

# Reagents

## History

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

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

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

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

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

## Tablets

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

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

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

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

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

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

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

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

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

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

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

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

## Specification and Certificate of Analysis

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

## Liquids

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

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



## VARIO Powder Packs

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

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

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

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

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

## Membrane filter set

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

### Advantage

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

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

**Order code:** 36 61 50

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

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

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



# Reagents

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

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

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

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

<sup>f)</sup> additionally required for determination of chlorine dioxide / 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

# including stirring rod

# Reagents

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

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

a) determination of free, combined and total

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

f) additionally required for determination of chlorine dioxide / ozone in the presence of chlorine

g) Reagent recovers most insoluble iron oxides without digestion

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

i) high range by dilution

# including stirring rod

# Reagents

Test	Range	Wavelength $\lambda$ / nm				Method	Cuvette
		MD 100	MD 200	PM 600	PM 620		
<b>Ozone</b> Tablets	0.02 - 2 mg/l	-	-	530	530	DPD/Glycine <sup>5</sup>	24 mm $\emptyset$
<b>PHMB</b> (Biguanide) Tablets	2 - 60 mg/l	-	-	-	560	Buffer/Indicator	24 mm $\emptyset$
<b>Phosphate LR</b> , ortho Tablets	0.05 - 4 mg/l	-	-	-	610	Phosphomolybdic acid/ Ascorbic acid <sup>2</sup>	24 mm $\emptyset$
<b>pH value</b> Tablets	5.2 - 6.8	-	-	-	560	Bromcresol purple <sup>5</sup>	24 mm $\emptyset$
<b>pH value</b> Tablets	6.5 - 8.4	560	560	560	560	Phenol red <sup>5</sup>	24 mm $\emptyset$
<b>pH value</b> Tablets	6.5 - 8.4	560	560	-	560	Phenol red <sup>5</sup>	24 mm $\emptyset$
<b>pH value</b> Tablets	8.0 - 9.6	-	-	-	560	Thymol blue <sup>5</sup>	24 mm $\emptyset$
<b>Sodiumhypochlorite</b> Tablets	0.2 - 16 %	-	-	530	530	Potassium iodide <sup>5</sup>	24 mm $\emptyset$
<b>Stablizer</b> Tablets	0 - 160 mg/l <sup>1)</sup>	530	530	530	530	Melamine	24 mm $\emptyset$
<b>Sulphate VARIO</b> Powder reagent	5 - 100 mg/l	-	-	-	530	Bariumsulphate Turbidity <sup>2</sup>	24 mm $\emptyset$
<b>Sulphate</b> Tablets	5 - 100 mg/l	-	-	-	530	Bariumsulphate Turbidity <sup>2</sup>	24 mm $\emptyset$
<b>Urea</b> Tablets / Liquid reagent	0.1 - 2.5 mg/l 0.2 - 5 mg/l <sup>1)</sup>	-	610 610	-	610 -	Urease / Indophenol	24 mm $\emptyset$

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

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

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

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

<sup>f)</sup> additionally required for determination of chlorine dioxide / 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

# including stirring rod