -      | 530    | 530         | -      | -      | 507           | Diazotation                                   | 24 mm ø |
| Nitrogen-total <sup>b)</sup>              | 0.5 - 14 mg/l<br>5 - 140 mg/l <sup>4)</sup> | -                           | -      | -      | -           | -      | -      | 340           | 2,6-Dimethylphenole 2,3                       | 16 mm ø |
| Nitrogen VARIO,<br>total LR <sup>b)</sup> | 0.5 - 25 mg/l                               | -                           | -      | 430    | 430         | -      | -      | 410           | Persulphate-digestion method                  | 16 mm ø |
| Nitrogen VARIO,<br>total HR <sup>b)</sup> | 5 - 150 mg/l                                | -                           | -      | 430    | 430         | -      | -      | 410           | Persulphate-digestion method                  | 16 mm ø |
| Oxygen, activ                             | 0.1 - 10 mg/l                               | -                           | -      | 530    | 530         | 530    | -      | -             | DPD   |         |
| Oxygen, dissolved <sup>c)</sup>           | 10 - 800 µg/l                               | 530                         | -      | 530    | 530         | -      | -      | -             | Rhodazine D <sup>TM</sup>                     |         |

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

For other reagent quantities please see our current price list.

Legend

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

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

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

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

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

| Display        | Reagent  | Form of reagent/Quantity  | Order code                                     |
|----------------|--|---|--|
| N              | NITRATE TEST Powder<br>NITRATE TEST Tablet<br>NITRITE LR<br>Nitrate test tube  | Powder / 15 g<br>Tablet / 100<br>Tablet / 100   | 46 52 30<br>50 28 10<br>51 23 10BT<br>36 62 20 |
| N              | VARIO Nitrate Chromotropic<br>VARIO Nitra X Reagent tube<br>VARIO Deionised Water (for Zero)   | Powder Pack / 50<br>Reaction tube / 50<br>Bottle, 100 ml<br>Set (Tube test)   | 53 55 80                                       |
| N              | Reaction tube, Nitrat-111  | Tube test<br>Liquid reagent / 24  | 2 42 07 02                                     |
| N              | NITRITE LR   | Tablet / 100  | 51 23 10 BT                                    |
| N              | Reaction tube, Nitrit-101  | Tube test (Powder) / 24   | 2 41 90 18                                     |
| N              | VARIO Nitri 3  | Powder Pack / 100   | 53 09 80                                       |
| N              | Digestion reagent,<br>Compensation reagent, Nitrat-111   | Tube test (Powder,<br>Liquid reagent) / 24  | 2 42 07 03                                     |
| N              | VARIO TN HYDROX. LR Tubes<br>VARIO PERSULFATE Reagent<br>VARIO TN Reagent A<br>VARIO TN Reagent B<br>VARIO TN ACID LR/HR Tubes<br>VARIO Deionised Water (for Zero) | Digestion tubes / 50<br>Powder Pack / 50<br>Powder Pack / 50<br>Powder Pack / 50<br>Reaction tubes / 50<br>Bottle, 100 ml<br><b>Set</b> (Tube test) | 53 55 50                                       |
| N              | VARIO TN HYDROX. HR Tubes<br>VARIO PERSULFATE Reagent<br>VARIO TN Reagent A<br>VARIO TN Reagent B<br>VARIO TN ACID LR/HR Tubes<br>VARIO Deionised Water (for Zero) | Digestion tubes / 50<br>Powder Pack / 50<br>Powder Pack / 50<br>Powder Pack / 50<br>Reaction tubes / 50<br>Bottle, 100 ml<br><b>Set</b> (Tube test) | 53 55 60                                       |
| O <sub>2</sub> | DPD No. 4  | Tablet / 100  | 51 12 20 BT                                    |
| O <sub>2</sub> | Vacu-vial® <sup>j)</sup>   | Liquid reagent / 30.<br>Adapter for Vacu-vials® <sup>j)</sup>   | 38 04 50<br>19 20 75                           |

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

<sup>b)</sup> Thermoreactor is necessary for COD (150°C), TOC (120°C) and total -chromium, - phosphate, -nitrogen, (100°C)

<sup>c)</sup> MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75)

<sup>d)</sup> Spectroquant® is a Merck KGaA Trademark

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

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

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

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

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

<sup>j)</sup> Vacu-vials® is a Chemetrics Trademark

# including stirring rod

# Reagents

| Test  | Range              | Wave lengths $\lambda$ / nm |        |        |             |        |        |               | Method  | Cuvette                       |
|---|--------------------|-----------------------------|--------|--------|-------------|--------|--------|---------------|---|-------------------------------|
|   |                    | MD 100                      | MD 200 | MD 600 | MultiDirect | PM 620 | PM 600 | SpectroDirect |   |                               |
| Ozone   | 0.02 - 1 mg/l      | -                           | -      | -      | -           | -      | -      | 510           | DPD/Glycine <sup>5</sup>  | 24 mm ø<br>50 mm □<br>24 mm ø |
|   | 0.02 - 0.5 mg/l    | -                           | -      | -      | -           | -      | -      | 510           |   |                               |
|   | 0.02 - 2 mg/l      | 530                         | -      | 530    | 530         | 530    | 530    | -             |   |                               |
| Phenols   | 0.1 - 5 mg/l       | -                           | -      | -      | -           | -      | -      | 507           | 4-Aminoantipyrine <sup>1</sup>  | 24 mm ø                       |
| PHMB (Biguanide)  | 2 - 60 mg/l        | -                           | -      | 560    | 560         | 560    | -      | -             | Buffer/Indicator  | 24 mm ø                       |
| Phosphate-total LR <sup>b)</sup>                                | 0.07 - 3 mg/l      | -                           | -      | -      | -           | -      | -      | 690           | Phosphomolybdic acid/<br>Ascorbic acid <sup>2</sup>   | 16 mm ø                       |
|   | 0.2 - 10 mg/l      | -                           | -      | -      | -           | -      | -      | 690           |   |                               |
| Phosphate-total HR <sup>b)</sup>                                | 1.5 - 20 mg/l      | -                           | -      | -      | -           | -      | -      | 690           | Phosphomolybdic acid/<br>Ascorbic acid <sup>2</sup>   | 16 mm ø                       |
|   | 5 - 60 mg/l        | -                           | -      | -      | -           | -      | -      | 690           |   |                               |
| Phosphate LR, ortho   | 0.05 - 4 mg/l      | 660                         | -      | 660    | 660         | 610    | 610    | 710           | Phosphomolybdic acid/<br>Ascorbic acid <sup>2</sup>   | 24 mm ø                       |
| Phosphate HR, ortho   | 1 - 80 mg/l        | -                           | -      | 430    | 430         | -      | -      | 470           | Vanadomolybdate <sup>2</sup>  | 24 mm ø                       |
| Phosphate VARIO ortho   | 0.06 - 2.5 mg/l    | 660                         | -      | 660    | 660         | -      | -      | 890           | Phosphomolybdenum blue/<br>Ascorbic acid <sup>2</sup>   | 24 mm ø                       |
| Phosphate VARIO ortho   | 0.06 - 5 mg/l      | -                           | -      | 660    | 660         | -      | -      | 890           | Phosphomolybdenum blue/<br>Ascorbic acid <sup>2</sup>   | 16 mm ø                       |
| Phosphate-ortho   | 3 - 60 mg/l        | -                           | -      | -      | -           | -      | -      | 438           | Vanadomolybdate <sup>2</sup>  | 16 mm ø                       |
| Phosphate VARIO <sup>b)</sup><br>acid hydrolyzable<br>and total | acid hydrolyzable: | -                           | -      | 660    | 660         | -      | -      | 890           | Acid digestion<br>Phosphomolybdenum blue/<br>Ascorbic acid <sup>2</sup><br>Acid-/<br>Persulphate digestion<br>Phosphomolybdic acid/<br>Ascorbic acid <sup>2</sup> | 16 mm ø                       |
|   | 0.02 - 1.6 mg/l    | -                           | -      | 660    | 660         | -      | -      | 890           |   | 16 mm ø                       |
|   | 0.06 - 5 mg/l      | -                           | -      | 660    | 660         | -      | -      | 890           |   | 16 mm ø                       |
|   | total:             | -                           | -      | 660    | 660         | -      | -      | 890           | Acid-/<br>Persulphate digestion<br>Phosphomolybdic acid/<br>Ascorbic acid <sup>2</sup>  | 16 mm ø                       |
|   | 0.02 - 1.1 mg/l    | -                           | -      | 660    | 660         | -      | -      | 890           |   | 16 mm ø                       |
|   | 0.06 - 3.5 mg/l    | -                           | -      | 660    | 660         | -      | -      | 890           |   | 16 mm ø                       |

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

For other reagent quantities please see our current price list.

Legend

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

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

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

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

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

| Display  | Reagent   | Form of reagent/Quantity   | Order code  |
|--|---|--|---|
| O <sub>3</sub>                                   | DPD No. 1<br>DPD No. 3<br>Combi pack <sup>#</sup> DPD No.1 / No.3<br>Combi pack <sup>#</sup> DPD No.1 / No.3<br>GLYCINE <sup>†)</sup><br>Combi pack <sup>#</sup> DPD No.1 / GLYCINE<br>Combi pack <sup>#</sup> DPD No.1 / GLYCINE | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250<br>Tablet / 100<br>each 100<br>each 250                                       | 51 10 50 BT<br>51 10 80 BT<br>51 77 11 BT<br>51 77 12 BT<br>51 21 70 BT<br>51 77 31 BT<br>51 77 32 BT |
| C <sub>6</sub> H <sub>5</sub> O <sub>H</sub>     | PHENOLE No. 1<br>PHENOLE No. 2  | Tablet / 100<br>Tablet / 100   | 51 59 50<br>51 59 60  |
| PHMB   | PHMB PHOTOMETER   | Tablet / 100   | 51 61 00 BT   |
| P<br>PO <sub>4</sub>                             | Reaction tube, Phosphat-101,<br>Phosphat- 102, Phosphat-103   | Tube test (Powder,<br>Liquid reagent) / 24   | 2 41 90 19  |
| P<br>PO <sub>4</sub>                             | Reaction tube, Phosphat-101,<br>Phosphat-102, Phosphat-103  | Tube test (Powder,<br>Liquid reagent) / 24   | 2 42 07 00  |
| PO <sub>4</sub>                                  | PHOSPHATE No. 1 LR<br>PHOSPHATE No. 2 LR<br>Combi pack <sup>#</sup> PHOSPHATE No.1 LR / No.2 LR<br>Combi pack <sup>#</sup> PHOSPHATE No.1 LR / No.2 LR  | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250   | 51 30 40<br>51 30 50 BT<br>51 76 51 BT<br>51 76 52 BT   |
| PO <sub>4</sub>                                  | PHOSPHATE No. 1 HR<br>PHOSPHATE No. 2 HR<br>Combi pack <sup>#</sup> PHOSPHATE No.1 HR / No.2 HR<br>Combi pack <sup>#</sup> PHOSPHATE No.1 HR / No.2 HR  | Tablet / 100<br>Tablet / 100<br>each 100<br>each 200   | 51 58 10<br>51 58 20<br>51 76 61<br>51 76 62  |
| PO <sub>4</sub>                                  | VARIO PHOS3, F10  | Powder Pack / 100  | 53 15 50  |
| PO <sub>4</sub>                                  | VARIO Dilution Vial<br>VARIO PHOS3, F10<br>VARIO Deionised Water (for Zero)   | 50 Tubes<br>Powder Pack / 50<br>Bottle, 100 ml<br><b>Set</b> (Tube test)   | 53 52 00  |
| PO <sub>4</sub>                                  | Reaction tube   | Tube test / 24   | 2 42 07 01  |
| P<br>PO <sub>4</sub><br><br>P<br>PO <sub>4</sub> | VARIO Acid Reagent Vial<br>VARIO PHOS3, F10<br>VARIO Deionised Water (for Zero)<br>1N NaOH<br>1,54 N NaOH<br>VARIO Potassium Persulfate F10   | 50 Tubes<br>Powder Pack / 50<br>Bottle, 100 ml<br>Bottle / 100 ml<br>Bottle / 100 ml<br>Powder Pack / 50<br><b>Set</b> (Tube test) | 53 52 50  |

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

<sup>b)</sup> Thermoreactor is necessary for COD (150°C), TOC (120°C) and total -chromium, - phosphate, -nitrogen, (100°C)

<sup>c)</sup> MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75)

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

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

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

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

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

<sup>j)</sup> Vacu-vials® is a Chemetrics Trademark

<sup>#</sup> including stirring rod

# Reagents

| Test                                       | Range           | Wave lengths $\lambda$ / nm |        |        |             |        |        |               | Method  | Cuvette |
|--|-----------------|-----------------------------|--------|--------|-------------|--------|--------|---------------|---|---------|
|  |                 | MD 100                      | MD 200 | MD 600 | MultiDirect | PM 620 | PM 600 | SpectroDirect |   |         |
| <b>Phosphate VARIO</b> total <sup>b)</sup> | 0.02 - 1.1 mg/l | -                           | -      | 660    | 660         | -      | -      | 890           | Acid-/<br>Persulphate digestion<br>Ascorbic acid <sup>2</sup> | 16 mm ø |
|  | 0.06 - 3.5 mg/l | -                           | -      | -      | -           | -      | -      | -             |   | 16 mm ø |
| <b>Phosphate</b> , ortho <sup>c)</sup>     | 5 - 40 mg/l     | -                           | -      | 430    | 430         | -      | -      | -             | Vanadomolybdate <sup>2</sup>                                  |         |
| <b>Phosphate</b> , ortho <sup>c)</sup>     | 0.05 - 5 mg/l   | -                           | -      | 660    | 660         | -      | -      | -             | Stannous chloride <sup>2</sup>                                |         |
| <b>Phosphate LR</b>                        | 0.1 - 10 mg/l   | -                           | -      | 660    | -           | -      | -      | -             | Phosphomolybdic acid/<br>Ascorbic acid <sup>2</sup>           | 24 mm ø |
| <b>Phosphate HR</b>                        | 5 - 80 mg/l     | 430                         | -      | 430    | -           | -      | -      | -             | Vanadomolybdate <sup>2</sup>                                  | 24 mm ø |
| <b>Phosphonate VARIO</b>                   | 0.02 - 125 mg/l | -                           | -      | 660    | 660         | -      | -      | 660           | Persulfate UV-Oxidation                                       | 24 mm ø |
| <b>pH value</b>                            | 5.2 - 6.8       | -                           | -      | 560    | 560         | 560    | -      | -             | Bromcresol purple <sup>5</sup>                                | 24 mm ø |
| <b>pH value</b>                            | 6.5 - 8.4       | 560                         | 560    | 560    | 560         | 560    | 560    | 558           | Phenol red <sup>5</sup>                                       | 24 mm ø |
| <b>pH value</b>                            | 6.5 - 8.4       | 560                         | 560    | 560    | 560         | 560    | -      | 558           | Phenol red <sup>5</sup>                                       | 24 mm ø |
| <b>pH value</b>                            | 8.0 - 9.6       | -                           | -      | 560    | 560         | 560    | -      | -             | Thymol blue <sup>5</sup>                                      | 24 mm ø |
| <b>Polyacrylates</b>                       | 1 - 30 mg/l     | 660                         | -      | 660    | -           | -      | -      | -             | Turbidity   | 24 mm ø |

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Legend

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

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

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



| Display              | Reagent   | Form of reagent/Quantity   | Order code   |
|----------------------|---|--|--|
| P<br>PO <sub>4</sub> | VARIO Acid Reagent Vial<br>VARIO PHOS3, F10<br>VARIO Deionised Water (for Zero)<br>1,54 N NaOH<br>VARIO Potassium Persulfate F10  | 50 Tubes<br>Powder Pack / 50<br>Bottle, 100 ml<br>Bottle / 100 ml<br>Powder Pack / 50<br><b>Set</b> (Tube test)  | 53 52 10   |
| PO <sub>4</sub>      | Vacu-vial® <sup>j)</sup>  | Test Kit / 30<br>Adapter for Vacu-vials® <sup>j)</sup>   | 38 04 60<br>19 20 75   |
| PO <sub>4</sub>      | Vacu-vial® <sup>j)</sup>  | Test Kit / 30<br>Adapter for Vacu-vials® <sup>j)</sup>   | 38 04 80<br>19 20 75   |
| PO <sub>4</sub>      | KS80 (CRP Reagent)<br>KP19 (Ascorbic acid)  | Liquid reagent / 2 x 65 ml<br>Powder / 20 g<br><b>Set</b>  | 56L008065<br>56P011920<br>56R023765  |
| PO <sub>4</sub>      | KS228 (Ammonia Molybdate)<br>KS229 (Ammonia Metavanadate)<br>KS278 (50 % Sulfuric Acid)<br>KS135 (Phenolphthalein Indicator)<br>KS144 (Calcium Hardness Buffer)<br>KT274 (Ammonia Persulphate Tablet) | Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br><b>Set</b> | 56L022865<br>56L022965<br>56L027865<br>56L013565<br>56L014465<br>56T027450<br>56R019090    |
| PO <sub>4</sub>      | VARIO Potassium Persulfate F10<br>VARIO PHOS3, F10  | Powder Pack / 100<br>Powder Pack / 200<br><b>Set</b>   | 53 52 20   |
| 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   |
| Polyacryl            | KS255 (Polyacrylate Reagent 1)<br>KS256 (Polyacrylate Reagent 2)<br>KS336 (Propan-2-ol)<br>C18 (Cartouche)<br>KS173 (2,4 Dinitrophenol)<br>KT183 (Nitric Acid)  | Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br><br>Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br><b>Set</b>                       | 56L025565<br>56L026565<br>56L033665<br>AS-K22811-KW<br>56L017365<br>56L018365<br>56R019165 |

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

<sup>b)</sup> Thermoreactor is necessary for COD (150°C), TOC (120°C) and total -chromium, - phosphate, -nitrogen, (100°C)

<sup>c)</sup> MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75)

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

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

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

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

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

<sup>j)</sup> Vacu-vials® is a Chemetrics Trademark

# including stirring rod

# Reagents

| Test                                   | Range                          | Wave lengths $\lambda$ / nm |             |             |             |             |             |                   | Method                                       | Cuvette            |
|--|--------------------------------|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------------|--|--------------------|
|  |                                | MD 100                      | MD 200      | MD 600      | MultiDirect | PM 620      | PM 600      | SpectroDirect     |  |                    |
| <b>Potassium</b>                       | 0.7 - 12 mg/l<br>1 - 10 mg/l   | -<br>-                      | -<br>-      | 430<br>-    | 430<br>-    | -<br>-      | -<br>-      | -<br>730          | Tetraphenylborate-Turbidity <sup>4</sup>     | 24 mm ø<br>24 mm ø |
| <b>Silica</b>                          | 0.05 - 4 mg/l<br>0.05 - 3 mg/l | 660<br>-                    | -<br>-      | 660<br>-    | 660<br>-    | -<br>-      | -<br>-      | -<br>820          | Silicomolybdate <sup>2,3</sup>               | 24 mm ø            |
| <b>Silica VARIO LR</b>                 | 0.1 - 1.6 mg/l                 | 660                         | -           | 660         | 660         | -           | -           | 815               | Heteropolyblue <sup>2</sup>                  | 24 mm ø            |
| <b>Silica VARIO HR</b>                 | 1 - 90 mg/l<br>1 - 100 mg/l    | 430<br>-                    | -<br>-      | 430<br>-    | 430<br>-    | -<br>-      | -<br>-      | -<br>452          | Silicomolybdate <sup>2,3</sup>               | 24 mm ø<br>24 mm ø |
| <b>Silica</b>                          | 0.1 - 8 mg/l                   | -                           | -           | 430         | -           | -           | -           | -                 | Heteropolyblue <sup>2</sup>                  | 24 mm ø            |
| <b>Sodiumhypochlorite</b>              | 0.2 - 16 %                     | -                           | -           | 530         | 530         | 530         | 530         | -                 | Potassium iodide <sup>5</sup>                | 24 mm ø            |
| <b>Spectral Absorption-coefficient</b> | 0 - 50 m <sup>-1</sup>         | -<br>-<br>-                 | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | 436<br>525<br>620 | Direct reading <sup>1</sup><br>ISO 7887:1994 | 50 mm □            |
| <b>Sulphate VARIO</b>                  | 5 - 100 mg/l<br>2 - 100 mg/l   | 530<br>-                    | -<br>-      | 530<br>-    | 530<br>-    | 530<br>-    | -<br>-      | -<br>450          | Bariumsulphate Turbidity <sup>2</sup>        | 24 mm ø            |
| <b>Sulphate</b>                        | 5 - 100 mg/l                   | -                           | -           | 610         | 610         | 610         | -           | -                 | Bariumsulphate Turbidity <sup>2</sup>        | 24 mm ø            |

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

For other reagent quantities please see our current price list.

Legend

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

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

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

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

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

| Display          | Reagent  | Form of reagent/Quantity   | Order code   |
|------------------|--|--|--|
| K                | POTASSIUM T  | Tablet / 100   | 51 56 70   |
| SiO <sub>2</sub> | SILICA No. 1<br>SILICA No.2<br>Combi pack <sup>#</sup> SILICA No.1 / No.2<br>Combi pack <sup>#</sup> SILICA No.1 / No.2<br>SILICA PR (in presence of phosphate)                              | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250<br>Tablet / 100               | 51 31 30<br>51 31 40<br>51 76 71<br>51 76 72<br>51 31 50             |
| SiO <sub>2</sub> | VARIO Amino Acid F10<br>VARIO Citric Acid F10<br>VARIO Molybdate 3 Reagent solution  | Powder Pack / 100<br>Powder Pack / 200<br>Liquid reagent / 2 x 50 ml<br><b>Set</b> | 53 56 90   |
| SiO <sub>2</sub> | VARIO Silica HR Molybdate F10<br>VARIO Silica HR Acid Rgt F10<br>VARIO Silica HR Citric Acid F10   | Powder Pack / 100<br>Powder Pack / 100<br>Powder Pack / 100<br><b>Set</b>          | 53 57 00   |
| SiO <sub>2</sub> | KS104 (Silica Reagent 1)<br>KS105 (Silica Reagent 2)<br>KS106 (Silica Reagent 3)   | Liquid reagent / 65 ml<br>Liquid reagent / 65 ml<br>Powder / 10 g<br><b>Set</b>    | 56L010465<br>56L010565<br>56P010610<br>56R023856                     |
| NaOCl            | ACIDIFYING GP<br>CHLORINE HR (KI)<br>Combi pack <sup>#</sup> CHLORINE HR (KI)/ACIDIFYING GP<br>Combi pack <sup>#</sup> CHLORINE HR (KI)/ACIDIFYING GP<br>Dilution set for sample preparation | Tablet / 100<br>Tablet / 100<br>each 100<br>each 250<br>1 set                      | 51 54 80 BT<br>51 30 00 BT<br>51 77 21 BT<br>51 77 22 BT<br>41 44 70 |
| -                | no reagents required   | -  | -  |
| SO <sub>4</sub>  | VARIO Sulpha 4 / F10   | Powder Pack / 100  | 53 21 60   |
| SO <sub>4</sub>  | SULFATE T  | Tablet / 100   | 51 54 50 BT  |

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

<sup>b)</sup> Thermoreactor is necessary for COD (150°C), TOC (120°C) and total -chromium, - phosphate, -nitrogen, (100°C)

<sup>c)</sup> MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75)

<sup>d)</sup> Spectroquant® is a Merck KGaA Trademark

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

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

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

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

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

<sup>j)</sup> Vacu-vials® is a Chemetrics Trademark

<sup>#</sup> including stirring rod

# Reagents

| Test                                    | Range                      | Wave lengths $\lambda$ / nm |        |        |             |        |        |               | Method   | Cuvette            |
|---|----------------------------|-----------------------------|--------|--------|-------------|--------|--------|---------------|--|--------------------|
|   |                            | MD 100                      | MD 200 | MD 600 | MultiDirect | PM 620 | PM 600 | SpectroDirect |  |                    |
| <b>Sulphide</b>                         | 0.04 - 0.5 mg/l            | -                           | -      | 660    | 660         | -      | -      | 668           | DPD/Catalyst <sup>3, 4</sup>                               | 24 mm ø            |
| <b>Sulphite</b>                         | 0.1 - 5 mg/l               | -                           | -      | 430    | 430         | -      | -      | -             | DTNB   | 24 mm ø            |
|   | 0.1 - 10 mg/l              | -                           | -      | -      | -           | -      | -      | 405           |  | 10 mm ø            |
|   | 0.05 - 4 mg/l              | -                           | -      | -      | -           | -      | -      | 405           |  | 24 mm ø            |
| <b>Surfactants</b> (anionic)            | 0.05 - 2 mg/l              | -                           | -      | -      | -           | -      | -      | 653           | Methylene blue <sup>1</sup>                                | 16 mm ø            |
| <b>Suspended solids</b>                 | 5 - 750 mg/l               | 660                         | -      | 660    | 660         | -      | -      | -<br>660      | Turbidity/Attenuated Radiation                             | 24 mm ø<br>50 mm □ |
| <b>TOC</b> <sup>b)</sup>                | 50 - 800 mg/l              | -                           | -      | -      | -           | -      | -      | 596           | H <sub>2</sub> SO <sub>4</sub> / Indicator                 | 16 mm ø            |
| <b>Triazoles</b><br>(UV lamp requested) | 1 - 16 mg/l                | 430                         | -      | 430    | -           | -      | -      | -             | Catalyzed UV Digestion                                     | 24 mm ø            |
| <b>Turbidity</b>                        | 5 - 500                    | -                           | -      | -      | -           | -      | -      | 860           | Attenuated Radiation Method<br>Attenuated Radiation Method | 50 mm □            |
|   | 0 - 1000                   | -                           | -      | 530    | 530         | -      | -      | -             |  | 24 mm ø            |
| <b>Urea</b>                             | 0.1 - 2.5 mg/l             | 610                         | 610    | 610    | 610         | 610    | -      | -             | Urease / Indophenol  | 24 mm ø            |
|   | 0.2 - 5 mg/l <sup>i)</sup> | 610                         | 610    | -      | -           | -      | -      | -             |  |                    |
|   | 0.1 - 2 mg/l               | -                           | -      | -      | -           | -      | -      | 676           |  |                    |
| <b>Zinc</b>                             | 0.02 - 1 mg/l              | -                           | -      | 610    | 610         | -      | -      | -             | Zincon <sup>3</sup> /EDTA                                  | 24 mm ø            |
|   | 0.02 - 0.5 mg/l            | -                           | -      | -      | -           | -      | -      | 616           |  |                    |
| <b>Zinc</b>                             | 0.1 - 2.5 mg/l             | -                           | -      | 610    | -           | -      | -      | -             | Zincon <sup>3</sup> /EDTA                                  | 24 mm ø            |

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For other reagent quantities please see our current price list.

Legend

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

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

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

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

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

| Display                          | Reagent  | Form of reagent/Quantity   | Order code   |
|----------------------------------|--|--|--|
| S                                | SULFIDE No. 1<br>SULFIDE No. 2   | Tablet / 100<br>Tablet / 100   | 50 29 30<br>50 29 40   |
| SO <sub>3</sub>                  | SULFITE LR   | Tablet / 100   | 51 80 20 BT  |
| MBAS                             | Spectroquant® 1.14697.0001 <sup>d)</sup>   | Tube test / 25   | 42 07 55   |
| -                                | no reagents required   | -  | -  |
| TOC                              | Spectroquant® 1.14879.0001 <sup>d)</sup>   | Tube test / 25<br>Aluminium screwcaps / 6 pc.  | 42 07 56<br>42 07 57   |
| Benzotriazole                    | Triazole Reagent   | Powder Pack / 100  | 53 22 00   |
| FAU<br>FAU                       | no reagents required   | -  | -  |
| CH <sub>4</sub> N <sub>2</sub> O | UREA Reagent 1<br>UREA Reagent 2<br>AMMONIA No. 1<br>AMMONIA No. 2<br>Combi pack# AMMONIA No.1 / No.2<br>Combi pack# AMMONIA No.1 / No.2 | Liquid reagent / 15 ml<br>Liquid reagent / 10 ml<br>Tablet / 100<br>Tablet / 100<br>each 100<br>each 250 | 45 93 00<br>45 94 00<br>51 25 80 BT<br>51 25 90 BT<br>51 76 11 BT<br>51 76 12 BT |
| Zn                               | COPPER/ZINC LR<br>EDTA<br>DECHLOR (in case of high levels of residual chlorine)  | Tablet / 100<br>Tablet / 100<br>Tablet / 100   | 51 26 20 BT<br>51 23 90 BT<br>51 23 50 BT  |
| Zn                               | KS243 (Zinc Reagent 1)<br>KS244 (Zinc Reagent 2)   | Liquid reagent / 65 ml<br>Powder / 20 g<br><b>Set</b>  | 56L024365<br>56L024420<br>56R023965  |

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

<sup>b)</sup> Thermoreactor is necessary for COD (150°C), TOC (120°C) and total -chromium, - phosphate, -nitrogen, (100°C)

<sup>c)</sup> MultiDirect: Adapter is necessary for Vacu-vials® (Order code 19 20 75)

<sup>d)</sup> Spectroquant® is a Merck KGaA Trademark

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

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

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

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

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

<sup>j)</sup> Vacu-vials® is a Chemetrics Trademark

# including stirring rod

# PD 250 Powder Dispenser



## Highlights

- Determination of chlorine according to ISO 7393-2:2000 (free + total)
- 250 tests
- 5 years reagent shelf life (before opening)
- Easy handling
- Precise dosage

## Precise and repeatable dosing of Powder Reagents

The PD250 is designed for easy and controlled dosage of DPD powder reagents. One click gives the exact amount of reagent required for a 10 ml sample. The PD 250 is the perfect alternative to the Powder Packs for those carrying out a number of tests, saving time while also reducing the amount of packaging waste.

The reagent is supplied in sealed glass vials, sufficient for up to 250 tests. The protective sealing enables a shelf life of up to 5 years although, once the vial has been opened, the contents should be used within 6 months. The vials can be changed quickly and easily. Furthermore, the dispenser can be thoroughly cleaned and the ergonomic design allows for comfort during operation.

## Refill Packs

| Article  | Order code |
|--|------------|
| VARIO Chlorine <b>Free</b> 10 ml<br>2 reagent vials                  | 53 01 40   |
| VARIO Chlorine <b>Total</b> 10 ml<br>2 reagent vials                 | 53 01 50   |
| VARIO Chlorine<br><b>Free + Total</b> 10 ml<br>one reagent vial each | 53 01 60   |





## Delivery Content

PD 250 in carton including  
1 reagent vial and instruction manual

### PD 250 Set 1 - Free Chlorine

- 1 powder dispenser "Free Chlorine"
- 1 reagent vial "Free Chlorine"
- 1 instruction manual
- 1 protective sleeve (rubber)

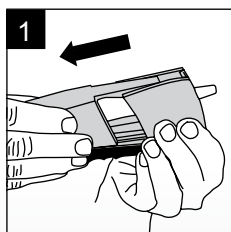
Order code: 19 49 00

### PD 250 Set 2 - Total Chlorine

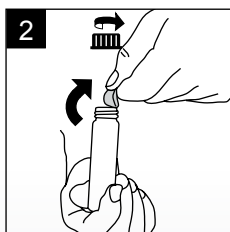
- 1 powder dispenser "Total Chlorine"
- 1 reagent vial "Total Chlorine"
- 1 instruction manual
- 1 protective sleeve (rubber)

Order code: 19 49 10

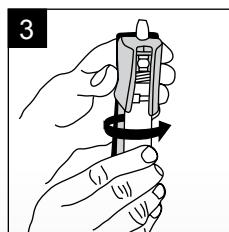
## Easy Handling



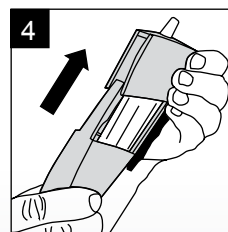
Remove the dispenser cover.



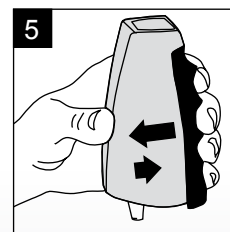
Uncap the reagent vial and remove the seal. Use material within 6 months of removing the seal.



Hold the dispenser with the tip upright and screw the vial on to the dispenser.



Slide the cover into the grooves until the lower end snaps into place.



To use: Hold with the tip down and press the blue handle towards the dispenser body. Release quickly. Releasing the handle quickly helps prevent powder build up.

# Reagents also compatible in Hach®

## VARIO Powder Packs (PP) and Reagents for Photometry

| Test   | Range   | Reagent  | Liquid Reagent | Tube Tests       | Powder Pack   |
|--|---|--|----------------|------------------|---|
| <b>Aluminium</b>   | 0 – 0.22 mg/l Al  | VARIO Aluminium Reagent, Set F20<br>consists of:<br>VARIO Aluminium ECR<br>VARIO Aluminium Hexamine<br>VARIO Aluminium Masking Rgt   | ■              |                  | ■<br>■  |
| <b>Ammonia</b>   | 0 – 0.5 mg/l N  | VARIO Ammonia Nitrogen, Set F10<br>consists of:<br>VARIO Ammonia Salicylate, F10<br>VARIO Ammonia Cyanurate, F10   |                |                  | ■<br>■  |
| <b>Ammonia LR</b>  | 0 – 2.5 mg/l N  | VARIO Am tube test Reagent, Set LR, F5<br>consists of:<br>VARIO Ammonia Salicylate, F5<br>VARIO Ammonia Cyanurate, F5<br>VARIO Am Diluent Reagent Low Range  |                | ■                | ■<br>■  |
| <b>Ammonia HR</b>  | 0 – 50 mg/l N   | VARIO Am tube test Reagent, Set HR, F5<br>consists of:<br>VARIO Ammonia Salicylate, F5<br>VARIO Ammonia Cyanurate, F5<br>VARIO Am Diluent Reagent High Range   |                | ■                | ■<br>■  |
| <b>Ammonia, free</b><br>(Part of method monochloramine)                | 0.01 - 0.5 mg/l N   | VARIO FREE AMMONIA REAGENT SET<br>consists of:<br>VARIO Free Ammonia Reagent Solution<br>VARIO Monochlor FRGT  | ■              |                  | ■   |
| <b>Bromine</b>   | 0.05 – 4.5 mg/l Br  | VARIO Chlorine TOTAL-DPD, F10<br>VARIO Chlorine TOTAL-DPD, F10   |                |                  | ■<br>■  |
| <b>Chlorine</b><br>free, combined and total<br><b>Chlorine dioxide</b> | Visuelles Test Kit bis 3,5mg/l Cl <sub>2</sub><br><br>0.01 – 2 mg/l Cl <sub>2</sub><br><br>0 – 5 mg/l Cl <sub>2</sub> | VARIO Chlorine FREE-DPD, F5<br>VARIO Chlorine FREE-DPD, F5<br>VARIO Chlorine TOTAL-DPD, F5<br>VARIO Chlorine TOTAL-DPD, F5<br>VARIO Chlorine FREE-DPD, F10<br>VARIO Chlorine FREE-DPD, F10<br>VARIO Chlorine TOTAL-DPD, F10<br>VARIO Chlorine TOTAL-DPD, F10<br>VARIO Chlorine FREE-DPD, F25<br>VARIO Chlorine FREE-DPD, F25<br>VARIO Chlorine TOTAL-DPD, F25<br>VARIO Chlorine TOTAL-DPD, F25 |                |                  | ■<br>■<br>■<br>■<br>■<br>■<br>■<br>■<br>■<br>■<br>■<br>■<br>■ |
| <b>COD LR</b>  | 0 – 150 mg/l O <sub>2</sub>   | COD VARIO 0 - 150 mg/l   |                | ■<br>■           |   |
| <b>COD MR</b>  | 0 – 1500 mg/l O <sub>2</sub>  | COD VARIO 0 - 1500 mg/l  |                | ■<br>■<br>■<br>■ |   |
| <b>COD HR</b>  | 0 – 15000 mg/l O <sub>2</sub>   | COD VARIO 0 - 15000 mg/l   |                | ■<br>■<br>■      |   |
| <b>Copper</b>  | 0 – 5 mg/l Cu   | VARIO CU1, F10<br>VARIO CU1, F10   |                |                  | ■<br>■  |
| <b>DEHA</b>  | 20 - 500 µg/l DEHA  | VARIO DEHA REAGENT SET<br>consists of:<br>VARIO OXYSCAV 1 RGT<br>VARIO DEHA 2 RGT  | ■              |                  | ■   |

# devices\*

| Method  | Applications                 | Quantity  | Code   |
|---|------------------------------|---|--|
| Eriochrome cyanine R  | Water                        | <b>1 Set</b><br>100<br>100<br>25 ml                                       | 53 50 00   |
| Salicylate  | Water, waste water, seawater | <b>1 Set</b><br>2 x 100<br>2 x 100  | 53 55 00   |
| Salicylate  | Water, waste water, seawater | <b>1 Set</b><br>50<br>50<br>50 tubes                                      | 53 56 00   |
| Salicylate  | Water, waste water, seawater | <b>1 Set</b><br>50<br>50<br>50 tubes                                      | 53 56 50   |
| Indophenol  | Water                        | <b>1 Set</b><br>5 ml<br>100   | 53 58 00<br>53 18 10                                 |
| DPD-Method:<br><b>USEPA</b> accepted for<br>drinking water analysis | Water, waste water, seawater | 100<br>1000   | 53 01 20<br>53 01 23                                 |
| DPD method:<br><b>USEPA</b> accepted for<br>drinking water analysis | Water, waste water, seawater | 100<br>1000<br>100<br>1000  | 53 00 90<br>53 00 93<br>53 00 80<br>53 00 83         |
| DPD method:<br><b>USEPA</b> accepted for<br>drinking water analysis | Water, waste water, seawater | 100<br>1000<br>100<br>1000  | 53 01 00<br>53 01 03<br>53 01 20<br>53 01 23         |
| DPD method:<br><b>USEPA</b> accepted for<br>drinking water analysis | Water, waste water, seawater | 100<br>1000<br>100<br>1000  | 53 01 10<br>53 01 13<br>53 01 30<br>53 01 33         |
| Dichromate Reactor, Digestion                                       | Water, waste water, seawater | 25 tubes<br>150 tubes<br>25 tubes, mercury free                           | 2 42 07 20<br>2 42 07 25<br>2 42 07 10               |
| Dichromate Reactor, Digestion                                       | Water, waste water, seawater | 25 tubes<br>150 tubes<br>25 Küv., mercury free<br>150 tubes, mercury free | 2 42 07 21<br>2 42 07 26<br>2 42 07 11<br>2 42 07 16 |
| Dichromate Reactor, Digestion                                       | Water, waste water, seawater | 25 tubes<br>150 tubes<br>25 tubes, mercury free                           | 2 42 07 22<br>2 42 07 27<br>2 42 07 12               |
| Bicinchoninate  | Water, waste water, seawater | 100<br>1000   | 53 03 00<br>53 03 03                                 |
|   |                              | <b>1 Set</b>  | 53 60 00   |
| PPST  |                              | 100<br>100 ml   |  |



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

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# Reagents also compatible in Hach®

## VARIO Powder Packs (PP) and Reagents for Photometry

| Test   | Range  | Reagent   | Liquid Reagent | Tube Tests | Powder Pack |
|--|--|---|----------------|------------|-------------|
| Hydrazine  | 0.005 – 0.6 mg/l N <sub>2</sub> H <sub>4</sub> | VARIO Hydra2 Reagent  | ■              |            |             |
| Iron (Fe <sup>2+</sup> , Fe <sup>3+</sup> ), dissolved | 0 – 3 mg/l Fe<br>0 – 1.8 mg/l Fe               | VARIO Ferro, F10<br>VARIO IRON TPTZ   |                |            | ■<br>■      |
| Manganese LR   | 0 – 0.7 mg/l Mn                                | VARIO Manganese Reagent, Set LR, F10<br>consists of:<br>VARIO Alkaline-Cyanide Reagent Solution<br>VARIO Ascorbic Acid<br>VARIO PAN Indicator Solution  | ■<br>■         |            | ■           |
| Manganese HR   | 0 – 20 mg/l Mn                                 | VARIO Manganese Reagent, Set HR, F10<br>consists of:<br>VARIO MANGANESE CITRATE BUFFER, F10<br>VARIO SODIUMPERIODATE, F10   |                |            | ■<br>■      |
| Molybdate LR   | 0.5 – 5 mg/l MoO <sub>4</sub>                  | VARIO MOLYBDENUM LR, Set, F10<br>consists of:<br>VARIO Molybdenum 1 LR, F10<br>VARIO Molybdenum 2 LR, F10   |                |            | ■<br>■      |
| Molybdate HR   | 0 – 35 mg/l Mo                                 | VARIO MOLYBDENUM HR, Set F10<br>consists of:<br>VARIO MOLYBDENUM HR1, F10<br>VARIO MOLYBDENUM HR2, F10<br>VARIO MOLYBDENUM HR3, F10   |                |            | ■<br>■<br>■ |
|  | 0 – 35 mg/l Mo                                 | VARIO MOLYBDENUM HR, Set F25<br>consists of:<br>VARIO MOLYBDENUM HR1, F25<br>VARIO MOLYBDENUM HR2, F25<br>VARIO MOLYBDENUM HR3, F25   |                |            | ■<br>■<br>■ |
| Monochloramine   | 0.04 - 4.5 mg/l Cl <sub>2</sub>                | VARIO FREE AMMONIA REAGENT SET<br>consists of:<br>VARIO Free Ammonia Reagent Solution<br>VARIO Monochlor FRGT   | ■              |            | ■           |
| Nitrate  | 0 – 30 mg/l N                                  | VARIO NITRA X Reagent, Set<br>consists of:<br>VARIO NITRA X Test vials<br>VARIO NITRA NITROGEN NITRATE Reag. B<br>Deionised water   |                | ■          | ■           |
| Nitrogen, total LR                                     | 0 – 25 mg/l N                                  | VARIO TOTAL NITROGEN LR, Set<br>consists of a) und b):<br>a) VARIO TOTAL NITROGEN HYDROX. LR, Set<br>VARIO TOTAL NITROGEN HYDROX. LR, tubes<br>VARIO TOTAL N PERSULFATE Reagent,<br>b) VARIO TOTAL NITROGEN ACID LR/HR, Set<br>VARIO TOTAL NITROGEN Reag. A<br>VARIO TOTAL NITROGEN Reag. B<br>VARIO TOTAL NITROGEN ACID LR/HR tubes<br>Deionised water | ■<br>■         | ■<br>■     | ■<br>■<br>■ |
| Nitrogen, total HR                                     | 5 – 150 mg/l N                                 | VARIO TOTAL NITROGEN HR, Set<br>consists of a) und b):<br>a) VARIO TOTAL NITROGEN HYDROX. HR, Set<br>VARIO TOTAL NITROGEN HYDROX. HR, tubes<br>VARIO TOTAL N PERSULFATE Reagent,<br>b) VARIO TOTAL NITROGEN ACID LR/HR, Set<br>VARIO TOTAL NITROGEN Reag. A<br>VARIO TOTAL NITROGEN Reag. B<br>VARIO TOTAL NITROGEN ACID LR/HR tubes<br>Deionised water | ■<br>■         | ■<br>■     | ■<br>■<br>■ |

# devices\*

| Method                           | Applications                 | Quantity                                 | Code                 |
|----------------------------------|------------------------------|--|----------------------|
| 4-(Dimethylamino)-benzaldehyde   | Water, waste water, seawater | 100 ml                                   | 53 12 00             |
| Iron, total: 1, 10-phenantroline | Water, waste water, seawater | 100                                      | 53 05 60             |
| Iron, total: TPTZ                | Water, waste water, seawater | 100                                      | 53 05 50             |
| PAN                              | Water, waste water           | <b>1 Set</b><br>60 ml<br>100<br>60 ml    | 53 50 90             |
| Periodate oxidation              | Water, waste water           | <b>1 Set</b><br>100<br>100               | 53 51 00             |
| Mercaptoacetic acid              | Water, waste water           | <b>1 Set</b><br>100<br>100               | 53 54 50             |
| Mercaptoacetic acid              | Water, waste water           | <b>1 Set</b><br>100<br>100<br>100        | 53 53 00             |
| Mercaptoacetic acid              | Water, waste water           | <b>1 Set</b><br>100<br>100<br>100        | 53 54 00             |
| Indophenol                       | Water                        | <b>1 Set</b><br>5 ml<br>100              | 53 58 00<br>53 18 10 |
| Chromotropic acid                | Water, waste water           | <b>1 Set</b><br>50<br>50<br>100 ml       | 53 55 80             |
| Persulfate digestion             | Water, waste water           | <b>1 Set</b><br>50<br>50<br>50<br>100 ml | 53 55 50             |
| Persulfate digestion             | Water, waste water           | <b>1 Set</b><br>50<br>50<br>50<br>100 ml | 53 55 60             |



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

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# Reagents also compatible in Hach®

## VARIO Powder Packs (PP) and Reagents for Photometry

| Test   | Range  | Reagent  | Liquid Reagent | Tube Tests | Powder Pack |
|--|--|--|----------------|------------|-------------|
| Nitrite LR                                   | 0 – 0.3 mg/l N   | VARIO NITRI3, F10<br>VARIO NITRI3, F25   |                |            | ■<br>■      |
| Phosphate                                    | 0 – 2.5 mg/l PO <sub>4</sub>   | VARIO PHOS3, F10   |                |            | ■           |
| Phosphate, ortho                             | 0.06 – 5 mg/l PO <sub>4</sub>  | VARIO REACTIVE PHOSPHATE REAGENT SET<br>consists of:<br>VARIO PHOSPHATE DILUTION TUBE TEST<br>VARIO PHOS3, F10<br>Deionised water  | ■              | ■          | ■           |
| Phosphate,<br>Acid hydrolyzable<br>and total | acid hydrolyzable:<br>0.02 – 1.6 mg/l P Δ<br>0.06 – 5 mg/l PO <sub>4</sub><br>total:<br>0.02 – 1.1 mg/l P Δ<br>0.06 – 3.5 mg/l PO <sub>4</sub> | VARIO TOTAL & ACID HYDROLYZABLE<br>PHOSPHATE REAGENT SET<br>consists of:<br>VARIO PHOSPHATE ACID REAG. TUBE TEST<br>Deionised water<br>VARIO PHOS3, F10<br>VARIO SODIUM HYDROXID 1N<br>VARIO SODIUM HYDROXID 1,54N<br>VARIO POTASSIUM PERSULFATE | ■<br>■<br>■    | ■          | ■<br>■<br>■ |
| Phosphate, total                             | 0.02 – 1.1 mg/l P Δ<br>0.06 – 3.5 mg/l PO <sub>4</sub>   | VARIO TOTAL PHOSPHATE REAGENT SET<br>consists of:<br>VARIO PHOSPHATE ACID REAG. TUBE TEST<br>VARIO PHOS3, F10<br>Deionised water<br>VARIO SODIUM HYDROXID 1,54N<br>VARIO POTASSIUM PERSULFATE  | ■<br>■         | ■          | ■<br>■      |
| Phosphonates                                 | 0.02 – 125 mg/l PO <sub>4</sub>  | VARIO PHOSPHONATE REAGENT SET<br>consists of:<br>VARIO Potassium Persulfate F10<br>VARIO PHOS3, F10  |                |            | ■<br>■      |
| Silica, LR                                   | 0 – 1.6 mg/l SiO <sub>2</sub>  | VARIO SILICA Reagent LR, Set F10<br>consists of:<br>VARIO LR SILICA AMINO ACID F<br>VARIO SILICA CITRIC ACID<br>VARIO MOLYBDATE 3 Reagent solution   | ■              |            | ■<br>■      |
| Silica, HR                                   | 0 – 100 mg/l SiO <sub>2</sub>  | VARIO SILICA Reagent HR, Set F10<br>consists of:<br>VARIO SILICA HR MOLYBDATE, F10<br>VARIO SILICA HR ACID RGT, F10<br>VARIO SILICA CITRIC ACID, F10   |                |            | ■<br>■<br>■ |
| Silica, UHR                                  | 0 – 200 mg/l SiO <sub>2</sub>  | VARIO SILICA Reagent HR, Set F25<br>consists of:<br>VARIO SILICA HR MOLYBDATE, F25<br>VARIO SILICA HR ACID RGT, F25<br>VARIO SILICA HR CITRIC ACID, F25  |                |            | ■<br>■<br>■ |
| Sulphate                                     | 0 – 70 mg/l SO <sub>4</sub>  | VARIO Sulpha 4, F10<br>VARIO Sulpha 4, F25   |                |            | ■<br>■      |



# devices\*

| Method  | Applications                 | Quantity                                     | Code                 |
|---|------------------------------|--|----------------------|
| Diazotiation                                      | Water, waste water           | 100<br>100                                   | 53 09 80<br>53 09 70 |
| Phosphomolybdic acid/<br>Ascorbic acid            | Water, waste water, seawater | 100  | 53 15 50             |
|   |                              | <b>1 Set</b>                                 | 53 52 00             |
| Phosphomolybdic acid/<br>Ascorbic acid            | Water, seawater              | 50<br>50<br>100 ml                           |                      |
|   |                              | <b>1 Set</b>                                 | 53 52 50             |
| Phosphomolybdic acid/<br>Ascorbic acid            | Water, seawater              | 50<br>50<br>100 ml<br>100 ml<br>100 ml<br>50 |                      |
|   |                              | <b>1 Set</b>                                 | 53 52 10             |
| Phosphomolybdic acid/<br>Ascorbic acid            | Water, seawater              | 50<br>50<br>100 ml<br>100 ml<br>50           |                      |
|   |                              | <b>1 Set</b>                                 | 53 52 20             |
| Persulfate UV-Oxidation                           | Water                        | 100<br>200                                   |                      |
|   |                              | <b>1 Set</b>                                 | 53 56 90             |
| Heteropoly blue                                   | Water, seawater              | 100<br>200<br>2 x 50 ml                      |                      |
|   |                              | <b>1 Set</b>                                 | 53 57 00             |
| Silicomolybdate                                   | Water, seawater              | 100<br>100<br>100                            |                      |
|   |                              | <b>1 Set</b>                                 | 53 59 00             |
| Silicomolybdate                                   | Water, seawater              | 100<br>100<br>100                            |                      |
| <b>USEPA</b> accepted<br>for waste water analysis | Water, waste water, seawater | 100<br>100                                   | 53 21 60<br>53 21 50 |



Photometry

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

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# BOD Measurement System OxiDirect

## Highlights

- Direct sample selection
- Accurate and direct display of BOD values in mg/l
- User-friendly handling
- User-selectable measuring period from 1 to 28 days (BOD<sub>5</sub>, BOD<sub>7</sub>, OECD...)
- Automatic storage of all values
- Measuring ranges from 0-40 mg/l to 0-4000 mg/l BOD, sample volume related
- Auto start function after temperature equalisation
- Mercury-free, environmentally-friendly
- Inductive stirring system with automatic re-centering of stirring rods
- Interface RS 232



## Biochemical Oxygen Demand (BOD)

BOD – biochemical oxygen demand – is an expression for the quantity of oxygen required for biological degradation of organic matter in a waste water sample. BOD measurement is therefore used as a basis for the detection of biologically degradable organic matter in water. The difference between BOD and chemical oxygen demand (COD) is that COD additionally registers biologically non-degradable organic matter.

BOD measurement is therefore an important measurement of the effects of domestic and industrial waste water on sewage plants and outflow points.

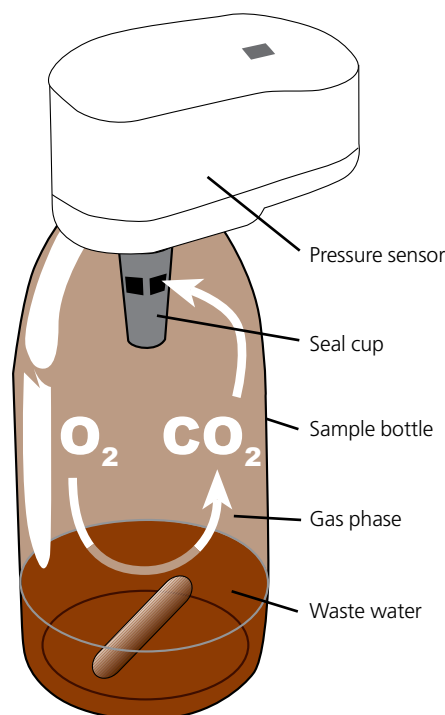
### Manometric, respirometric BOD measurement using the Lovibond® OxiDirect

The Lovibond® sensor system OxiDirect is a 6 sample system that allows precise measurements of BOD based on the manometric principle. Manometric respirometers relate oxygen uptake to the change in pressure caused by oxygen consumption while maintaining a constant volume. Thanks to the modern integral pressure sensors, it is no longer necessary to use mercury for pressure measurements.

### Measuring ranges and sample volumes

The BOD level of a sample depends on the quantity of organic matter present, which can vary considerably. The Lovibond® BOD measuring system OxiDirect is therefore calibrated for the various sample volumes and the corresponding measuring ranges listed in the table below. The overall measuring range of the system is 0 – 4000 mg/l.

For all measuring ranges, BOD is shown directly in mg/l.



## OxiDirect Principle

Respirometric methods provide direct measurements of the oxygen consumed by microorganisms from an air or oxygen-enriched environment in a closed vessel under conditions of constant temperature and agitation. Carbon dioxide produced metabolically by the bacteria is chemically bound by the potassium hydroxide solution contained in the seal cup in the bottle.

The result is a pressure drop in the system, which is directly proportional to the BOD value and is measured by the Lovibond® BOD sensor. The BOD level is then displayed directly in mg/l.

The BOD values are stored in the sensor memory and can be called up on the large-format display at any time without the need for time-consuming conversion using factors. This means that test series that end on a Sunday can be evaluated during the following week without any problem.

The measurement period is user-selectable between 1 and 28 days to suit the application. While short measurement periods are useful for scientific applications, standard BOD measurements typically extend over a period of 5 days – and manometric determination of OECD, for example, generally takes place over a period of 28 days.

| Range mg / l BOD | Sample Volume ml |
|------------------|------------------|
| 0 – 40           | 428              |
| 0 – 80           | 360              |
| 0 – 200          | 244              |
| 0 – 400          | 157              |
| 0 – 800          | 94               |
| 0 – 2000         | 56               |
| 0 – 4000         | 21.7             |



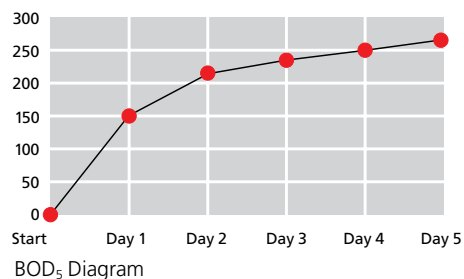
## Applications

- Waste Water
- Determination of Biological Activity
- Waste Water Treatment Plants
- Analytical Laboratories
- Science & Research

## References

- APHA, AWWA, WEF  
Standard Methods 5210 D
- H55 as a supplement to EN 1899-2

| Day    | Display  |
|--------|----------|
| 1. Day | 150 mg/l |
| 2. Day | 220 mg/l |
| 3. Day | 240 mg/l |
| 4. Day | 250 mg/l |
| 5. Day | 260 mg/l |



BOD accessories

## Delivery Content

- Lovibond® OxiDirect, complete unit with 6 sensor heads and control unit with batteries
- Inductive stirring unit with power supply
- 6 sample bottles
- 6 rubber gaskets
- 6 magnetic stirring rods
- 1 overflow flask, 157 ml
- 1 overflow flask, 428 ml
- 1 bottle, 50 ml potassium hydroxide solution
- 1 bottle, 50 ml nitrification inhibitor solution
- 1 instruction manual

Order code: 2 44 44 06

- Lovibond® OxiDirect, as above but with 12 sensor heads

Order code: 2 44 44 10

## Evaluation of measurements

If the measuring period is set at 24 hours, the Lovibond® OxiDirect BOD measuring system records a measurement once every hour. With a measuring period of 48 hours, the unit measures and stores a BOD value once every 2 hours. If the measuring period is between 3 and 28 days, one value is measured and stored each day.

Current values and stored values may be called up at any time. The table/graph below illustrates an example of BOD<sub>5</sub> evaluation. The development of BOD over a period of 5 days is easily seen.

## Automatic start function

Variations in sample temperature prior to testing result in pressure variations within the measuring system during the temperature equalisation period in the thermostatically controlled cabinet (if BOD measurement is to take place at 20°C, for example). Such variations would normally cause errors during manometric measurement. In order to prevent such errors, the Lovibond® OxiDirect BOD meter is equipped with an automatic start feature: measurement does not commence until the temperature in the samples is the same as that in the thermostatically controlled cabinet. This rules out the possibility of temperature (and hence pressure) fluctuations that are not related to the manometric measurement.

## The complete OxiDirect measuring system

In addition to the BOD unit for measurement and storage of BOD levels, the Lovibond® OxiDirect BOD measuring system includes sample bottles, measuring sensors, non-wearing inductive stirring system, overflow measuring flasks for metering of sample volumes, nitrification inhibitor and potassium hydroxide as an absorbent.

## Technical data

|                                      |  |
|--------------------------------------|--|
| <b>Meas. principle</b>               | Manometric; mercury-free; electronic pressure sensor   |
| <b>Ranges [mg/l O<sub>2</sub>]</b>   | 0 - 40, 0 - 80, 0 - 200, 0 - 400, 0 - 800, 0 - 2000, 0 - 4000 mg/l   |
| <b>Accuracy*</b>                     | 0.5 % full scale at 20°C   |
| <b>Applications</b>                  | BOD <sub>5</sub> , BOD <sub>7</sub> , OECD 301 F ...   |
| <b>Result display</b>                | BOD [mg/l]; 4 - digits; 7 - segment LED  |
| <b>Measurement parameter display</b> | BOD-range, volume, duration, time of measurement   |
| <b>Measurement period</b>            | User-selectable, between 1 and 28 days   |
| <b>Auto result storage</b>           | Up to 28 results, depending on measurement period  |
| <b>Storage interval</b>              | – hourly (1 day);<br>– every 2 hours (2 days);<br>– daily (3-28 days)                                      |
| <b>Automatic start function</b>      | – After temperature equalisation of samples;<br>– Can be switched off                                      |
| <b>Power supply</b>                  | 3 alkaline-manganese batteries ("Baby" cells/size "C")   |
| <b>Battery life</b>                  | 1 year (normal use as BOD <sub>5</sub> meter – max. one reading a day); early warning before battery fails |
| <b>Interface</b>                     | RS 232 for printer or PC connection  |
| <b>Clock</b>                         | Real-time clock  |
| <b>Protection class</b>              | IP 54 (sensor head)  |
| <b>Dimensions: (L x W x H)</b>       | 375 x 195 x 230 mm including stirring unit   |
| <b>Weight</b>                        | 3850 g, unit with bottles<br>5750 g, complete with stirring unit   |
| <b>Housing</b>                       | ABS  |
| <b>Approval</b>                      | CE   |

\*No standard is available to check the accuracy of respirometric oxygen uptake measurement. Tests with a glucose-glutamic acid solution having a known theoretical BOD have shown that the variation is approximately 5% in the range of 50...100 mg/l BOD, and 3% for higher range. Minimum Response or sensitivity of respirometric systems is about 0.05 ... 1 mg/l.

## Accessories

| Item  | Order code |
|---|------------|
| <b>Sensor head</b>  | 2 44 44 30 |
| <b>BOD sample bottle</b><br>Brown glass, 500 ml                         | 41 86 44   |
| <b>BOD sample bottles</b> , Brown glass,<br>500 ml, set of 6 bottles    | 41 86 45   |
| <b>Cable for connection to a PC</b><br>serial 9-pins                    | 2 44 44 40 |
| <b>Inductive stirring system</b><br>for 6 samples, 100-240 V / 50-60 Hz | 2 44 44 52 |
| <b>Stirring rod</b>   | 41 86 37   |
| <b>Stirring rod remover</b>   | 41 86 38   |
| <b>Rubber gasket</b>  | 41 86 36   |
| <b>Chemicals:</b>   |            |
| <b>Potassium hydroxide solution</b><br>45 %, 50 ml                      | 2 41 86 34 |
| <b>Nitrification inhibitor (N-ATH)</b><br>50 ml                         | 2 41 86 42 |
| <b>Overflow flask</b> , 21.7 ml   | 41 86 64   |
| <b>Overflow flask</b> , 56 ml   | 41 86 55   |
| <b>Overflow flask</b> , 94 ml   | 41 86 56   |
| <b>Overflow flask</b> , 157 ml  | 41 86 57   |
| <b>Overflow flask</b> , 244 ml  | 41 86 58   |
| <b>Overflow flask</b> , 360 ml  | 41 86 59   |
| <b>Overflow flask</b> , 428 ml  | 41 86 60   |
| <b>Complete set</b><br><b>Overflow flasks</b>                           | 41 86 54   |
| <b>Test set</b> , BOD CM test tablets,<br>box with 8 tablets            | 41 83 28   |

## Test set for OxiDirect

We also supply a test set to check for correct operation of the Lovibond® OxiDirect BOD meter. The set contains 8 BOD CM1 test tablets that cause a defined oxygen consumption.

The tablets are easy to use. Simply place a tablet in the BOD bottle, start the measurement process, read off the BOD value after 5 days, and then compare with the defined value. If this value is within the quoted tolerance, this means that the BOD measuring system is functioning correctly.



BOD CM test tablets, order code: 41 83 28

## Temperature equalisation during BOD measurement

Temperature equalisation is essential prior to biological testing, as temperature has a major effect on biological activity. BOD measurements, for example, are always performed in a thermostatically controlled cabinet at a temperature of 20°C.

For temperature equalisation, we recommend Lovibond® thermostatically controlled cabinets with a user-selectable temperature from 2°C to 40°C.

## Inductive stirring system



Inductive stirring system

The microprocessor-controlled Lovibond® inductive stirring system is non-wearing and maintenance-free. In other words, there are no moving parts in the system.

At regular intervals, the magnetic stirring rods are accelerated and slowed down again, taking them up to maximum speed and back down again. This ensures the centralization of the stirring rods.

Stirring rods that move away from the centre of the bottle are re-centered quickly and reliably.

The inductive actuation system guarantees maintenance-free operation (no need to replace drive belts or burnt-out drive motors) for many years.

## Highlights

- Maintenance-free and non-wearing
- Regular change in stirring speed
- Automatic centering of stirring rods
- No mechanical components in the stirring system





# Thermostatically controlled incubators - TC series



The TC series of thermostatically controlled cabinets is used for continuous temperature control over a range of 2 °C to 40 °C. This makes them ideal for a wide range of different applications in industrial and research laboratories.

In particular they are ideal for the temperature-controlled storage of samples or BOD determination in effluent analysis work.

The temperature can be set in steps of 0.1 °C and an LED display shows both the set temperature and the current temperature in the cabinets.

Devices such as magnetic agitators, which require a power supply, can be connected to sockets incorporated in the interior of the cabinet.

The integral temperature control unit meets the requirements of the EMC directive issued as IEC 61326: "Electrical devices for measurement, monitoring and for use in laboratories".

Improved, robust, insulated housing and highly efficient components provide maximum energy efficiency.

There are 4 models available with standard doors from 135 to 445 litres net capacity, and 2 models with glass doors with 140 and 255 litres net capacity.

## Standard or glass door - lockable

### Highlights

- Temperature range 2 °C to 40 °C, continuously adjustable in steps of 0,1 °C
- Low power consumption
- Illuminated LED display of preset and current temperatures
- Ideal for BOD determination at 20 °C
- Power sockets inside the incubator
- 6 models in 4 sizes
- Standard door or glass door

### Applications

- BOD-Measurement
- Microbiological Research
- Food Industry
- Dairies
- Laboratories
- Research Centres
- Universities



## Models with standard door

### TC 135 S

3 metal racks + 1 bottom grid + 4 sockets

Consumption: approx. 1.35 kWh / 24 h\*

I. D. (approx.): 513 W x 441 D x 702 H mm

Net capacity: approx. 135 l

O. D. (approx.):

600 W x 600 D x 850 H mm with work top  
600 W x 600 D x 819 H mm without work top

Suitable for built under applications

Weight: approx. 39.0 kg

Order code: 2 43 82 00

### TC 175 S

3 metal racks + 1 bottom grid + 5 sockets

Consumption: approx. 1.23 kWh / 24 h\*

I. D. (approx.): 470 W x 440 D x 1062 H mm

Net capacity: approx. 175 l

O. D. (approx.): 600 W x 610 D x 1250 H x mm

Weight: approx. 51.0 kg

Order code: 2 43 82 20

\* Ambient temperature 25 °C

Target temperature 20 °C

Variations possible

## Models with standard door

### TC 255 S

4 metal racks + 1 bottom grid + 7 sockets

Consumption: approx. 1.54 kWh / 24 h\*

I. D. (approx.): 470 W x 440 D x 1452 H mm

Net capacity: approx. 255 l

O. D. (approx.):

600 W x 610 D x 1640 H x mm

Weight: approx. 61.0 kg

Order code: 2 43 82 30

### TC 445 S

4 metal racks + 1 bottom grid + 9 sockets

Consumption: approx. 1.42 kWh / 24 h\*

I. D. (approx.): 600 W x 560 D x 1452 H mm

Net capacity: approx. 445 l

O. D. (approx.): 750 W x 730 D x 1640 H x mm

Weight: approx. 78.5 kg

Order code: 2 43 82 40

\* Ambient temperature 25 °C

Target temperature 20 °C

Variations possible

## Models with glass door

### TC 140 G

3 metal racks + 1 bottom grid + 4 sockets

Consumption: approx. 1.77 kWh / 24 h\*\*

I. D. (approx.): 513 W x 441 D x 702 H mm

Net capacity: approx. 140 l

O. D. (approx.):

600 W x 600 D x 850 H x mm with work top  
600 W x 600 D x 819 H mm without work top

Suitable for built under applications

Weight: approx. 48.0 kg

Order code: 2 43 82 10

### TC 256 G

4 metal racks + 1 bottom grid + 7 sockets

Consumption: approx. 1.56 kWh / 24 h\*\*

I. D. (approx.): 470 W x 440 D x 1452 H mm

Net capacity: approx. 255 l

O. D. (approx.): 600 W x 610 D x 1640 H x mm

Weight: approx. 77.0 kg

Order code: 2 43 82 35

\*\* Ambient temperature 25 °C

Target temperature 20 °C

with interior lighting switched on (15 W)  
Variations possible

## Technical Data

|                               |  |
|-------------------------------|--|
| <b>Design</b>                 | Fully insulated cabinet with universal temperature control unit                |
| <b>Lock</b>                   | existing   |
| <b>Models with glass door</b> | Insulating glass door in an ABS frame. ceiling lighting, separately switchable |
| <b>Operation</b>              | Splash-proofed keypad, 2 buttons with tactile feedback                         |
| <b>Control range</b>          | + 2 °C to + 40 °C, steps of 0.1 °C   |
| <b>Climate class</b>          | + 10 °C to + 32 °C,  |

|                              |  |
|------------------------------|--|
| <b>Temperature tolerance</b> | ± 1 °C, specified for a stirred 500 ml water sample. For BOD (T=20 °C ±0,5 °C) |
| <b>Display</b>               | Backlit LED display<br>Resolution 0.1 °C                                       |
| <b>Fan</b>                   | Axial, output 320 m³/h   |
| <b>Cooling/Heating</b>       | Integrated powerful cooling and heating  |
| <b>Power supply</b>          | 220 - 240 V / 50 Hz  |
| <b>Sockets</b>               | CEE 7/5, type E with hinged lid, 230 V / 16 A 2p + E, IP 44                    |
| <b>Coolant</b>               | R134a  |
| <b>Approval</b>              | CE   |

## Temperature control unit

The temperature control unit fulfills the EMC requirements according IEC 61326 : Electrical equipment for measurement, control and laboratory use.



## Space for OxiDirect systems

| Model               | Systems, standard <sup>1)</sup> | Systems, comfort <sup>2)</sup> |
|---------------------|---------------------------------|--------------------------------|
| TC 135 S / TC 140 G | 3                               | 2                              |
| TC 175 S            | 5                               | 2                              |
| TC 255 S / TC 256 G | 7                               | 3                              |
| TC 445 S            | 12                              | 9                              |

<sup>1)</sup> Change of bottles **by** removing racks.

<sup>2)</sup> Change of bottles **without** removing racks.

# Spark-free cabinets - EX series



Contents not supplied

The German guidelines „Working Safely in Laboratories BG-I 850-0“ stipulates that interior spaces must be explosion-protected where hazardous, explosive atmospheres can develop (for example, due to the presence of flammable liquids).

The Lovibond® cabinets in the EX range meet the requirements of these guidelines and are fully equipped for daily laboratory use.

The cabinet consists of a sturdy sheet steel housing with impact-proof and jolt-resistant powder coating. Improved, robust, insulated housing and highly efficient components provide maximum energy efficiency.

The robust interior is made of high-quality, strong white plastic material (PS).

The door is lockable and supplied with a right-hand hinge as standard (but can easily be converted to a left-hand hinge). A tight door seal is ensured by an all-round magnetic gasket.

The temperature in the refrigerator can be continuously adjusted over the range +1°C to +15°C; a room thermostat ensures constant control. The digital temperature display enables the interior temperature to be easily read. The high performance fan provides for an even temperature distribution inside.

The models EX 220, EX 300 and EX 490 have a “fan stop” function, which switches the fan off when the door is opened.

## Laboratory cabinets with a spark-free interior

### Highlights

- Spark-free according to BG-I 850-0
- Dynamic cooling system
- 1 °C to 15 °C, continuously adjustable
- Digital temperature display
- High energy efficiency
- Robust materials
- Lockable

### Applications

- Laboratories
- Research Centres
- Universities

## EX 160

220 - 240 V ~ / 1 A

Consumption: 0.898 kWh / 24 h

Temperature regulation: continuous 1 °C to 15 °C

Lockable door, changeable door stop

4 storage levels (3 height-adjustable glass shelves)

I. D. (approx.): 513 W x 441 D x 702 H mm

Net capacity: approx. 160 l

O. D. (approx.): 600 W x 600 D x 860 H x mm

Weight: approx. 41.0 kg

Order code: 2 42 21 05



## EX 220

220 - 240 V ~ / 1 A

Consumption: 0.786 kWh / 24 h

Temperature regulation: continuous 1 °C to 15 °C

Lockable door, changeable door stop

5 storage levels (4 height-adjustable glass shelves)

I. D. (approx.): 470 W x 440 D x 1062 H mm

Net capacity: approx. 220 l

O. D. (approx.): 600 W x 610 D x 1250 H x mm

Weight: approx. 53.0 kg

Order code: 2 42 21 15



## EX 300

220 - 240 V ~ / 1,5 A

Consumption: 0.947 kWh / 24 h

Temperature regulation: continuous 1 °C to 15 °C

Lockable door, changeable door stop

6 storage levels (5 height-adjustable glass shelves)

I. D. (approx.): 470 W x 440 D x 1452 H mm

Net capacity: approx. 300 l

O. D. (approx.): 600 W x 610 D x 1640 H mm

Weight: approx. 64.0 kg

Order code: 2 42 21 25



## EX 490

220 - 240 V ~ / 1,5 A

Consumption: 0.983 kWh / 24 h

Temperature regulation: continuous 1 °C to 15 °C

Lockable door, changeable door stop

6 storage levels (5 height-adjustable glass shelves)

I. D. (approx.): 600 W x 560 D x 1452 H mm

Net capacity: approx. 490 l

O. D. (approx.): 750 W x 730 D x 1640 H mm

Weight: approx. 84.0 kg

Order code: 2 42 21 35



## Technical data

|                          |  |
|--------------------------|--|
| <b>Cooling</b>           | Powerful compressor unit, mounted on low noise, vibration-free bearings                |
| <b>Coolant</b>           | R600a  |
| <b>Defrost</b>           | Automatic defrost - condensation drains into a collection bowl within the refrigerator |
| <b>Temperature</b>       | 1 °C to 15 °C  |
| <b>Climate class</b>     | EX 160: SN, 10 °C to 32 °C<br>EX 220, EX 300, EX 490: SN-T, 10 °C to 43 °C             |
| <b>Lock</b>              | existing   |
| <b>Power supply</b>      | 220 - 240 V / 50 Hz  |
| <b>Height adjustment</b> | Adjustable front feet  |
| <b>Approval</b>          | CE   |
| <b>EX-safety</b>         | Spark-free interior  |

The product complies with the following european directives and regulations: 2006/42/EC, 2006/95/EC, 94/9/EC, 2004/108/EC, 2011/65/EU.

## Accessories

### Safety- and collecting tub (PP) for EX 160

Order code: 42 21 55

### Safety- and collecting tub (PP) for EX 220, 300

Order code: 42 21 56

### Safety- and collecting tub (PP) for EX 490

Order code: 42 21 57

### Glass shelves for EX 160

Order code: 42 21 65

### Glass shelves for EX 220, 300

Order code: 42 21 66

### Glass shelves for EX 490

Order code: 42 21 67

# SD 300 pH & SD 320 Con (IP 67 waterproof)



Waterproof  
Hand-held Meters  
for  
  
pH/Redox/Temperature  
  
Conductivity, TDS,  
Salinity, Temperature

## Highlights

- Rugged, water resistant (IP 67) designed for field use
- PC interface (USB / serial or analog)
- Automatic buffer detection (SD 300 pH)
- Data logger and alarm function (min./max.)
- Good Laboratory Practice (GLP-features)
- Clear, concise result reading: easy-to-read backlit LCD display
- Automatic temperature compensation
- High resolution (0.001 pH / 0.1 mV) (SD 300 pH)
- Dirt-insensitive up-to-date 4-pole conductivity cell offering highest precision (SD 320 Con)

## Applications

- Drinking Water
- Cooling/Boiler Water
- Waste Water
- Pool Water
- Surface Water

## Features SD 300 pH

### Min / Max Value Memory

highest and lowest measured value is saved.

### Auto Hold

freeze and display measurement.

### Auto Power Off

if unused, the meter automatically switches off after a selected period (0 to 120 min, or deactivated)

### Additional Display for pH Electrode and Battery

Bar graph display

### Low Battery Display

"BAT"

### Automatic Temperature Compensation

Automatic Temperature Compensation (ATC) in pH mode (in the range of 0 - 105 °C) when the temperature probe is connected. Temperature can be input manually, when the temperature probe is not attached.

### pH Calibration

Automatic Buffer Recognition.

Permissible electrodes' data: Asymmetry:

$\pm 55$  mV / Slope: 45 ... 62 mV/pH

The condition of pH Electrode is checked at each calibration.

1, 2 or 3 point calibration with Lovibond® Standard Buffer, DIN 19266 Buffer or any manually entered Buffer values.

### Redox Measurement (ORP)

2 options:

"mV" Standard Redox or mV measurement

"mVH" Conversion to hydrogen systems according to DIN38404 Part 6

### rH Measurement

The rH value is calculated from a measured Redox value and a manually input pH value

## Features SD 320 Con

### Min / Max Value Memory

highest and lowest measured value is saved

### Auto Hold

freeze and display measurement

### Auto Power Off

if unused, the meter automatically switches off after a selected period (0 to 120 min, or deactivated)

### Low Battery Display

"BAT"

### Automatic temperature compensation

As conductivity depends strongly on temperature, each conductivity value is only valid at the corresponding temperature.

Therefore the device supports temperature compensation, i.e. referring the conductivity to a reference temperature (selectable: 20 °C or 25 °C).

### Salinity measurement

Salinity means the sum of amount of all dissolved salts in water.

The unit is g / kg.

### TDS measurement (total dissolved solids)

TDS means the mass concentration of dissolved media in a liquid. The unit is mg/l.





# SD 300 pH

## Accessories

## Technical Data

### Delivery Content

**Order Code: 72 46 00**

**SD 300 pH**

without electrode, with batteries,  
protective armoring,  
instruction manual, warranty information

**Order Code: 72 46 10**

**SD 300 pH (SET 1)**

instrument, batteries,  
pH/temp. plastic-electrode type 230,  
pH-buffer-set (pH 4.00/7.00/10.00),  
in case, manual, warranty information

**Order Code: 72 46 11**

**SD 300 pH (SET 2)**

as SET1, but with pH / temperature  
plastic-electrode type 225,  
temperature sensor Pt 1000,  
manual, warranty information

| Code      | Article  |
|-----------|--|
| 721231    | pH/temp.-electrode<br>type 230 plastic/gel/temperature<br>NTC30kOhm (SET 1)                              |
| 721226    | pH-electrode<br>plastic/gel-type 225 (SET 2)   |
| 721235BNC | pH-electrode glass/gel-type 235  |
| 721240BNC | Redox-electrode plastic-type 240   |
| 72 12 45  | PT1000Temperature sensor (SET 2)   |
| 41 86 09  | KCl-solution, 3 molar saturated<br>with AgCl, 100 ml   |
| 72 12 50  | pH buffer-set 4.00/7.00/10.00 (25°C)   |
| 72 12 52  | pH buffer 4.00 (25°C) 1 litre  |
| 72 12 54  | pH buffer 7.00 (25°C) 1 litre  |
| 72 12 56  | pH buffer 10.00 (25°C) 1 litre   |
| 19 50 70  | Redox calibration solution,<br>470 mV, 100 ml  |
| 72 46 20  | USB 300 cable,<br>for connection to a computer   |
| 72 46 25  | GSOFT 3050 data transmission<br>software with logger for setting,<br>reading and printing of stored data |
| 72 50 60  | Case with foam inlet   |

### Measuring ranges

**pH** - 2.000 ... 16.000 pH

**Redox /mV** - 2000.0 ... 2000.0 mV

**Temperature** - 5.0 ... + 150.0 °C  
+ 23.0 ... + 302.0 °F

**rH** 0.0 ... 70.0 rH

### Accuracy

**pH** ± 0.005 pH

**Redox / mV** ± 0.05 % FS (mV or mVH)

**Temperature** ± 0.2 °C  
- 5.0 ... + 100.0 °C

**rH** ± 0.1 rH

### Connections

**pH, Redox** BNC female connector,  
compatible to standard  
BNC plugs and waterproof  
BNC plugs, additional  
banana-jack (4 mm) for  
separate reference electrode  
input resistance: 10<sup>12</sup> Ohm

**Temperature** 2 banana jacks (4 mm) for  
temperature probe  
(Pt1000 or NTC 10K)

**Interface / Supply** 4-pole bayonet connector for  
serial interface and supply  
(with accessory USB 300)

**Display** two 4.5 - digit seven-segment  
display (15 mm and 12 mm)

### pH Calibration

**Automatically** 1, 2 or 3 point calibration,  
Lovibond® Standard Buffer  
or Buffer to DIN19266

**Manually** 1, 2 or 3 point calibration

**Protection class** IP67 (housing and connections)

**Dimensions** 160 x 86 x 37 mm (H x W x D)  
incl. protection cover

**Weight** 250 g incl. battery and  
protective armoring

**Housing** impact resistant PA 6 G B30  
housing with pop-up clip

**Armoring** Shock-absorbing  
protective armoring

**Power supply** 2 x AAA-battery (included)  
power consumption: < 1.0 mA

**Battery life** 1000 hours



SD 300 pH in case



# SD 320 Con

## Technical Data

### Measuring ranges

|                                 |   |
|---------------------------------|---|
| <b>Number</b>                   | 5   |
| <b>Smallest range</b>           | 0.000 ... 5.000 $\mu\text{S} / \text{cm}^*$<br>or 0.0 ... 500.0 $\mu\text{S} / \text{cm}^{**}$  |
| <b>Biggest range</b>            | 0 ... 5000 $\mu\text{S} / \text{cm}^*$<br>or 0 ... 1000 $\text{mS} / \text{cm}^{**}$  |
| <b>Resistivity</b>              | 0.005 ... 500.0 $\text{k}\Omega\text{m} / \text{cm}$<br>(depends on cell constant)  |
| <b>TDS</b>                      | 0 ... 5000 $\text{mg/l}$<br>(depends on cell constant)  |
| <b>Salinity</b>                 | 0.0 ... 70.0 (g salt / kg water<br>equals PSU = Practical<br>Salinity Unit)   |
| <b>Temperature</b>              | - 5.0 ... + 150.0 $^{\circ}\text{C}$ ,<br>Pt1000 or NTC (10 $\text{k}\Omega\text{m}$ )  |
| <b>Supported cell constants</b> | 4.000 ... 15.000 / $\text{cm}^{-1}$<br>0.4000 ... 1.5000 / $\text{cm}^{-1}$<br>0.04000 ... 0.15000 / $\text{cm}^{-1}$<br>0.004000 ... 0.015000 / $\text{cm}^{-1}$ |

### Accuracy

|                     |  |
|---------------------|--|
| <b>Conductivity</b> | $\pm 0.5\%$ of reading<br>$\pm 0.1\%$ FS (depends on electrode)              |
| <b>Temperature</b>  | $\pm 0.2\text{ }^{\circ}\text{C}$<br>(- 5.0 ... + 100.0 $^{\circ}\text{C}$ ) |

### Connection

|                                      |   |
|--------------------------------------|---|
| <b>Conductivity, Temperature</b>     | 1 x 7 pole bayonet connector<br>for connection of different<br>measuring cells          |
| <b>Supported temperature sensors</b> | Pt1000 or NTC (10k)   |
| <b>Interface / ext. supply</b>       | 4-pole bayonet connector for<br>serial interface and supply<br>(with accessory USB 300) |
| <b>Display</b>                       | two 4.5 - digit seven-segment<br>display (15 mm and 12 mm)                              |
| <b>Protection class</b>              | IP67 (housing and connections)  |
| <b>Dimensions</b>                    | 160 x 86 x 37 mm (W x H x D)<br>incl. protection cover                                  |
| <b>Weight</b>                        | 250 g incl. battery and<br>protective armouring   |
| <b>Housing</b>                       | impact resistant PA 6 G B30<br>housing with pop-up clip                                 |
| <b>Power supply</b>                  | 2 x AAA-battery (included)<br>power consumption: < 6,25 mA                              |
| <b>Battery life</b>                  | 160 hours   |

depends on cell constant  
of used electrode  
\* cell constant 0.01 / cm  
\*\* cell constant 0.1 ... 1.2 / cm

## Accessories

| Order code | Article  |
|------------|--|
| 19805040   | Conductivity cell LC 12,<br>measuring range 0 - 200 $\text{mS/cm}$                                       |
| 19805045   | Conductivity cell LC 16,<br>measuring range 0 - 1000 $\text{mS/cm}$                                      |
| 72 22 50   | Calibration solution 1413 $\mu\text{S/cm}$   |
| 72 46 20   | USB 300 cable,<br>for connection to a computer   |
| 72 46 25   | GSOFT 3050 data transmission<br>software with logger for setting,<br>reading and printing of stored data |
| 72 50 60   | Case with foam inlet   |

## Delivery Content

**Order Code: 72 47 00**  
**SD 320 Con (SET 1)**  
instrument, batteries,  
conductivity cell LC 12  
(measuring range 0 - 200  $\text{mS/cm}$ ),  
manual, warranty information  
in case

**Order Code: 72 47 20**  
**SD 320 Con (SET 2)**  
instrument, batteries,  
conductivity cell LC 16  
(measuring range 0 - 1000  $\text{mS/cm}$ ),  
manual, warranty information  
in case



SD 320 Con in case

# SensoDirect Oxi200 (IP 67 waterproof)



The microprocessor-controlled SensoDirect Oxi 200 handheld meter from Lovibond® meets the day-to-day demands for sturdy and reliable system for the measurement of temperature and dissolved oxygen.

The water-tight housing complies with **IP67** and is equipped as standard with protective armouring and built-in electrode holder ensuring reliable operation even in extreme ambient conditions.

The support can be flipped up to hang the meter on pipes or branches.

A direct, easily understood user interface, outlining the required configuration options for all three systems, facilitates meter operation both outdoors and in the laboratory.

The automatic Hold function "freezes" stable measuring data in the display and indicates the presence of stable and reproducible results.

The internal memory allows storage of 20 data sets to facilitate subsequent evaluation.

The integral automatic switch-off feature, varying from 1 to 120 minutes, increases the operating life of the units.

The power consumption of all three units has been reduced to a minimum. As a result, the 4 x 1.5 V integrated batteries have an operating life of up to 12,000 hours, depending on the unit version.

The galvanic, membrane-covered oxygen sensor with built-in temperature sensor allows instant measurement without the need for time-consuming polarisation.

## Determination of Oxygen Temperature

### Oxi200

- Dissolved Oxygen (O<sub>2</sub>)
- O<sub>2</sub> Concentration in mg/l
- O<sub>2</sub> Saturation in %
- °C/°F

### Applications

- Drinking Water
- Cooling/Boiler Water
- Waste Water
- Pool Water
- Surface Water
- Water Treatment Companies
- Industrial and Governmental Laboratories

## Technical Data

|                                       |   |
|---------------------------------------|---|
| <b>O<sub>2</sub> partial pressure</b> | 0.0...570.0 hPa,<br>0...1200 hPa<br>0.0...427.5 mm Hg,<br>0...900 mm Hg   |
| <b>O<sub>2</sub> concentration</b>    | 0.00...25.00 mg/L,<br>0.0...70.0 mg/L   |
| <b>O<sub>2</sub> saturation</b>       | 0.0...250.0 %,<br>0...600 %   |
| <b>Accuracy</b>                       | ± 1.5% ± 0.2 mg/L<br>(0...25 mg/L)<br>± 2.5% ± 0.3 mg/L<br>(25...70 mg/L) ± 1 Digit   |
| <b>Temperature</b>                    | -5.0 ... + 50.0 °C<br>23.0 ... 122.0 ° F  |
| <b>Accuracy</b>                       | ± 0.1 °C  |
| <b>Abs. air pressure</b>              | 500..1100 hPa   |
| <b>Accuracy</b>                       | ± 0.5% full scale   |
| <b>Nominal temperature</b>            | 25 °C   |
| <b>Operating temperature</b>          | 0 to +50 °C   |
| <b>Storage temperature</b>            | -20 to +70 °C   |
| <b>Power supply</b>                   | 4 x 1.5 V battery, Type AA<br>Operating time up to 12.000 h   |
| <b>Power consumption</b>              | max. 0.25 mA  |
| <b>Auto-Off function</b>              | 0 - 120 minutes   |
| <b>Dimensions</b>                     | 175 x 140 x 45 mm (L x W x H)   |
| <b>Weight</b>                         | approx. 580 g   |
| <b>Electrode</b>                      | Self-polarising oxygen<br>electrode with integrated<br>NTC sensor<br>Connection: 7-pin DIN socket<br>Installation diameter:<br>12.0 ± 0.2 mm<br>Overall length:<br>approx. 220 mm<br>(incl. kink protection)<br>Operating temperature:<br>0...40 °C |

## CE-Conformity

## Accessories

| Code   | Article  |
|--------|--|
| 723201 | Oxygen sensor, 1.5 m cable   |
| 723210 | Oxygen sensor, 10 m cable  |
| 723230 | Oxygen sensor, 30 m cable  |
| 723250 | Service Set Oxygen sensor<br>3 interchangeable<br>membrane heads,<br>100 ml plastic bottle<br>KOH-solution 3 mol/l |
| 723260 | Protection cap for depth<br>measurement  |
| 725020 | Case with foam inlet   |



SensoDirect Oxi200 in case

## Features

- Oxygen partial pressure, Oxygen concentration, Oxygen saturation, Temperature measurement
- Automatic absolute air pressure measurement
- Auto Hold function
- Easy calibration against oxygen in air
- Salinity correction
- Self-polarising galvanic oxygen probe, allows instant measurement after the system is switched on
- Low battery and battery change indicator
- Sensor evaluation in the display
- Accessories for depth measurement
- Battery operation period up to 12000 hours
- Shock-absorbing rubber protective armouring
- Waterproof

## Delivery Content

**Order Code: 723220**  
**SensoDirect Oxi200**  
 with batteries,  
 oxygen sensor (1.5 m cable),  
 electrolyte (KOH), 3 interchangeable  
 membrane heads, in case, manual,  
 warranty information

**Order Code: 723221**  
**SensoDirect Oxi200**  
 as above, but with  
 oxygen sensor 10 m cable

**Order Code: 723222**  
**SensoDirect Oxi200**  
 as above, but with  
 oxygen sensor 30 m cable

# SensoDirect 150

pH value

# Redox

## Oxygen (dissolved)

## Conductivity

TDS

## Temperature (°C/°F)



## All in one Hand-held Meter

## Highlights

- pH/Redox  
Conductivity  
Dissolved Oxygen etc.
- All in one
- Real time data logger
- Large digital display
- Protective casing
- RS 232 / USB

## Applications

- Drinking Water
- Cooling/Boiler Water
- Waste Water
- Pool Water
- Surface Water
- Water Treatment Companies
- Industrial and Governmental Laboratories

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.

## Accessories

| Code   | Article  |
|--------|--|
| 721330 | Spare electrode, (approx. 1 m cable), 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, (approx. 1 m cable), 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 computer  |
| 724510 | USB cable, for connection to a computer  |
| 724540 | Power supply   |
| 725050 | Case incl. foam  |
| 724520 | Data Retrieve Software<br>Software which enables the user to transmit data stored on the instrument to a computer                |
| 724530 | Data Logger / Acquisition Software<br>Software which enables the user to monitor and log data on a computer (online measurement) |

## SensoDirect 150

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

## pH/Redox

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

## Dissolved Oxygen

|                                  |   |
|----------------------------------|---|
| <b>Range</b>                     | Dissolved Oxygen<br>0 to 20.0 mg/l (liter)<br>Oxygen in Air<br>0 to 100.0 %<br>Temperature 0 to 50 °C |
| <b>Resolution</b>                | Dissolved Oxygen 0.1 mg/l<br>0.1 % O <sub>2</sub><br>Temperature 0.1 °C                               |
| <b>Accuracy</b><br>(23± 5 °C)    | Dissolved Oxygen ± 0.4 mg/l<br>Oxygen in Air ± 0.7% O <sub>2</sub><br>Temperature ± 0.8 °C / 1.5 °F   |
| <b>Salinity Correction</b>       | 0 to 39 % Salt  |
| <b>Air Pressure Compensation</b> | 0 to 8900 meter   |

## Conductivity/TDS

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

## Delivery Content

### Order Code: 724200

**SensoDirect 150 Set pH/Con/TDS/Oxi**  
instrument, batteries, pH electrode, temperature probe, conductivity probe, oxygen sensor, pH buffer set 4,00 / 7,00, electrolyte, membrane heads, instruction manual, warranty information, in case

### Order Code: 724210

**SensoDirect 150 Set pH / Con / TDS**  
instrument, batteries, pH electrode, temperature probe, conductivity probe, pH buffer set 4,00 / 7,00, instruction manual, warranty information, in case

### Order Code: 724220

**SensoDirect 150 Set pH / Oxi**  
instrument, batteries, pH electrode, temperature probe, oxygen sensor, pH buffer set 4,00 / 7,00, electrolyte, membrane heads, instruction manual, warranty information, in case

### Order Code: 724230

**SensoDirect 150 Set pH / Redox**  
instrument, batteries, pH electrode, temperature probe, redox electrode, pH buffer set 4,00 / 7,00, instruction manual, warranty information, in case



# SensoDirect 110



Determination of  
pH  
Conductivity  
Salinity

## Highlights

- High measuring accuracy
- Light weight
- Protective casing
- Large digital display
- "Low battery" indicator
- Two-Point Calibration

## Applications

- Drinking Water
- Cooling/Boiler Water
- Waste Water
- Pool Water
- Surface Water
- Water Treatment Companies
- Industrial and Governmental Laboratories



## 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

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



### Accessories SensoDirect pH110

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

### Delivery Content

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

## Con110

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

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

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

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



### Technical data Con110

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

### Accessories SensoDirect Con110

| Code   | Article   |
|--------|---|
| 722250 | Conductivity calibration solution, 1413 µS/cm, 500 ml |
| 722320 | Conductivity sensor                                   |

### Delivery Content

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

## Salt110



The portable 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

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

### Delivery Content

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

# SD Hand-held Meter (IP 67 waterproof)

NEW



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

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

Result | Temperature | Date & Time | 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 devices are equipped with replaceable electrodes to ensure long-life functionality in the field.

## Highlights

- Portable Hand-Held Meter
- 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
- With SD 50 pH:
- additionally: pH 4, 7, 10 buffer tablets (1 strip of 10 tablets each)



## Technical Specifications SD Hand-Held Meter

### SD 50 pH

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

### SD 80 TDS

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

### SD 60 ORP

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

### SD 90 Salt

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

### SD 70 Con

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

### Conversion table

- <sup>1)</sup> 0 - 20.00 mS/cm = 0 - 20,000 µS/cm  
<sup>2)</sup> 0 - 10.00 ppt TDS = 0 - 10,000 ppm TDS  
<sup>3)</sup> 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





# TURBIDITY



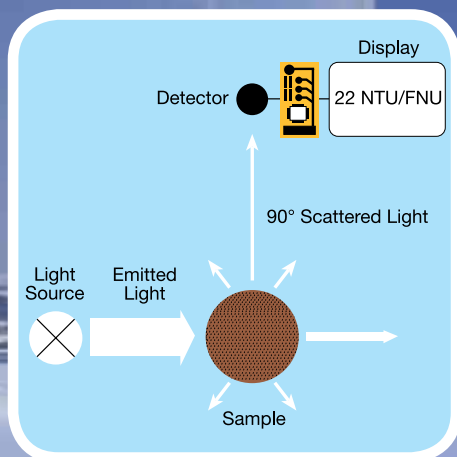
TB 300 IR



TB 210 IR



TB 250 WL



## Principle

### Turbidity measurement

The term "turbidity" is used to describe the cloudy or milky appearance of liquid or solid media such as water (drinking, mineral, bathing or waste water), beverages (beer, wine or soft drinks) or window glass (translucent glass).

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

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

In former days, researchers attempted to use visual systems as a means of turbidity measurement. "Jackson Turbidity Units" (JTU), for example, were based on a defined volume of dissolved silicic acid from diatomaceous earth in water. Turbidity was measured using a candle turbidity meter, apparatus comprising a candle and a glass vessel that permitted visual comparison of the suspension with the silicic acid solution.

Today, it is still common practice to test water samples using a white "sight disc" made of cast bronze; the disc is lowered into the water until it can no longer be seen. The turbidity is then calculated on the basis of immersion depth.

Today, 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.

Nowadays, the scattered light is generally measured at an angle of 90°. This measurement principle is known as nephelometry. A nephelometer is therefore a turbidity meter that measures scattered light at an angle of 90°. The results are shown in NTU (Nephelometric Turbidity Unit).

To obtain defined, reproducible results, turbidity meters are calibrated and adjusted using formazine solutions (reference standard).

These meters display their results in FNUs (Formazine Nephelometric Units).

The result measured by a meter operating on the transmitted light principle is shown in FAUs (Formazine Attenuation Units).

There are two standards for turbidity measurement that are widely accepted at an international level.

EN ISO 7027, "Water quality, determination of turbidity" outlines all the possible methods for turbidity measurement.

All optoelectronic methods require an infrared light source. This also permits testing of coloured samples.

In its method 180.1, "Determination of turbidity by nephelometry", the EPA in the US describes solely the nephelometric (scatter light) method using a so-called white light source (tungsten halogen lamp).

The results measured by different units using the two aforementioned methods cannot be compared.

# TB 300 IR with infra-red light source



## Highlights

- Meets EN ISO 7027
- Automatic overall range adjustment with Standard-Set T-Cal
- Autoranging
- High accuracy
- Laboratory and mobile use
- RS 232 interface
- Storage for up to 1000 data-sets
- Real-time clock
- Waterproof sample chamber and housing

Turbidity is measured according to EN ISO 7027 by nephelometric means (90° scattered light). The infra-red light-source permits measurement of coloured and colour-free samples.

The automatic measurement range detection facility (Autorange) enables direct turbidity measurement from 0.01 to 1100 NTU with an accuracy of  $\pm 2\%$  up to 500 NTU and  $\pm 3\%$  thereafter.

A large graphic display, a choice of several different languages and user-friendly operating instructions make the device extremely easy to use.

Software updates (for example: languages) can be downloaded free of charge from our website [www.lovibond.com](http://www.lovibond.com).



## Technical data

|                            |   |
|----------------------------|---|
| <b>Principle</b>           | nephelometric (90° scattered light)   |
| <b>Light source</b>        | IR-LED (860 nm)   |
| <b>Keypad</b>              | acid and solvent resistant; membrane keypad   |
| <b>Auto – Off</b>          | automatic switch off  |
| <b>Display</b>             | Graphic-Display   |
| <b>Update</b>              | Software update via Internet  |
| <b>Clock</b>               | real time clock   |
| <b>Memory</b>              | 1000 data sets  |
| <b>Sample vol.</b>         | approx. 12 ml   |
| <b>Range</b>               | 0.01 – 1100 NTU (Auto range)  |
| <b>Resolution (NTU)</b>    | 0.01 from 0.01 - 9.99<br>0.1 NTU from 10.0 - 99.9<br>1 NTU from 100 - 1100                                      |
| <b>Accuracy (NTU)</b>      | ± 2 % of reading or 0.01 (0 - 500) ± 5 % of reading (500 - 1100)  |
| <b>Ambient conditions</b>  | temperature: 5-40°C at 30-90% relative humidity (non condensing)  |
| <b>Interface</b>           | RS232 for printer and PC-connection   |
| <b>Power supply</b>        | 7 NiCd rechargeable batteries (Type AA) ; mains adapter (Input: 100-230V ; and lithium battery for data storage |
| <b>Weight (instrument)</b> | approx. 1000 g including batteries and power pack   |
| <b>Dimensions</b>          | 265 x 195 x 70 mm (L x W x H)   |
| <b>CE-Conformity</b>       |   |



## Accessories

|   |             |
|---|-------------|
| Set of 12 sample vials with black lid, height 55 mm, ø 24 mm    | 19 76 55    |
| Cleaning cloth for vials  | 19 76 35    |
| Rubber seal cap, black for interface and power plug-in          | 19 80 17 16 |
| Sample chamber lid, black                                       | 19 80 11 19 |
| Mains charger, 100-240 V, 50-60 Hz, with international adapters | 19 30 10    |
| Universal adapter for socket, international                     | 19 20 65    |
| Connection cable connection to PC, serial 9-pins                | 19 81 98    |
| Akku AA Mignon, 1100 mAh (7 pc.)                                | 19 50 02 0  |
| Lithium battery   | 19 50 01 7  |
| Formazin Stock Solution (4000 NTU), 100 ml                      | 19 41 41    |
| Formazin Stock Solution (4000 NTU), 250 ml                      | 19 41 42    |
| Set Turbidity Standards T-CAL (<0.1, 20, 200, 800 NTU)          | 19 41 50    |
| Paper printer DPN 2335  | 19 80 75    |
| Roll of paper for printer DPN 2335                              | 19 80 62    |
| Pack of accus for printer DPN 2335                              | 19 80 66    |
| Ribbon cartridge for printer DPN 2335                           | 19 80 67    |

## Delivery Content

- Instrument in carrying case
- 1 set of turbidity standards T-CAL
- 7 rechargeable batteries (AA)
- Mains charger, 100-240 V
- PC connection cable
- 4 vials (ø 24 mm) with lids
- Warranty information
- Certificate of Compliance
- Instruction Manual

Order code: 19 40 00

# TB 210 IR with infra-red light source (EN ISO 7027)



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

The wide measuring range from 0.01-1100 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.

The standards required for calibration of the unit are also supplied. A second adjustment mode allows alternative adjustment with user-defined turbidity standards.

## Accessories

| Article  | Code        |
|--|-------------|
| Turbidity standard set T-CAL (< 0.1, 20, 200, 800 NTU) | 19 41 50    |
| Set empty vials, 24 mm ø (12 pc.)                      | 19 76 55    |
| Cleaning cloth for vials                               | 19 76 35    |
| Sample chamber lid                                     | 19 80 11 00 |
| Battery, 9 V   | 19 50 012   |
| Formazin Stock Solution (4000 NTU), 100 ml             | 19 41 41    |
| Formazin Stock Solution (4000 NTU), 250 ml             | 19 41 42    |

## Technical data

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

## Highlights

- Range 0.01 - 1100 NTU
- Measurement with infrared light at an angle of 90°
- Measurement of coloured liquids
- Easy handling
- 600 tests without battery change

## Delivery Content

- Instrument in carrying case
- 4 turbidity standards (< 0,1, 20, 200 and 800 NTU)
- 9 V battery
- 3 vials (ø 24 mm) with lids
- Warranty information
- Certificate of Compliance
- Instruction Manual

Order code: 26 60 20

# TB 250 WL with white light source

## Technical data

|                           |   |
|---------------------------|---|
| <b>Display</b>            | large LCD display   |
| <b>Keypad</b>             | 5 key polycarbonate membrane, splash proof  |
| <b>Power supply</b>       | 4 AA Alkaline batteries for approx. 20 h continuous operation or 3500 tests               |
| <b>Range</b>              | 0.01 to 1100 NTU  |
| <b>Accuracy</b>           | ± 2% of value or 0.01 NTU (0-500 NTU)<br>± 3% of value (500-1100 NTU)                     |
| <b>Resolution</b>         | 0.01 NTU to 99.99 NTU<br>0.1 NTU from 100.0 to 999.9 NTU<br>1.0 NTU from 1000 to 1100 NTU |
| <b>Housing</b>            | ABS   |
| <b>Dimensions</b>         | 210 x 95 x 45 mm  |
| <b>Weight</b>             | approx. 0.45 kg (base unit)   |
| <b>Ambient conditions</b> | Temperature: 0 – 50 °C<br>rel. humidity: 0 – 90%  |
| <b>CE-Conformity</b>      |   |



## Accessories

Set of secondary standards  
0.02, 10, 1000 NTU  
**Order code: 19 42 80**

Set of 3 vials  
with black lids  
**Order code: 19 42 90**

The TB 250 WL allows easy turbidity measurement in either the field or in the laboratory. Using a „white light“ source and 90° detection, the TB 250 WL meets the specifications for EPA turbidity measurement (EPA Standard 180.1). A power efficient micro-circuit design allows the instrument to yield 5000 tests on 4-AA alkaline batteries with an estimated 7-10 year bulb life. Integrated diagnostics confirm proper operation and accuracy. The instrument features an Auto-Ranging feature that automatically selects the correct turbidity range for your sample. Calibration is simple with the included calibration standards. The instrument comes with all required items for testing including the TB 250 WL Turbidimeter, sample cuvettes, batteries, calibration set, operators manual and carrying case.

## Highlights

- Ideal for regulatory monitoring, process control or field use
- Simple operation
- Easy calibration
- Auto-Ranging
- Meets USEPA

## Delivery content

- Instrument in a sturdy handy case
  - 2 sample vials
  - 3 turbidity standards
  - 4 batteries
  - Instruction manual
  - Warranty information
- Order code: 19 42 00**

# Floc Testers



Floc testers with continuously variable stirring speed for laboratory and field use

## Highlights

- Continuously variable stirring speed
- Digital display
- Height adjustment of the stirring blades during operation
- Timer feature

## Applications

- Flocculant Manufacturer
- Waste Water Treatment Plants
- Laboratories
- Research Centres
- Universities



## ET 740 (laboratory)

|                               |  |
|-------------------------------|--|
| <b>Stirring places</b>        | four   |
| <b>Stirring speed control</b> | 10 - 300 revolutions per minute              |
| <b>Resolution</b>             | 1 revolution                                 |
| <b>Timer</b>                  | 1 - 999 minutes or 0 - 99 hours (continuous) |
| <b>Power supply</b>           | 100 – 240 V, 50 - 60 Hz                      |
| <b>Weight</b>                 | approx. 13 kg                                |
| <b>Dimensions (mm)</b>        | 645 L x 347 W x 260 H                        |
| <b>EC-conformity</b>          | CE   |
| <b>Order code</b>             | 2 41 91 55                                   |

## ET 750 ( laboratory)

|                               |  |
|-------------------------------|--|
| <b>Stirring places</b>        | six  |
| <b>Stirring speed control</b> | 10 - 300 revolutions per minute              |
| <b>Resolution</b>             | 1 revolution                                 |
| <b>Timer</b>                  | 1 - 999 minutes or 0 - 99 hours (continuous) |
| <b>Power supply</b>           | 100 – 240 V, 50 - 60 Hz                      |
| <b>Weight</b>                 | approx. 17 kg                                |
| <b>Dimensions (mm)</b>        | 935 L x 347 W x 260 H                        |
| <b>EC-conformity</b>          | CE   |
| <b>Order code</b>             | 2 41 91 60                                   |

## ET 730 (portable/field)

|                               |   |
|-------------------------------|---|
| <b>Stirring places</b>        | four  |
| <b>Stirring speed control</b> | 20 - 40 - 50 - 100 - 120 revolutions per minute |
| <b>Timer</b>                  | 1 - 30 minutes (continuous)                     |
| <b>Power supply</b>           | 100 – 240 V, 50 - 60 Hz                         |
| <b>Weight</b>                 | approx. 4.8 kg                                  |
| <b>Dimensions (mm)</b>        | 250 L x 320 W x 250 H                           |
| <b>EC-conformity</b>          | CE  |
| <b>Order code</b>             | 2 41 91 50                                      |

## Accessories

|   |          |
|---|----------|
| Measuring beaker, glass, low form, 1000 ml packaging unit 10 pieces | 41 91 65 |
| Measuring beaker, PP, low form, 1000 ml packaging unit 6 pieces     | 41 91 66 |
| Bag for transport of ET 730   | 41 91 51 |

Floc testers are designed for a range of applications – such as testing the efficiency of flocculation or precipitation agents.

The ET 740 model with 4 stirring places and the ET 750 model with 6 stirring places are fitted with an illuminated back panel for glare-free observation of the samples and are suitable for laboratory use.

The floc tester ET 730 with 4 stirring places is primarily designed for field use. The 4 stirring points are arranged in a circle around a lamp making it easier to observe the flocculation process.

State-of-the-art technology ensures maximum operating convenience and makes the unit maintenance-free. The main features of the laboratory floc testers are the continuously variable stirring speed, the digital display of stirring rpm, the timer function, the illuminated back panel, and the height adjustment option for the stirring blades during operation.

For model ET 730 beakers with 1000 ml volume, low form can be used.

For models ET 740 and ET 750 beakers with 1000 ml - 1500 ml volume, low or high form can be used.

The beakers are **not** included. Please contact your laboratory distributor.



# POOL PRODUCTS





Rapid Tests



PM Photometer



# Rapid Tests



Active Oxygen  
Biguanide (PHMB)  
Bromine  
Calcium Hardness  
Chloride  
Chlorine  
Copper

Cyanuric acid  
Hydrogen Peroxide  
pH-value  
QAC  
Sulphate  
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 Award

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

### Pooltester-Set

The 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     |
|--|----------|
| <b>Chlorine-pH<sup>1)</sup></b>            | 15 70 60 |
| Chlorine 0.1–3.0 mg/l / pH value 6.8–8.2   |          |
| <b>Bromine-pH<sup>1)</sup></b>             | 15 80 20 |
| Bromine 1–8 mg/l / pH value 6.8–8.2        |          |
| <b>Active Oxygen-pH<sup>1)</sup></b>       | 15 73 80 |
| Active Oxygen 0–10 mg/l / pH value 6.8–8.2 |          |

## THREE-CHAMBER-TESTER

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

<sup>1)</sup> in bubble pack ; <sup>2)</sup> in plastic case

## POOLTESTER

| Item  | Code     |
|---|----------|
| <b>Chlorine-pH LR</b>   | 15 16 00 |
| Chlorine 0.1–3.0 mg/l / pH value 6.8–8.2                                      |          |
| <b>Chlorine-pH HR</b>   | 15 16 01 |
| Chlorine 0.5–6.0 mg/l / pH value 6.8–8.2                                      |          |
| <b>Bromine-pH</b>   | 15 16 04 |
| Bromine 1.0–8.0 mg/l / pH value 6.8–8.2                                       |          |
| <b>Active Oxygen-pH</b>   | 15 16 05 |
| O <sub>2</sub> 0–10 mg/l / pH value 6.8–8.2                                   |          |
| <b>Copper LR/HR-pH</b>  | 15 51 90 |
| Copper LR 0.1–1.0 mg/l & HR 0.5–5.0 mg/l / pH value 6.8–8.2                   |          |
| <b>Active Oxygen-Copper-pH</b>  | 15 52 35 |
| O <sub>2</sub> 0–10 mg/l / Copper 0.1–1.0 mg/l / pH value 6.8–8.2             |          |
| <b>Biguanide (PHMB)-Hydrogen Peroxide (H<sub>2</sub>O<sub>2</sub>)-pH</b>     | 15 61 00 |
| PHMB 10–100 mg/l / H <sub>2</sub> O <sub>2</sub> 5–50 mg/l / pH value 6.8–8.2 |          |
| <b>Quaternary Ammonia Compounds (QAC)-pH</b>                                  | 15 10 40 |
| QAC 25–150 mg/l / pH value 6.8–8.2  |          |

### 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     |
|--|----------|
| <b>Chlorine / pH*</b><br>30 DPD No.1 / RAPID-tablets and<br>30 PHENOL RED / RAPID-tablets  | 51 58 84 |
| <b>Bromine / pH*</b><br>30 DPD No.1 / RAPID-tablets and<br>30 PHENOL RED / RAPID-tablets   | 51 58 68 |
| <b>Active Oxygen - pH*</b><br>30 DPD No.4 / RAPID-tablets and<br>30 PHENOL RED / RAPID-tablets   | 51 59 34 |
| <b>Active Oxygen - Copper - pH*</b><br>20 DPD No.4 / RAPID-tablets<br>20 COPPER No.1-tablets and<br>20 PHENOL RED / RAPID-tablets                        | 51 58 65 |
| <b>PHMB/H<sub>2</sub>O<sub>2</sub> - pH</b><br>20 PHMB-, 20 H <sub>2</sub> O <sub>2</sub> -,<br>20 ACIDIFYING PT- and<br>20 PHENOL RED / RAPID-tablets   | 51 58 70 |
| <b>PHMB - pH*</b><br>30 PHMB-tablets and<br>30 PHENOL RED / RAPID-tablets  | 51 61 55 |
| <b>QAC HR - pH*</b><br>20 QAC-, 20 ACIDIFYING GP- and<br>20 PHENOL RED / RAPID-tablets   | 51 58 69 |
| <b>Copper - pH*</b><br>30 COPPER No.1-tablets and<br>30 PHENOL RED / RAPID-tablets   | 51 57 78 |
| <b>Combi pack for<br/>Three-Chamber-Tester 4 in 1</b><br>20 DPD No.1/ RAPID-,<br>20 PHENOL RED / RAPID-,<br>20 ALK LR-<br>20 CyA-TEST-tablets            | 51 59 35 |
| <b>Combi pack for<br/>Three-Chamber-Tester 5 in 1</b><br>20 DPD No.1/ RAPID-,<br>20 PHENOL RED / RAPID-,<br>20 ALK LR-<br>20 CyA-TEST<br>20 CALC-tablets | 51 59 85 |

\* Each pack contains 12 units

## Reagents

| Item                         | Quantity                      | Code                                   |
|------------------------------|-------------------------------|--|
| <b>ACID DEMAND</b>           | 10 ml                         | 15 60 09                               |
| <b>ACIDIFYING GP</b>         | 100 pc.<br>250 pc.            | 51 54 80BT<br>51 54 81BT               |
| <b>ACIDIFYING PT</b>         | 100 pc.<br>250 pc.            | 51 54 90<br>51 54 91                   |
| <b>ALK LR</b>                | 100 pc.                       | 51 60 40                               |
| <b>CALC</b>                  | 100 pc.                       | 51 57 20                               |
| <b>COPPER No.1</b><br>★      | 100 pc.<br>250 pc.            | 51 35 50BT<br>51 35 51BT               |
| <b>CYANURIC ACID</b>         | 100 pc.<br>250 pc.            | 51 13 70BT<br>51 13 71BT               |
| <b>DPD No.1 / RAPID</b><br>★ | 100 pc.<br>250 pc.<br>500 pc. | 51 13 10BT<br>51 13 11BT<br>51 13 12BT |

| Item                         | Quantity                      | Code                                   |
|------------------------------|-------------------------------|--|
| <b>DPD No.3 / RAPID</b><br>★ | 100 pc.<br>250 pc.<br>500 pc. | 51 12 90BT<br>51 12 91BT<br>51 12 92BT |
| <b>DPD No.4 / RAPID</b><br>★ | 100 pc.<br>250 pc.<br>500 pc. | 51 15 70BT<br>51 15 71BT<br>51 15 72BT |
| <b>HYDROGENPEROXIDE HR</b>   | 100 pc.<br>250 pc.            | 51 59 40BT<br>51 59 41BT               |
| <b>PHENOL RED/RAPID</b>      | 100 pc.<br>250 pc.<br>500 pc. | 51 17 90BT<br>51 17 91BT<br>51 17 92BT |
| <b>PHMB</b>                  | 100 pc.<br>250 pc.            | 51 58 90<br>51 58 91                   |
| <b>QAC HR</b>                | 100 pc.<br>250 pc.            | 51 54 00<br>51 54 01                   |

★ 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](http://www.lovibond.com)



# PM 600 & PM 620 Pool Photometers

NEW

The ultimate range  
in Pool Photometers

For reliable  
pool relevant  
water analysis



## Highlights

- One unit – 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 reagents

\*) 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  
Cyanuric acid  
Hardness, total  
Hardness, calcium

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



## Photometers PM 600 / PM 620

The PM 600 / 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 anywhere.

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 (DPD) 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 78 onwards for reagents (order codes)



## Technical Data

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

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

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

\* tested with standard solutions

## 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 <sup>1)</sup>

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

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

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

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

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

## Verification Standard Kit

The verification standard kit for the PM 600 and PM 620 is designed to assure the user of the accuracy and the reliability of the results related to the integrated wave lengths.

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

Measurements are taken in mAbs.

**Verification Standard Kit** 21 56 80

## Delivery Content

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




























### PM 600



























- 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, cyanuric acid, alkalinity-M  
**Order code: 21 40 65**























# Applications of Lovibond® Reagents

| Parameter                        | Reagent  | Application   |  |
|----------------------------------|--|---|--|
| <b>Acid capacity Ks4.3</b>       | ALKA-M-PHOTOMETER  |    |  = Water                |
| <b>Acid concentration</b>        | ACID CONCENTRATION   |    |  = Waste Water          |
| <b>Alkalinity-M</b>              | ALKA-M-PHOTOMETER  |    |  = Seawater             |
| <b>Alkalinity-P</b>              | ALKA-P-PHOTOMETER  |    |  = Boiler Water related |
| <b>Aluminium</b>                 | ALUMINIUM No. 1<br>ALUMINIUM No. 2   |    |  = Pool Water related   |
| <b>Aluminium</b>                 | VARIO Aluminum ECR/F20<br>VARIO Aluminum Hexamine/F20<br>VARIO Aluminum Masking Reagent  |    | RT = Reagent Test<br>KT = Tube Test  |
| <b>Amine</b>                     | Amine  |    |  |
| <b>Ammonia vario</b>             | VARIO Ammonia Salicylate F10<br>VARIO Ammonia Cyanurate F10                              |    |  |
| <b>Ammonia</b>                   | AMMONIA No. 1<br>AMMONIA No. 2<br>Conditioning powder                                    | <br><br> |  |
| <b>Ammonia LR</b>                | VARIO Ammonia Salicylate F5<br>VARIO Ammonia Cyanurate F5<br>VARIO Am Diluent Reagent LR |   |  |
| <b>Ammonia HR</b>                | VARIO Ammonia Salicylate F5<br>VARIO Ammonia Cyanurate F5<br>VARIO Am Diluent Reagent HR |    |  |
| <b>Arsenic (III, IV)</b>         | Chemicals see manual   |    |  |
| <b>Boron</b>                     | BORON No. 1<br>BORON No. 2   |    |  |
| <b>Bromine</b>                   | DPD 1 Buffer solution<br>DPD 1 Reagent solution  |    |  |
| <b>Bromine</b>                   | DPD No. 1<br>DPD No. 1 HIGH CALCIUM  | <br>  |  |
| <b>Cadmium (Cd<sup>2+</sup>)</b> | Spectroquant® 1.14834.0001   |    |  |
| <b>Chloride</b>                  | CHLORIDE T1<br>CHLORIDE T2   |    |  |
| <b>Chloride</b>                  | RT (Chloride-51 / Chloride-52)   |    |  |
| <b>Chlorine</b>                  | DPD No. 1 RAPID<br>DPD No. 3 RAPID<br>DPD No. 4 RAPID                                    |    |  |

| Parameter                                   | Reagent   | Application   |   |
|---|---|---|---|
| Chlorine                                    | DPD No. 1   |    |  = Water<br> = Waste Water<br> = Seawater<br> = Boiler Water related<br> = Pool Water related<br>RT = Reagent Test<br>KT = Tube Test |
|   | DPD No. 3   |    |   |
|   | DPD No. 1 HIGH CALCIUM  |    |   |
| Chlorine                                    | DPD 1 Buffer solution<br>DPD 1 Reagent solution<br>DPD 3 Solution |    |   |
| Chlorine                                    | VARIO Chlorine FREE-DPD/F10<br>VARIO Chlorine TOTAL-DPD/F10       |    |   |
| Chlorine HR (KI)                            | ACIDIFYING GP<br>CHLORINE HR (KI)                                 |    |   |
| Chlorine dioxide                            | DPD No. 1<br>DPD No. 3<br>GLYCINE                                 |    |   |
| Chlorine dioxide                            | DPD 1 Buffer solution<br>DPD 1 Reagent solution                   |    |   |
| Chromium                                    | PERSULF. RGT FOR CR<br>Chromium Hexavalent                        |    |   |
| COD LR                                      | Reaction tube 0-150 mg/l  |    |   |
| COD MR                                      | Reaction tube 0-1500 mg/l   |   |   |
| COD HR                                      | Reaction tube 0-15000 mg/l  |  |   |
| Colour<br>(Spectral Absorption Coefficient) | ---   |  |   |
| Copper                                      | COPPER / ZINC LR  |  |   |
| Copper                                      | COPPER / ZINC HR  |  |   |
| Copper                                      | COPPER No. 1<br>COPPER No. 2                                      |  |   |
| Copper, free                                | VARIO Cu 1 F 10   |  |   |
| Cyanide                                     | Reagent test set, consists of:<br>Cyanide-11/ -12 / -13           |  |   |
| Cyanuric acid                               | CyA-TEST  |  |   |
| DEHA  | DEHA Solution<br>DEHA   |  |   |
| DEHA  | VARIO OXYSCAV 1 Rgt<br>VARIO DEHA 2 Rgt Solution                  |  |   |






# Applications of Lovibond® Reagents

























| Parameter                            | Reagent  | Application   |  |
|--------------------------------------|--|---|--|
| <b>Fluoride</b>                      | SPADNS-Reagent<br>Fluoride Standard                                  |    |  = Water                    |
| <b>Fluoride</b>                      | Fluoride A-Z<br>Fluoride Excess Al                                   |    |  = Waste Water              |
| <b>Formaldehyde</b>                  | Spectroquant® 1.14678.0001   |    |  = Seawater                 |
| <b>Formaldehyde</b>                  | Spectroquant® 1.14500.0001   |    |  (B) = Boiler Water related |
| <b>Hardness, Calcium</b>             | CALCHECK   |    |  (P) = Pool Water related   |
| <b>Hardness, total</b>               | HARDCHECK P  |    | RT = Reagent Test  |
| <b>Hardness, total</b>               | Hardness Yes/No  |    | KT = Tube Test   |
| <b>Hardness, total</b>               | T Hardness-Test  |    |  |
| <b>Hardness, total</b>               | Total Hardness   |  |  |
| <b>Hazen<br/>(Pt-Co-Scale; APHA)</b> | ---  |  |  |
| <b>Hydrazine</b>                     | Hydrazine Test Powder<br>Spoon                                       |  |  |
| <b>Hydrazine</b>                     | Vacu-vials® / Chemetrics K-5003                                      |  |  |
| <b>Hydrogen peroxide</b>             | HYDROGENPEROXIDE LR  |  |  |
| <b>Iodine</b>                        | DPD No. 1  |  |  |
| <b>Iron (II, III) soluble</b>        | Vario Ferro F10  |  |  |
| <b>Iron (II, III) soluble</b>        | IRON LR<br>IRON (II) LR  |  |  |
| <b>Iron</b>                          | IRON HR  |  |  |
| <b>Iron (TPTZ)</b>                   | Vario TPTZ F10   |  |  |
| <b>Lead (Pb<sup>2+</sup>)</b>        | Spectroquant® 1.09717.0001   |  |  |
| <b>Lead (Pb<sup>2+</sup>)</b>        | Spectroquant® 1.14833.0001   |  |  |
| <b>Manganese</b>                     | MANGANESE LR 1<br>MANGANESE LR 2                                     |  |  |
| <b>Manganese</b>                     | VARIO Ascorbic Acid<br>VARIO Alkaline-Cyanide<br>VARIO PAN Indicator |  |  |
| <b>Molybdate</b>                     | MOLYBDATE No. 1 HR<br>MOLYBDATE No. 2 HR                             |  |  |

| Parameter                 | Reagent   | Application   |  |
|---------------------------|---|---|--|
| <b>Nickel</b>             | RT (Nickel-51, Nickel-52)   |    |  = Water  |
| <b>Nitrate</b>            | KT (Nitrate-111)  |    |  = Waste Water  |
| <b>Nitrate</b>            | VARIO Nitrate Chromotropic<br>VARIO Nitra X Reagent tube<br>VARIO Deionised water   |    |  = Seawater   |
| <b>Nitrate</b>            | NITRITE LR<br>Nitrate Test Tablets<br>Nitrate Test Powder   |    |  = Boiler Water related<br> = Pool Water related |
| <b>Nitrate HR</b>         | Nitracheck No.1<br>Nitracheck No.2  |    | RT = Reagent Test<br>KT = Tube Test  |
| <b>Nitrite</b>            | KT (Nitrit-101)   |    |  |
| <b>Nitrite</b>            | NITRITE LR  |    |  |
| <b>Nitrite</b>            | Nitrite No.1<br>Nitrite No.2  |    |  |
| <b>Nitrogen-total</b>     | KT (Reagent for digestion,<br>Reagent for compensation, Nitrat-111)   |    |  |
| <b>Nitrogen, total LR</b> | VARIO TN HYDROX. LR tubes<br>VARIO PERSULFATE Reagent<br>VARIO TN Reagent A<br>VARIO TN Reagent B<br>VARIO TN ACID LR/HR tubes<br>VARIO Deionised water |  |  |
| <b>Nitrogen, total HR</b> | VARIO TN HYDROX HR tubes<br>VARIO PERSULFATE Reagent<br>VARIO TN Reagent A<br>VARIO TN Reagent B<br>VARIO TN ACID LR/HR tubes<br>VARIO Deionised water  |  |  |
| <b>Oxygen, active</b>     | DPD No. 4   |  |  |
| <b>Oxygen, active</b>     | INDIGO CARMINE  |  |  |
| <b>Oxygen, dissolved</b>  | Vacu-vials® / Chemetrics K-7553   |  |  |
| <b>Ozone</b>              | DPD No. 1<br>DPD No. 3<br>GLYCINE   |  |  |
| <b>Ozone</b>              | Ozone   |  |  |
| <b>Phenols</b>            | Phenole No. 1<br>Phenole No. 2  |  |  |



# Applications of Lovibond® Reagents

| Parameter                           | Reagent  | Application  |
|-------------------------------------|--|--|
| <b>PHMB (Biguanide)</b>             | PHMB PHOTOMETER  |  = Water                |
| <b>Phosphate-Organo</b>             | ORGANO-PHOSPHONATE No.1<br>ORGANO-PHOSPHONATE No.2   |  = Waste Water          |
| <b>Phosphate HR</b>                 | PHOSPHATE HR   |  = Seawater             |
| <b>Phosphate-total* (PMB)</b>       | KT (Phosphate-101, Phosphate-102, Phosphate-103)   |  = Boiler Water related |
| <b>Phosphate-total* (PMB)</b>       | KT (Phosphate-101, Phosphate-102, Phosphate-103)   |  = Pool Water related   |
| <b>Phosphate-ortho (VM)</b>         | KT   | RT = Reagent Test  |
| <b>Phosphate LR, ortho</b>          | PHOSPHATE LR No. 1<br>PHOSPHATE LR No. 2   | KT = Tube Test   |
| <b>Phosphate HR, ortho</b>          | PHOSPHATE HR No. 1<br>PHOSPHATE HR No. 2   |  |
| <b>Phosphate, ortho</b>             | VARIO Phos 3 F10   |  |
| <b>Phosphate, ortho</b>             | VARIO Dilution Vial<br>VARIO Phos 3 F10<br>VARIO Deionised water   |  |
| <b>Phosphate, acid hydrolyzable</b> | Content see: Phosphate, total, set, additional:<br>VARIO Natriumhydroxid 1,00 N  |  |
| <b>Phosphate, total</b>             | VARIO Acid Reagent Vial<br>VARIO Phos 3 F10<br>VARIO Potassium Persulfate<br>VARIO Natriumhydroxid 1,54 N<br>VARIO Deionised water |  |
| <b>pH value</b>                     | BROMOCRESOLPURPLE/PHOTOM.  |  |
| <b>pH value</b>                     | PHENOLRED RAPID  |  |
| <b>pH value</b>                     | PHENOLRED / PHOTOMETER   |  |
| <b>pH value</b>                     | PHENOLRED Solution   |  |
| <b>pH value</b>                     | THYMOLBLUE/PHOTOMETER  |  |
| <b>pH value</b>                     | METHYL RED   |  |
| <b>pH value</b>                     | CRESOL RED   |  |
| <b>pH value</b>                     | BROMOPHENOL BLUE   |  |
| <b>pH value</b>                     | BROMOCRESOL GREEN  |  |
| <b>pH value</b>                     | M-CRESOLPURPLE   |  |
| <b>pH value</b>                     | UNIVERSAL PH   |  |

| Parameter             | Reagent  | Application   |  |
|-----------------------|--|---|--|
| Potassium             | POTASSIUM T  |    |  = Water                |
| QAC                   | QAC Test   |    |  = Waste Water          |
| QAC LR                | QAC LR   |    |  = Seawater             |
| QAC HR                | QAC HR   |    |  = Boiler Water related |
| Silica                | SILICA No. 1<br>SILICA No.2<br>SILICA PR   |    |  = Pool Water related   |
| Silica                | VARIO LR Amino Acid F F10<br>VARIO Citric Acid F10<br>VARIO Molybdate 3 Rgt Solution       |    | RT = Reagent Test  |
| Silica                | VARIO Silica HR Acid Rgt F10<br>VARIO Silica Citric Acid F10<br>VARIO Silica Molybdate F10 |    | KT = Tube Test   |
| Sulphate              | SULFATE T  |    |  |
| Sulphate              | VARIO Sulpha 4 / F10   |    |  |
| Sulphate              | SULFATE No.1<br>SULFATE No.2   |   |  |
| Sulphide              | SULFIDE No. 1<br>SULFIDE No. 2   |  |  |
| Sulphite              | SULFITE LR   |  |  |
| Sulphite              | SULFITE No.1<br>SULFITE No.2 HR<br>SULFITE No.2 LR   |  |  |
| Surfactants (anionic) | Spectroquant® 1.14697.0001   |  |  |
| Tannin                | TANNIN No.1<br>TANNIN No.2   |  |  |
| TOC                   | Spectroquant® 1.14879.0001   |  |  |
| Turbidity             | ---  |  |  |
| Urea                  | UREA-Reagent 1<br>UREA-Reagent 2<br>AMMONIA No. 1<br>AMMONIA No. 2                         |  |  |
| Zinc                  | COPPER / ZINC LR<br>EDTA<br>DECHLOR  |  |  |

# Index

- A**
  - Acid Demand**
    - THREE-CHAMBER-Tester 140
  - Alkalinity-M**
    - Comparator 2000+ 26
    - MD 100 54
    - MD 200 58
    - MD 600 64
    - MINIKIT 10
    - MultiDirect 68
    - PM 600 142
    - PM 620 142
    - Rapid Tests 138
    - SpectroDirect 72
  - Alkalinity-P**
    - MD 600 64
    - MINIKIT 10
    - MultiDirect 68
    - SpectroDirect 72
  - Aluminium**
    - CHECKIT®Comparator 12
    - Comparator 2000+ 26
    - MD 100 54
    - MD 600 64
    - MultiDirect 68
    - PM 620 142
    - SpectroDirect 72
    - VARIO Powder Packs 102
  - Amine**
    - Comparator 2000+ 26
  - Ammonia**
    - CHECKIT®Comparator 12
    - Comparator 2000+ 26
    - MD 100 54
    - MD 600 64
    - MultiDirect 68
    - PM 620 142
    - SpectroDirect 72
    - VARIO Powder Packs 102
  - Ammonia, free**
    - MD 100 54
    - MD 600 64
    - MultiDirect 68
    - SpectroDirect 72
    - VARIO Powder Packs 102
  - Arsenic**
    - SpectroDirect 72
  - Arsenic Test Kit 11**
- B**
  - Biguanide (PHMB)**
    - POOLTESTER 140
    - THREE-CHAMBER-Tester 140
  - BOD 108**
  - BOD OxiDirect 108**
  - Boron**
    - MD 600 64
    - MultiDirect 68
    - SpectroDirect 72
  - Bromine**
    - CHECKIT®Comparator 12
    - Comparator 2000+ 26
    - MD 100 54
    - MD 200 58
    - MD 600 64
    - MINITESTER 140
    - MultiDirect 68
    - PM 600 142
    - PM 620 142
    - POOLTESTER 140
    - Rapid Tests 138
    - SpectroDirect 72
    - THREE-CHAMBER-Tester 140
    - VARIO Powder Packs 102
- C**
  - Cadmium**
    - SpectroDirect 72
  - Calcium Hardness**
    - CHECKIT®Comparator 12
    - MD 100 54
    - MD 200 58
    - MD 600 64
    - MINIKIT 10
    - MultiDirect 68
    - PM 600 142
    - PM 620 142
    - Rapid Tests 138
    - THREE-CHAMBER-Tester 140
  - CHECKIT®Comparator 12**
  - Chloride**
    - Comparator 2000+ 26
    - MD 100 54
    - MD 600 64
    - MINIKIT 10
    - MultiDirect 68
    - Rapid Tests 138
    - SpectroDirect 72
  - Chlorine**
    - CHECKIT®Comparator 12
    - Comparator 2000+ 26
    - MD 100 54
    - MD 200 58
    - MD 600 64
    - MINITESTER 140
    - MultiDirect 68
    - PM 600 142
    - PM 620 142
    - POOLTESTER 140
    - Rapid Tests 138
    - SpectroDirect 72
    - THREE-CHAMBER-Tester 140
    - VARIO Powder Packs 102

- Chlorine Dioxide**
  - CHECKIT®Comparator 12
  - Comparator 2000+ 26
  - MD 100 54
  - MD 200 58
  - MD 600 64
  - MultiDirect 68
  - PM 620 142
  - SpectroDirect 72
  - VARIO Powder Packs 102
- Chromium**
  - Comparator 2000+ 26
  - MD 600 64
  - SpectroDirect 72
- COD**
  - MD 100 62
  - MD 200 62
  - MD 600 64
  - MultiDirect 68
  - SpectroDirect 72
  - VARIO Powder Packs 102
- COD Setups**
  - COD Setup MD 100 COD VARIO 62
  - COD Setup MD 200 COD VARIO 62
- Comparator 2000+ 26**
- Conductivity**
  - SD 70 126
  - SD 320 Con 116
  - SensoDirect 110 124
  - SensoDirect 150 122
- Copper**
  - CHECKIT®Comparator 12
  - Comparator 2000+ 26
  - MD 100 54
  - MD 200 58
  - MD 600 64
  - MultiDirect 68
  - PM 600 142
  - PM 620 142
  - POOLTESTER 140
  - Rapid Tests 138
  - SpectroDirect 72
  - VARIO Powder Packs 102
- Cyanide**
  - Comparator 2000+ 26
  - MD 600 64
  - MultiDirect 68
  - SpectroDirect 72
- Cyanuric Acid**
  - CHECKIT®Comparator 12
  - Comparator 2000+ 26
  - MD 100 54
  - MD 200 58
  - MD 600 64
  - MINIKIT 10
  - MultiDirect 68
  - PM 600 142
  - PM 620 142
  - SpectroDirect 72
  - THREE-CHAMBER-Tester 140

## D

### DEHA

CHECKIT®Comparator 12  
Comparator 2000+ 26  
MD 100 54  
MD 600 64  
MultiDirect 68  
SpectroDirect 72  
VARIO Powder Packs 102

### DPD Reagents 76

## F

### Fluoride

CHECKIT®Comparator 12  
Comparator 2000+ 26  
MD 100 54  
MD 600 64  
MultiDirect 68  
SpectroDirect 72

### Formaldehyde

SpectroDirect 72

## H

### Hand-Held Meters

MicroDirect 126  
SD 300 pH 116  
SD 320 Con 116  
SD series 126  
SensoDirect 110 124  
SensoDirect 150 122  
SensoDirect Oxi200 120

### Hazen

Comparator 2000+ 26  
MD 100 54  
MD 600 64  
MultiDirect 68  
SpectroDirect 72

### Hydrazine

Comparator 2000+ 26  
MD 100 54  
MD 600 64  
MultiDirect 68  
SpectroDirect 72  
VARIO Powder Packs 104

### Hydrogen Peroxide

Comparator 2000+ 26  
MD 100 54  
MD 600 64  
MultiDirect 68  
PM 620 142  
POOLTESTER 140  
Rapid Tests 138  
SpectroDirect 72

## I

### Indicator Systems 76

### Iodine

Comparator 2000+ 26  
MD 600 64  
MultiDirect 68  
PM 620 142  
SpectroDirect 72

### IRIM 65

## Iron

CHECKIT®Comparator 12  
Comparator 2000+ 26  
MD 100 54  
MD 200 58  
MD 600 64  
MultiDirect 68  
PM 600 142  
PM 620 142  
SpectroDirect 72  
VARIO Powder Packs 104

## L

### Langelier Water Balance

MD 600 64  
MultiDirect 68  
PM 620 142

### Lead

SpectroDirect 72

### Liquid Reagents 76

## M

### Manganese

CHECKIT®Comparator 12  
Comparator 2000+ 26  
MD 100 54  
MD 600 64  
MultiDirect 68  
SpectroDirect 72  
VARIO Powder Packs 104

### MD 100 54

### MD 200 58

### MD 600 64

### Membrane Filter Set 77

### MINIKIT 10

### MINITESTER 140

### Molybdate / Molybdenum

CHECKIT®Comparator 12  
Comparator 2000+ 26  
MD 100 54  
MD 600 64  
MultiDirect 68  
SpectroDirect 72  
VARIO Powder Packs 104

### Monochloramine

MD 100 54  
MD 600 64  
MultiDirect 68  
VARIO Powder Packs 104

### MultiDirect 68

## N

### Nessleriser 29

### Nickel

Comparator 2000+ 26  
MD 600 64  
MultiDirect 68  
SpectroDirect 72

## Nitrate

CHECKIT®Comparator 12  
Comparator 2000+ 26  
MD 600 64  
MultiDirect 68  
SpectroDirect 72  
VARIO Powder Packs 104

## Nitrite

CHECKIT®Comparator 12  
Comparator 2000+ 26  
MD 600 64  
MINIKIT 10  
MultiDirect 68  
SpectroDirect 72  
VARIO Powder Packs 106

## Nitrogen

MD 600 64  
MultiDirect 68  
SpectroDirect 72  
VARIO Powder Packs 104

## O

### Organo-Phosphonate

MINIKIT 10

### ORP

SD 60 126  
SensoDirect 150 122

### Oxygen

Comparator 2000+ 26

### Oxygen, active

MD 600 64  
MINITESTER 140  
MultiDirect 68  
PM 620 142  
POOLTESTER 140  
Rapid Tests 138

### Oxygen, dissolved

MD 100 54  
MD 600 64  
MultiDirect 68  
SensoDirect 150 122  
SensoDirect Oxi200 120

### Ozone

CHECKIT®Comparator 12  
Comparator 2000+ 26  
MD 100 54  
MD 600 64  
MultiDirect 68  
PM 600 142  
PM 620 142  
SpectroDirect 72

## P

PD 250 100

### Permanganate

Comparator 2000+ 26

### Phenols

SpectroDirect 72

### PHMB (Biguanide)

MD 600 64

MultiDirect 68

PM 620 142

Rapid Tests 138

### Phosphate

CHECKIT®Comparator 12

Comparator 2000+ 26

MD 100 54

MD 600 64

MultiDirect 68

PM 600 142

PM 620 142

SpectroDirect 72

VARIO Powder Packs 106

### Phosphonates

MD 600 64

MultiDirect 68

SpectroDirect 72

VARIO Powder Packs 106

### Photometer

PM 600 142

### Photometers

MD 100 54

MD 200 58

MD 600 64

MultiDirect 68

PM 620 142

SpectroDirect 72

### Photometry 52

### pH Value

CHECKIT®Comparator 12

Comparator 2000+ 26

MD 100 54

MD 200 58

MD 600 64

MINITESTER 140

MultiDirect 68

PM 600 142

PM 620 142

POOLTESTER 140

Rapid Tests 138

SD 50 126

SD 300 pH 116

SensoDirect 110 124

SensoDirect 150 122

SpectroDirect 72

THREE-CHAMBER-Tester 140

PM 600 142

PM 620 142

### Polyacrylates

MD 100 54

MD 600 64

Pool & Spa Products 138

### POOLTESTER 140

### Potassium

MD 600 64

MultiDirect 68

SpectroDirect 72

Powder Dispenser PD 250 100

Powder Pack 77

## Q

### QAC

Comparator 2000+ 26

MINIKIT 10

POOLTESTER 140

Rapid Tests 138

## R

Rapid Tests 138

RD 125 63

Reagents 76

### Redox

SD 60 126

SD 300 pH 116

SensoDirect 150 122

### Reference Standard Kit

MD 100 57

MD 200 61

PM 600 142

PM 620 143

## S

### Salinity

SD 90 126

SD 320 Con 116

SensoDirect 110 124

### Sample Preparation 77

SD 50 pH 126

SD 60 ORP/Redox 126

SD 70 Con 126

SD 80 TDS 126

SD 90 Salt 126

SD 300 pH 116

SD 320 Con 116

SD series 126

SensoDirect 110 124

SensoDirect 150 122

SensoDirect Oxi200 120

### Silica

CHECKIT®Comparator 12

Comparator 2000+ 26

MD 100 54

MD 600 64

MultiDirect 68

SpectroDirect 72

VARIO Powder Packs 106

### Sodium Hypochlorite

CHECKIT®Comparator 12

Comparator 2000+ 26

MD 600 64

MultiDirect 68

PM 600 142

PM 620 142

Spark-free cabinets - EX series 114

### Spectral Absorption-Coefficient

SpectroDirect 72

SpectroDirect 72

Spectrophotometer 72

### Sugar

Comparator 2000+ 26

### Sulphate

Comparator 2000+ 26

MD 100 54

MD 600 64

MINIKIT 10

MultiDirect 68

PM 620 142

Rapid Tests 138

SpectroDirect 72

VARIO Powder Packs 106

### Sulphide

Comparator 2000+ 26

MD 600 64

MultiDirect 68

SpectroDirect 72

### Sulphite

CHECKIT®Comparator 12

MD 600 64

MINIKIT 10

MultiDirect 68

SpectroDirect 72

### Surfactants (anionic)

SpectroDirect 72

### Suspended Solids

MD 100 54

MD 600 64

MultiDirect 68

SpectroDirect 72

## T

Tablet Reagents 76

### Tannin

MINIKIT 10

TB 210 IR 132

TB 250 WL 133

TB 300 IR 130

### TDS

SD 80 126

SD 320 Con 116

SensoDirect 150 122

### Temperature

SD 300 pH 116

SD 320 Con 116

SD Hand-held Meters 126

SensoDirect 150 122

SensoDirect Oxi200 120



**Thermoreactor** 63

**Thermostatically controlled incubators - TC series** 112

**THREE-CHAMBER-Tester** 140

Stabilizer 140

**TOC**

SpectroDirect 72

**Total Alkalinity**

CHECKIT®Comparator 12

**Total Hardness**

Comparator 2000+ 26

MD 100 54

MD 600 64

MINIKIT 10

MultiDirect 68

PM 620 142

Rapid Tests 138

SpectroDirect 72

**Total Nitrogen**

SpectroDirect 72

**Triazoles**

MD 100 54

MD 600 64

**Tube Tests** 76

**Turbidity**

MD 600 64

MultiDirect 68

SpectroDirect 72

TB 210 IR 132

TB250 WL 133

TB 300 IR 130

**Turbidity meters** 128

## U

**Urea**

MD 100 54

MD 200 58

MD 600 64

MultiDirect 68

PM 620 142

SpectroDirect 72

## V

**VARIO Powder Packs** 76

**VARIO Reagents** 102

**Verification Standard Kit**

MD 100 57

MD 200 61

MD 600 66

MultiDirect 71

PM 600 142

PM 620 143

## W

**Waste Water Set-Up MD 600** 63

**Waste Water Set-Ups** 63

**Waste Water Set-Up SpectroDirect** 63

## Z

**Zinc**

CHECKIT®Comparator 12

Comparator 2000+ 26

MD 100 54

MD 600 64

MultiDirect 68

SpectroDirect 72