

Lovibond® Water Testing

Tintometer® Group



Photometer-System MD100



Chlorid • Chloride • Chlorure • Cloruro • Cloreto



Instruction Manual

Page 18–31

www.lovibond.com

CE-Konformitätserklärung / Declaration of CE-Conformity Déclaration de conformité CE / Dichiarazione di conformità CE / CE-Declaración de conformidad

Hersteller / manufacturer / fabricant / produttore / fabricante:
Tintometer GmbH / Schleefstraße 8-12 / 44287 Dortmund / Deutschland

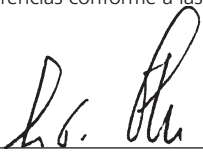
Produktname / Product name / Nom du fabricant / Nome del prodotto / Nombre del
producer: **MD 100**

- (DE)** EG-Konformitätserklärung gemäß RICHTLINIE **2004/108/EG** DES EUROPÄISCHEN PARLAMENTS UND DES RATES vom 15. Dezember 2004 und RICHTLINIE **2011/65/EU** DES EUROPÄISCHEN PARLAMENTS UND DES RATES vom 8. Juni 2011. Der Hersteller erklärt, dass dieses Produkt die Anforderungen der folgenden Produktfamiliennorm erfüllt:
- (GB)** Declaration of EC-Conformity according to DIRECTIVE **2004/108/EC** OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 2004, December the 15th and DIRECTIVE **2011/65/EU** OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 2011, June the 8th. The manufacturer declares that this product meets the requirements of the following product family standard:
- (FR)** Déclaration de conformité CE conformément à la DIRECTIVE **2004/108/CE** DU PARLEMENT EUROPÉEN ET DU CONSEIL du 15 décembre 2004 et DIRECTIVE **2011/65/UE** DU PARLEMENT EUROPÉEN ET DU CONSEIL du 8 juin 2011. La fabricant déclare que le produit est conforme aux exigences de la norme de famille de produits suivante :
- (IT)** Dichiarazione di conformità CE in conformità alla DIRETTIVA **2004/108/CE** DEL PARLAMENTO EUROPEO E DEL CONSIGLIO del 15 dicembre 2004 e DIRETTIVA **2011/65/UE** DEL PARLAMENTO EUROPEO E DEL CONSIGLIO del 8 Giugno 2011. Il produttore dichiara che il seguente prodotto soddisfa i requisiti della seguente norma per famiglia di prodotti:
- (ES)** CE - Declaración de conformidad conforme a la NORMA **2004/108/CE** DEL PARLAMENTO Y DEL CONSEJO EUROPEO del 15 de diciembre de 2004 y NORMA **2011/65/UE** DEL PARLAMENTO Y DEL CONSEJO EUROPEO del 8 de junio de 2011. El fabricante declara, que este producto cumple con las exigencias de la siguiente norma correspondiente a la familia de productos:

DIN EN 61326-1:2006

- (DE)** Gemäß den grundlegenden Prüfanforderungen für die Störfestigkeit (Tabelle 1) / Störaussendungen gemäß den Anforderungen für Geräte der Klasse B
- (GB)** Basic immunity test requirements (Table1) / Emission according to the requirements for class B equipment
- (FR)** Conformément aux exigences fondamentales relatives aux essais d'immunité (tableau 1) / Émissions parasites conformément aux exigences applicables aux appareils de la classe B
- (IT)** Conforme ai requisiti relativi al test di resistenza alle interferenze (Tabella 1) / Emissione in conformità ai requisiti per i dispositivi della classe B
- (ES)** De acuerdo a los requisitos básicos de verificación para la resistencia a interferencias (tabla 1) / Emisión de interferencias conforme a las exigencias para aparatos de clase B

Dortmund, 07.10.2014


Cay-Peter Voss, Managing Director

GB Important Information



The accuracy of the instrument is only valid if the instrument is used in an environment with controlled electromagnetic disturbances according to DIN 61326. Wireless devices, e.g. wireless phones, must not be used near the instrument.

Important disposal instructions for batteries and accumulators

EC Guideline 2006/66/EC requires users to return all used and worn-out batteries and accumulators. They must not be disposed of in normal domestic waste. Because our products include batteries and accumulators in the delivery package our advice is as follows :

Used batteries and accumulators are not items of domestic waste. They must be disposed of in a proper manner. Your local authority may have a disposal facility; alternatively you can hand them in at any shop selling batteries and accumulators. You can also return them to the company which supplied them to you; the company is obliged to accept them.



Important Information To Preserve, Protect and Improve the Quality of the Environment Disposal of Electrical Equipment in the European Union

Because of the European Directive 2012/19/EU your electrical instrument must not be disposed of with normal household waste!

Tintometer GmbH will dispose of your electrical instrument in a professional and environmentally responsible manner. This service, **excluding the cost of transportation** is free of charge. This service only applies to electrical instruments purchased after 13th August 2005. Send your electrical Tintometer instruments for disposal freight prepaid to your supplier.



• General notes	20
Guidelines for photometric measurements	20
Method notes	20
Replacement of batteries	21
• Functional description	22
Operation	22
Display backlight	23
Recall of stored data	23
Countdown	23
• Methods	24
Chloride 0.5- 25 mg/l with tablet	24
Chloride 5- 250 mg/l with tablet	25
• Menu options	26
Menu selections	26
Recall of stored data	26
Transmitting stored data	26
Setting date and time	27
• Calibration Mode	27
User calibration	27
Factory calibration reset	29
• Technical data	30
Operating messages	31
Error codes	31

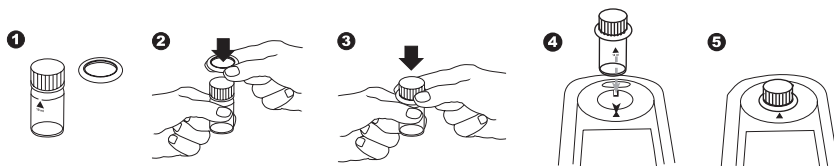
Guidelines for photometric measurements

1. Vials, caps and stirring rods should be cleaned thoroughly **after each analysis** to prevent interference. Even minor reagent residues can cause errors in the test result.
2. The outside of the vial must be clean and dry before starting the analysis. Clean the outside of the vials with a towel to remove fingerprints or other marks.
3. Zero calibration and test must be carried out with the same vial as there may be slight differences in optical performance between vials.
4. The vials must be positioned in the sample chamber for zeroing and test with the Δ mark on the vial aligned with the ∇ mark on the instrument.
5. Always perform zeroing and test with the vial cap tightly closed. Only use the cap with a sealing ring.
6. Bubbles on the inside wall of the vial lead to incorrect measurements. To prevent this, remove the bubbles by swirling the vial before performing the test.
7. Avoid spillage of water into the sample chamber because this can lead to incorrect test results.
8. Contamination of the transparent cell chamber can result in wrong readings. Check at regular intervals and – if necessary – clean the transparent cell chamber using a moist cloth or cotton buds.
9. Large temperature differences between the instrument and the environment can lead to errors – e.g. due to the formation of condensation in the cell chamber or on the vial.
10. To avoid errors caused by stray light do not use the instrument in bright sunlight.
11. Always add the reagent tablets to the water sample straight from the foil without touching them with the fingers.
12. The reagents must be added in the correct sequence.

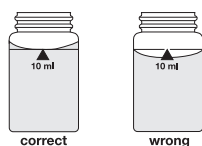
Method notes

- Prior to measurement ensure that the sample is suitable for analysis (no major interferences) and does not require any preparation i.e. pH adjustment, filtration etc.
- Different Refill Packs available on request.
- Reagents are designed for use in chemical analysis only and should be kept well out of the reach of children.
- Ensure proper disposal of reagent solutions.
- Material Safety Data Sheets are available on request (Internet: www.lovibond.com)

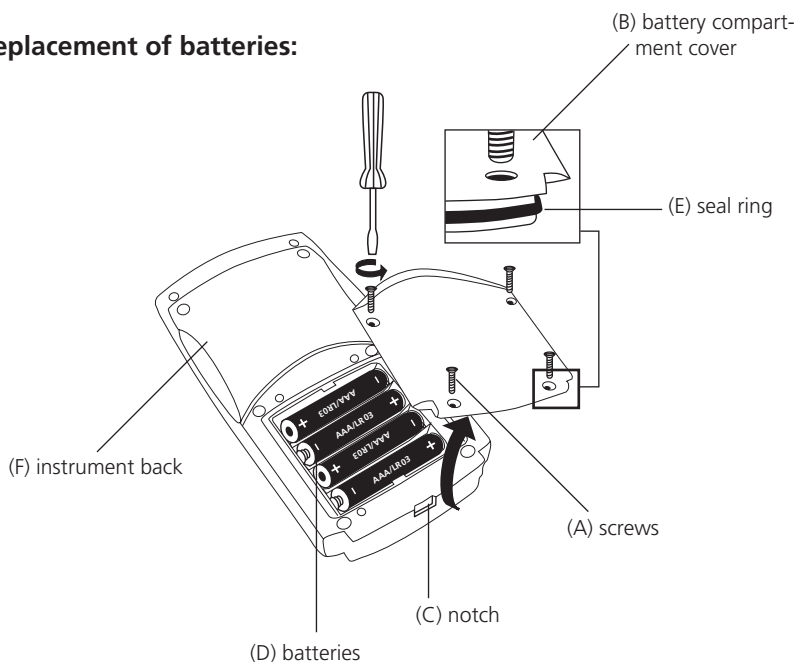
Correct position of the vial (Ø 24 mm):



Correct filling of the vial:



Replacement of batteries:



CAUTION:

To ensure that the instrument is water proof:

- seal ring (E) must be in position
- battery compartment cover (B) must be fixed with the four screws

If the batteries are removed for more than one minute the date and time menu starts automatically when the photometer is switched on the next time.

Operation



METHOD



Switch the unit on using the [ON/OFF] key.

The display shows the following:

Select the required test using the [MODE] key.

Scroll Memory (SM)

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

METHOD

The display shows the following:

Fill a clean vial with the water sample up to the 10 ml mark, screw the cap on and place the vial in the sample chamber making sure that the Σ marks are aligned.

Press the [ZERO/TEST] key.

The "Method" symbol flashes for approx. 8 seconds.

The display shows the following:

After zero calibration is completed, remove the vial from the sample chamber. The characteristic coloration appears after the addition of the reagents.

Replace the cap on the vial and place in the sample chamber making sure that the Σ marks are aligned.

Press the [ZERO/TEST] key.

(For Countdown/reaction period see page 23)

The "Method" symbol flashes for approx. 3 seconds.

The result appears in the display.

The result is saved automatically.



METHOD

RESULT

Repeating the test:

Press the [ZERO/TEST] key again.

Repeating the zero:

Press the [ZERO/TEST] key for 2 seconds.



Display backlight



Press the [!] key to turn the display backlight on or off. The backlight is switched off automatically during the measurement.

Recall of stored data



If the instrument is switched on, press the [!] key for more than 4 seconds, then release the [!] key to access the recall menu.

Countdown / reaction period

If a reaction period is included in a method a countdown function can be used:



Press the [!] key and hold.

Press the [ZERO/TEST] key.



Release the [!] key; the countdown starts.

After the countdown is finished the measurement starts automatically.

It is possible to interrupt the countdown by pressing the [ZERO/TEST] key. Measurement starts immediately.

Caution:

An incomplete reaction period can lead to incorrect test results.

CL⁻ 1

Chloride with Tablet

0.5 – 25 mg/l

0.0.0

Fill a clean vial (24 mm Ø) with **10 ml of the water sample** and perform zero calibration (see "Operation").

Add **one CHLORIDE T1 tablet** straight from the foil to the water sample, crush the tablet using a clean stirring rod and dissolve the tablet completely.

Add **one CHLORIDE T2 tablet** straight from the foil to the same water sample and crush the tablet using a clean stirring rod.

Close the vial tightly with the cap and swirl gently several times until the tablet is dissolved (note 1).

Place the vial in the sample chamber making sure that the Σ marks are aligned.



Wait for a reaction period of 2 minutes.

(Countdown can be activated, see page 23)

CL⁻ 1

The "Method" symbol flashes for approx. 3 seconds.

RESULT

The result is shown in the display in mg/l Chlorid.

Tolerances: $\pm 2.5 \text{ mg/l Cl}^-$

Notes:

1. Ensure that all particles of the tablet are dissolved – Chloride causes an extremely fine distributed turbidity with a milky appearance.
Heavy shaking leads to bigger sized particles which can cause false readings.
2. High concentrations of electrolytes and organic compounds have different effects on the precipitation reaction.
3. Ions which also form deposits with Silver nitrate in acidic media, such as Bromides, Iodides and Thiocyanates, interfere with the analysis.
4. Highly alkaline water should - if necessary - be neutralised using Nitric acid before analysis.

Reagent	Form of reagent/Quantity	Order-No.
Set CHLORIDE T1 / T2	Tablet / per 100 inclusive stirring rod	517741BT
CHLORIDE T1	Tablet / 100	515910BT
CHLORIDE T2	Tablet / 100	515920BT

CL⁻ 2**Chloride with Tablet
5 – 250 mg/l**

Fill a clean vial (24 mm Ø) with **1 ml of the water sample** and fill the vial to the 10 ml mark with **deionised water**. Close the vial tightly with the cap.

Place the vial in the sample chamber making sure that the Σ marks are aligned.

Press the [ZERO/TEST] key.

The "Method" symbol flashes for approx. 8 seconds.

The display shows:

Add **one CHLORIDE T1 tablet** straight from the foil to the prepared water sample, crush the tablet using a clean stirring rod and dissolve the tablet completely.

Add **one CHLORIDE T2 tablet** straight from the foil to the same water sample and crush the tablet using a clean stirring rod.

Close the vial tightly with the cap and swirl gently several times until the tablet is dissolved (note 1).

Place the vial in the sample chamber making sure that the Σ marks are aligned.

Wait for a reaction period of 2 minutes.

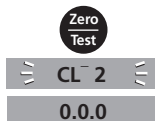
(Countdown can be activated, see page 23)

The "Method" symbol flashes for approx. 3 seconds.

The result is shown in the display in mg/l Chlorid.

Tolerances: $\pm 25 \text{ mg/l Cl}^-$

Notes see page 24



Menu selections

Press the [MODE] key and **hold**.

Switch the unit on using the [ON/OFF] key.
Allow the 3 decimal points to be displayed before releasing the [MODE] key.

The [!] key allows for selection of the following menu points:

- ▲ diS recall stored data
- ▲ Prt printing stored data
- ▲ ▽ setting the date and time
- ▼ user calibration

The selected menu is indicated by an arrow in the display.



▲ diS – Recall of stored data

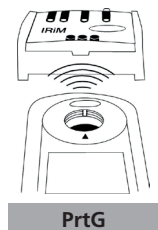
After confirming the selection with the [MODE] key the photometer shows the last 16 data sets in the following format (automatically proceeds every 3 seconds until result is displayed):

Number n xx (xx: 16...1)
 Year YYYY (e.g. 2014)
 Date mm.dd (month:month:day:day)
 Time hh:mm (hour:hour:minute:minute)
 Test Method
 Result x,xx

The [ZERO/TEST] key repeats the current data set.

The [MODE] key scrolls through all stored data sets.

Quit the menu by pressing [!] key.



▲ Prt – Transmitting stored data (to Printer or PC)

Note: To print data, or to transmit to a PC, the optional IRiM (Infrared Interface Module) is required.

The IRiM Module and the connected printer/PC must be ready. Press the [MODE] key to start the transmitting, the instrument displays "PrtG" (Printing) for approx. 1 second followed by the number of the first data set and its transmission. All data sets will be transmitted one after the other. After finishing the instrument switches to test mode.

The print job can be cancelled by pressing the [On/Off] key. The instrument switches off.

E 132

If the instrument is not able to communicate with the IRiM, a timeout occurs after approx. 2 minutes. The error E 132 is displayed for approx. 4 seconds. Subsequently, the instrument switches to test mode (see also IRiM manual).



Mode

SET

DATE

YYYY

(2 sec.)

Mode

Zero
Test

!

2 3 Setting date and time (24-hour-format)

After confirming the selection with the [MODE] key the value to be edited will be shown for 2 sec.

The setting starts with the year (YYYY) followed by the actual value to be edited. The same applies for month (mm), day (dd), hour (hh) and minutes (mm). Set the minutes first in steps of 10, press the [!] key to continue setting the minutes in steps of 1.

Increase the value by pressing the [MODE] key.

Decrease the value by pressing [ZERO/TEST] key.

Proceed to the next value to be edited by pressing [!] key.

After setting the minutes and pressing the [!] key the display will show "IS SET" and the instrument returns to the measurement mode.



cAL

CAL

CAL

CL⁻ 1

4 User calibration

Note:

user calibration (Display in calibration mode)

factory calibration (Display in calibration mode)

After confirming the selection with the [MODE] key the instrument will show CAL/CL⁻ 1.

Fill a clean vial with the standard up to the 10 ml mark, screw the cap on and place the vial in the sample chamber making sure that the X marks are aligned.

Press the [ZERO/TEST] key.

The "Method" symbol flashes for approx. 8 seconds.

The display shows the following in alternating mode:

Perform calibration with a standard of known concentration (see "Operation").

Press the [ZERO/TEST] key.

The "Method" symbol flashes for approx. 3 seconds.



≡

CL 1

≡

0.0.0

CAL



≡

CL 1

≡

GB Calibration Mode

RESULT

CAL

The result is shown in the display, alternating with CAL.

If the reading corresponds with the value of the calibration standard (within the specified tolerance), exit calibration mode by pressing the [ON/OFF] key.

Changing the displayed value:

Mode

Pressing the [MODE] key once increases the displayed value by 1 digit.

Zero
Test

Pressing the [ZERO/TEST] key once decreases the displayed value by 1 digit.

CAL

RESULT + x

Press the corresponding key until the reading equals the value of the calibration standard.

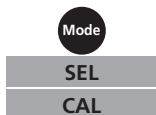
On
Off

By pressing the [ON/OFF] key, the new correction factor is calculated and stored in the user calibration software.

: :

Confirmation of calibration (3 seconds).

Separate calibration of the method for CL⁻ 2 is not possible. The unit uses the calibration for the CL⁻ 1 method.



Factory calibration reset

A user calibrated method is indicated by an arrow while the test result is displayed.

To reset the calibration press both the [MODE] and [ZERO/TEST] key and **hold**.

Switch the unit on using the [ON/OFF] key.
Release the [MODE] and [ZERO/TEST] keys after approx. 1 second.

The following messages will appear in turn on the display:

The factory setting is active.
(SEL stands for Select)

or:

Calibration has been set by the user.
(If the user calibration is to be retained, switch the unit off using the [ON/OFF] key).

Calibration is reset to the factory setting by pressing the [MODE] key.
The following messages will appear in turn on the display:

Switch the unit off using the [ON/OFF] key.

Technical Data

Instrument	single wavelength, automatic wavelength selection, direct reading colorimeter
Light source:	LED, interference filter (IF) and photosensor in transparent cell chamber. Wavelength specifications of the IF: 530 nm $\Delta \lambda = 5 \text{ nm}$
Wavelength accuracy	$\pm 1 \text{ nm}$
Photometric accuracy*	3% FS (T = 20° C – 25° C)
Photometric resolution	0.01 A
Power supply	4 batteries (AAA/LR 03)
Operating time	17hr operating time or 5000 test measurements in continuous mode when display backlight is off
Auto-OFF	automatic switch off 10 minutes after last keypress
Display	backlit LCD (on keypress)
Storage	internal ring memory for 16 data sets
Serial Interface	IR interface for data transfer
Time	real time clock und date
Calibration	user and factory calibration resetting to factory calibration possible
Dimensions	155 x 75 x 35 mm (LxWxH)
Weight	approx. 260 g (incl. batteries)
Ambient conditions	temperature: 5–40°C rel. humidity: 30–90 % (non-condensing)
Waterproof	floating; as defined in IP 68 (1 hour at 0.1 meter)
CE	Certificate for Declaration of CE-Conformity at www.lovibond.com

**measured with standard solutions*

To ensure maximum accuracy of test results, always use the reagent systems supplied by the instrument manufacturer.

Operating messages

Hi

Measuring range exceeded or excessive turbidity.

Lo

Result below the lowest limit of the measuring range.



Replace batteries, no further tests possible.

btLo

Battery capacity is too low for the display backlight; measurement is still possible.

Store Date
Cal Cal
RESULT ▼
Time Cal

A user calibrated method is indicated by an arrow while the test result is displayed (see "Factory calibration reset").

Error codes

E27 / E28 / E29

Light absorption too great. Reasons: e.g. dirty optics.

E 10 / E 11

Calibration factor "out of range"

E 20 / E 21

Too much light reaching the detector.

E23 / E24 / E25

Too much light reaching the detector.

E 22

Battery capacity was too low during measurement. Change battery.

E 70

CL⁻ 1: Factory calibration incorrect / erased

E 71

CL⁻ 1: User calibration incorrect / erased

Tintometer GmbH

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

The Tintometer Ltd

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

Tintometer AG

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

Tintometer Inc.

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

Tintometer China

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

Tintometer South East Asia

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

Tintometer Brasilien

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

Tintometer Indien Pvt. Ltd.

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

Technische Änderungen vorbehalten
Printed in Germany 07/16
No.: 00 38 62 77

Lovibond® und Tintometer®
sind eingetragene Warenzeichen
der Tintometer Firmengruppe



novatech
INTERNATIONAL

sales@novatech-usa.com

www.novatech-usa.com

Tel: (866) 433-6682

Fax: (866) 433-6684

Tel: (281) 359-8538

Fax: (281) 359-0084