

# GB Photometer CI LR (Liquid), ClO<sub>2</sub>, Cl HR

## ● Operation



Switch the unit on using the ON/OFF switch.

CL

The display shows the following:



Select the test required using the MODE key:  
CL → CLO → CLH → ..... (Scroll)

METHOD

The display shows the following:

Fill a clean vial with the water sample up to the 10 ml mark, replace the cap tightly and place the vial in the sample chamber with the Δ-mark on the vial aligned with the ∇-mark on the instrument.



Press the ZERO/TEST key.

METHOD

The method symbol flashes for approx. 3 seconds.

0.0.0

The display shows the following:

After zero calibration is completed, remove the vial from the sample chamber. Add the appropriate reagent tablet; a colour will develop in the sample.

Replace the cap tightly and place the vial in the sample chamber with the Δ and ∇ marks aligned.



Press the ZERO/TEST key.

METHOD

The method symbol flashes for approx. 3 seconds.

RESULT

The result appears in the display.

### Repeating the analysis:

Press the ZERO/TEST key again.

### New zero calibration:

Press the MODE key until the desired method symbol appears in the display again.

## ● User messages

EOI

Light absorption too great. Reasons: zero calibration not carried out or, possibly, dirty optics.

+Err or HI

Measuring range exceeded or excessive turbidity.

-Err or LO

Result below the lowest limit of the measuring range.

LO BAT

Replace 9 V battery, no further analysis possible.

## ● Technical data

Light source:

LED, λ<sub>1</sub> = 528 nm, λ<sub>2</sub> = 470 nm

Battery:

9 V-block battery (Life 600 tests).

Auto-OFF:

Automatic switch off 5 minutes after last keypress

Ambient conditions:

5-40°C

rel. humidity (non-condensing).

CE:

DIN EN 55 022, 61 000-4-2, 61 000-4-8,  
50 082-2, 50 081-1, DIN V ENV 50 140, 50 204

## ● Chlorine 0,05 - 4,0 mg/l with liquid reagent

### (a) Free Chlorine

Perform zero calibration (see "Operation").

Empty the vial. Hold the drip bottle vertically and add evenly sized drops to the vial by pressing slowly (6 drops of DPD 1 buffer solution, 2 drops of DPD 1 reagent solution). Add the water sample to the 10 ml mark, replace the cap tightly, swirl to mix, and place the vial in the sample chamber making sure the ∇ and Δ marks are aligned.

Press the ZERO/TEST key.

The method symbol flashes for approx. 3 seconds.

The result is shown in the display in mg/l free chlorine.

### (b) Total Chlorine

Immediately after measurement, add 3 drops of DPD 3 solution to the coloured test solution. Replace the cap tightly, swirl to mix, and place the vial in the sample chamber, making sure the ∇ and Δ marks are aligned.

### Wait for a colour reaction time of two minutes!

Press the ZERO/TEST key.

The method symbol flashes for approx. 3 seconds.

The result is shown in the display in mg/l total chlorine.

### (c) Combined Chlorine

Combined Chlorine = Total Chlorine - Free Chlorine

**Tolerance:** 0-1 mg/l: ± 0,05 mg/l  
> 1-2 mg/l: ± 0,10 mg/l  
> 2-3 mg/l: ± 0,20 mg/l  
> 3-4 mg/l: ± 0,30 mg/l

## ● Chlorine dioxide 0,1 - 11 mg/l

0.0.0

Perform zero calibration (see "Operation").

Empty the vial and then add a DPD No. 1 tablet. Crush the tablet with a clean stirring rod then add the water sample to the 10 ml mark. Mix well with the stirring rod to dissolve the tablet. Replace the cap tightly and place the vial in the sample chamber making sure the Δ and ∇ marks are aligned.



Press the ZERO/TEST key.

CLO

The method symbol flashes for approx. 3 seconds.

RESULT

The result is shown in the display in mg/l chlorine dioxide.

**Tolerance:** 0,1 - 1,9 mg/l: ± 0,1 mg/l  
> 1,9 - 3,8 mg/l: ± 0,2 mg/l  
> 3,8 - 5,7 mg/l: ± 0,4 mg/l  
> 5,7 - 7,6 mg/l: ± 0,6 mg/l  
> 7,6 - 11,0 mg/l: ± 0,8 mg/l

## ● Chlorine HR 5 - 200 mg/l

Use the adapter for the 16 mm vial.

Fill a clean vial (16 mm ø) with 10 ml of the water sample using the syringe, replace the cap tightly and place the vial in the adapter/sample chamber making sure the I and Δ marks are aligned.

0.0.0

Perform zero calibration.

Add one CHLORINE HR (KI) tablet straight from the foil to the 10 ml water sample, and crush using a clean stirring rod. Add one ACIDIFYING GP tablet straight from the foil to the same sample and crush using a clean stirring rod. Allow to dissolve completely, replace the cap tightly and place the vial in the adapter/sample chamber making sure the I and ∇ marks are aligned.



Press the ZERO/TEST key.

CLH

The method symbol flashes for approx. 3 seconds.

RESULT

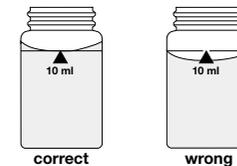
The result is shown in the display in mg/l total chlorine.

**Tolerance:** ± 5 mg/l Cl

## ● Notes

All oxidation agents in the samples react in the same way as chlorine.

## ● Correct filling of the vial



correct

wrong

## ● Calibration Mode



Press MODE key and **keep it depressed**.



Switch unit on using ON/OFF key.  
Release MODE key after approx. 1 second.

**CAL**

Select the test required using the MODE key:  
CAL CL → CAL CLH →..... (Scroll)



Perform zero calibration (see "Operation").  
Press the ZERO/TEST key.



The method symbol flashes for approx. 3 seconds.

**0.0.0**

The display shows the following in alternating mode:

**CAL**



Place the calibration standard to be used in the sample chamber with the Δ and ∇ marks aligned.  
Press the ZERO/TEST key.



The method symbol flashes for approx. 3 seconds.

**RESULT**

**CAL**

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

If the result displayed corresponds with the value of the calibration standard (within the tolerance quoted), exit calibration mode by pressing the ON/OFF key.



Otherwise, pressing the MODE key once increases the displayed value by 1 digit.



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

**CAL**

Pressing the relevant key until the displayed value equals the value of the calibration standard.

**RESULT ÷ x**



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

: :

Confirmation of calibration (3 seconds).

## ● Note

Separate calibration of the measuring range for chlorine dioxide is not possible. The unit uses the calibration for the chlorine measuring range. Factor of 1.9 is used to calculate chlorine dioxide respectively, from the chlorine polynomial.

**CAL**

Factory calibration active.

**cAL**

Calibration has been set by the user.

## ● Recommended calibration values

Chlorine LR: between 0,5 and 1,5 mg/l Cl\*

Chlorine HR: between 70 and 150 mg/l Cl

\* or rather values mentioned in the reference standard kits

## ● User calibration : cAL

**Manufacturing calibration : CAL**

To reset the calibration to the factory setting:



Press both the MODE and ZERO/TEST and **keep them depressed**.



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:

**SEL**

The calibration is reset to the factory setting.

**CAL**

(SEL stands for Select)

**or:**

**SEL**

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

**cAL**



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

**SEL**

**CAL**



Switch the unit off using the ON/OFF key.

## ● User notes

**E 10**

Calibration factor "out of range"

**E 70**

CL: Manufacturing calibration incorrect / erase

**E 72**

CLH: Manufacturing calibration incorrect / erase

**E 71**

CL: User calibration incorrect / erase

**E 73**

CLH: User calibration incorrect / erase

## ● Method notes

Observe application options, analysis regulations and matrix effects of methods. Reagent tablets are designed for use in chemical analysis only and should be kept well out of the reach of children.

Material Safety Data Sheets: [www.tintometer.de](http://www.tintometer.de)

Ensure proper disposal of reagent solutions.

## ● Troubleshooting: Guidelines for photometric measurements

1. Vials, caps and stirring rods should be cleaned thoroughly **after each analysis** to prevent errors being carried over. Even minor reagent residues can cause errors in the test results. Use the brush provided for cleaning.
2. The outside of the vial must be clean and dry before starting the analysis. Clean the outside of the vials with a towel. Fingerprints or other marks will be removed.
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 zero calibration and test with the Δ-mark on the vial aligned with the ∇-mark on the instrument.
5. Place the cover on the sample chamber for zero calibration and test.
6. Bubbles on the inside of the vial may also lead to errors. In this case, fit the vial with a clean stopper and remove bubbles by swirling the contents before starting test.
7. Avoid spillage of water in the sample chamber. If water should leak into the photometer housing, it can damage electronic components and cause corrosion.
8. Contamination of the windows over the light source and photo sensor in the sample chamber can result in errors. If this is suspected check the condition of the windows.
9. The reagent tablets should be added to the water sample without being handled.
10. Large temperature differentials between the photometer and the operating environment can lead to incorrect measurement due to, for example, the formation of condensate in the area of the lens or on the vial.
11. To avoid errors caused by stray-light do not use the instrument in bright sunlight.

Technical changes without notice

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