

# Palintest

Water Analysis Technologies



Made in UK



**Lumiso Chlorine**  
**Lumiso Chlorine Dioxide**  
**Lumiso Ozone**  
User Manual

ZIINST64 V1

## About us

### A Rich History of Innovation

Palintest are committed to making water analysis technologies simple and accessible.

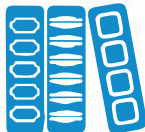
### A Global Company with a Local Approach

•USA •UK •China •Australia



## 75 Years of Research

We have built up an extensive online library, with research and insights about our products and the applications they serve.



## Product Range

From multiparameter photometer kits to visual test Palintest has an instrument solution for every application.



# Contents

<b>Getting Started</b>	<b>4</b>
Instrument Layout	4
How to Select and Perform a Test	6
Information Messages	12
Keeping the Optics Clean	13
The Settings Menu	14
<b>Using Check Standards</b>	<b>16</b>
<b>Accessing the Results Log</b>	<b>22</b>
Displaying a QR Code	23
<b>Changing Lumiso settings</b>	<b>24</b>
Setting Time and date	24
Adjusting the Display Backlight	25
Using Sample Labels	26
<b>Procedures for Water Testing</b>	<b>27</b>
How to get Accurate Results	27
Blanking	29
Sample Dilution	29
Test Instructions	30
<b>Technical Specification</b>	<b>46</b>
<b>Changing the Batteries</b>	<b>47</b>

# 4 Getting Started

Thank you for choosing a Palintest Lumiso Photometer.  
Please take time to read and follow the advice in this manual.  
If this instrument is used in ways not specified, the protection  
it provides and its accuracy may be impaired.





Waterproof USB port

Integral  
Dust Cover

Non-Slip  
Rubberised Base

Serial Number

Battery Cover  
with Captive Screw

Non slip rubber feet

Integral USB  
Dust Cover




## How to Select and Perform a Test


This is the basic procedure for all tests. For specific test details please refer to the Test Instructions.

1





The test selection menu appears when first starting up Lumiso.



From most other screens, pressing "back"  once or twice, will take you back to the test selection menu.


Select a test, using the up and down keys  until the desired test is highlighted.

2



These tube icons   will usually appear.

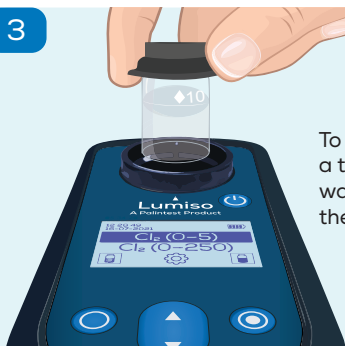
These indicate that the left key  is for "blinking" and the right key  is for "reading"

**Please Note:** The read icon  only appears after the blanking stage has been completed. Lumiso will require blanking to be repeated after 50 minutes or if it registers a significant change in environmental temperature.

Blank

Read

3



To blank the instrument, place a test tube containing sample water (without test tablets) in the cell holder.

Blanking enables the instrument to set the correct zero value. This ensures the final result will be accurate, even when testing water that is cloudy or coloured.

4



Press blank



5




The screen will show that the blank is being measured.

6



This indicates that blanking was successful.

If after blanking, you want to read a different parameter press the back key  to go to the test menu. A different test can then be "Read" without needing to blank again.


7



Prepare a 10mL sample by adding reagents according to the test instructions. Place this sample tube in the cell holder.

8



Press read. 


Depending upon test selected, Lumiso will either go to step 9, or show intermediate steps 8a or 8b.


## For Chlorine Tests Only

8a



A choice of free or total chlorine is offered. See test instructions.

Highlight F Cl<sub>2</sub> and press read  to read and display free chlorine result. (see step 10)

Highlight T Cl<sub>2</sub> and press read  to display a preset timer which will automatically count down and then read the total chlorine result.

## For Tests with a Wait Time Only

8b



For tests with a "wait time" (see test instructions), a preset timer will count down and then automatically commence reading.

Press read  to override

9



The screen will show that the sample is being measured.

10




The result will be displayed with the following information

Time and Date

The Test Name from the Menu

The Measured Result

Depending upon the test, pressing back  from this screen will either go back to the test selection menu or to the free/total chlorine selection.

Lumiso will display these messages as M numbers, if it detects unexpected readings when making its optical measurements

Message Number	Likely Cause	Suggested Action
<b>M1 and M2</b>	Blank is too dark	Check and clean all glass tubes used. Repeat blanking process
	Contamination obscuring optics	See "Keeping the Optics Clean"
<b>M3 and M4</b>	Blank, sample tube, or NDF standard moved or removed too early	Carefully repeat blanking and reading procedure
<b>M5</b>	Light cap not fitted correctly	Check or change light cap on tube
	External light entering the optical cell	Move instrument away from external light

A common cause that can trigger any of these messages to be displayed is contamination of the optical windows or stained glassware. See sections Keeping the Optics Clean and How to Get Accurate Results. If messages continue to be displayed, please contact your local Palintest branch or distributor.

## Keeping the Optics Clean

Contamination in the optical cell may effect the accuracy of readings and can trigger an information message to be displayed.

Clean optical windows gently with a soft, non-abrasive cloth dampened with water or anti-static foam cleaner. Do not use solvents.



*Instrument failure due to contamination is not covered by warranty.*

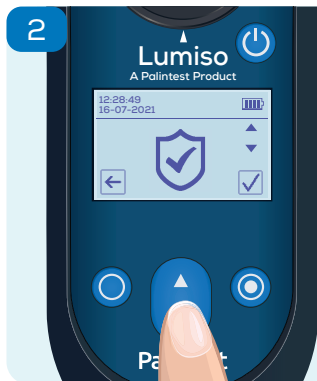



A number of additional functions and settings can be accessed from within the Settings Menu.





The Settings Menu is accessed from the opening Test Selection Menu.







Select  and confirm 



Use the  key to scroll through the options.

Press confirm  to explore that option

Press back  to go back to the Test Selection Menu.

	<p><b>Check Standard Mode:</b> Verify instrument performance using NDF check standards</p>
	<p><b>Label Mode:</b> Assign a label to your measurement</p>
	<p><b>Log Mode:</b> Access the last 50 measurement results</p>
	<p><b>QR Log Mode:</b> Access a QR code that contains the current log.</p>
	<p><b>Date &amp; Time Mode:</b> Manually edit the date &amp; time in the instrument. Date format can also be changed.</p>
	<p><b>Brightness Control Mode:</b> Adjust the brightness of the screen backlight.</p>

## 16 Using Check Standards

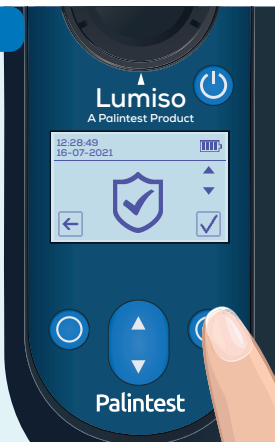
Check Standards can be purchased separately for your Lumiso instrument. These standards contain Neutral Density Filters (NDFs) and can be used to verify that the instrument is within calibration and performing correctly.






### Why is Percentage Transmission of Light being measured with Lumiso Check Standards?

Lumiso works by measuring the amount of light that passes through the sample. This value is known as the "Percentage Transmission" or "%T". Lumiso's software then converts this %T value into a concentration, such as mg/L of chlorine. So, to verify that the instrument is within calibration it is only necessary to check that the instrument correctly measures %T for each wavelength of light it uses. This simplifies the process for using check standards.

1



Check Standard Mode is accessed from the Settings Menu 

Scroll to the Check Standard icon  and confirm 

2



The wavelength(s) of light the instrument uses are shown in nanometres (nm).

While some Lumiso instruments use more than one wavelength, the Chlorine, Chlorine Dioxide and Ozone instruments all use only this wavelength.

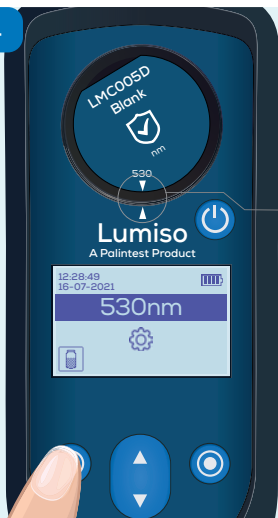
If nothing is shown here, it is because Lumiso has not been "blanked" on the wavelength highlighted.

3




To set the blank (zero) value for the selected wavelength. Insert the "Blank" from the set of standards.

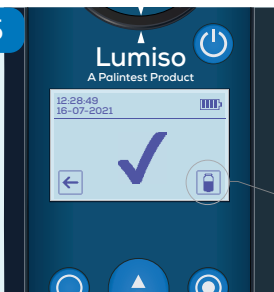
4



Ensure that the wavelength being checked is aligned with the mark on the Lumiso instrument.

Then press blank 

5



The instrument will measure the blank and show when this has been successful.


A read icon now appears.

6



Insert Standard A from the set of standards

Ensure that the correct wavelength is aligned.

Then press read 

7



The measurement of %T (Percentage Transmission) is shown on screen.

This value needs to be compared with that on the certificate for the correct wavelength and standard.

**Please Note: The certificate shown here is for illustration only. Please refer to the certificate supplied with the set of standards.**

# Palintest

Water Analysis Technologies

## Check Standards Certificate

For use with instruments : Lumiso Chlorine  
Lumiso Chlorine Dioxide  
Lumiso Ozone

	Wavelength 530 nm	
	Min	Max
Standard A	89%T	93%T
Standard B	67%T	73%T
Standard C	24%T	28%T



8



Continue, by inserting all the remaining standards, pressing read, and comparing the result with certificate.

Should any standard read outside the values shown on your certificate, the most likely cause is contamination on the optical windows in the cell holder. Please clean the cell holder carefully and remeasure the standards. (See 'Keeping the Optics Clean')

If this does not resolve the issue, please contact your local Palintest branch or distributor.


## 22 Accessing the Results Log

Lumiso stores the most recent 50 test results along with the test time, date and sample label. The oldest test result will be automatically overwritten once this capacity is reached.

1




The Results Log is accessed from the Settings Menu 

Select the "Results Log" icon  and confirm

2



The screen will show the most recent result with its time and date.

Use the up and down keys  to scroll through up to 50 results.

This is a reminder that you are looking at a stored result in the log.




The log of results can be downloaded as a text file via the USB port.


Alternatively, use the QR code function (see below).

## Displaying a QR Code



It is possible to display the entire content of the Results Log as a QR code for scanning by other devices.

From the Settings Menu 

Select the QR code icon  and confirm

An alpha numeric, version 30, QR code will be displayed.


# 24 Changing Lumiso Settings



## Setting Time and Date

Changes to the instrument settings are accessed through the Settings Menu.

1



From the Settings Menu 


Scroll to the Time and Date icon  and confirm 


2




Three items are adjustable:

- Date Format
- Time (24 hour clock)
- Date

To make changes to the highlighted item, use the up and down key 



 Advances to the next item


 Goes back to previous item

To exit without saving any changes press back  from this first screen.

3



To save changes, advance  until the tick  shows to confirm.


To exit without saving any changes keep pressing back 



## Adjusting the Display Backlight

Lumiso's screen brightness is adjustable and there are five levels to choose from.

1





From the Settings Menu 


Select the light bulb icon  and confirm 

2



Use the up and down keys  to adjust the brightness of the screen as required.

Confirm  to save the new setting.



Press back  to exit without making any changes.

## Using Sample Labels

1




Sample readings can be tagged to indicate a sample name, project or sampling location.


In the settings menu  scroll to the tag icon  and confirm

2

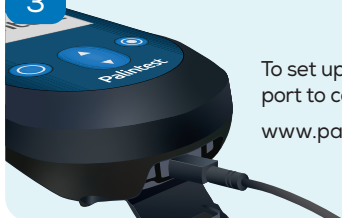


Use the up and down keys  to highlight a name.

Select confirm  and that name will then be used to label all future measurements until it is changed.

Press back  to leave the current label name unchanged.

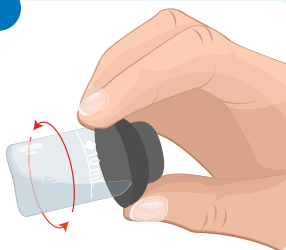
3



To set up a list of names, use the USB port to connect Lumiso to a PC and visit: [www.palintest.com/palintestconnect](http://www.palintest.com/palintestconnect)



4



During sample testing or blanking, remove any attached bubbles by capping the tube and rotating as shown.

5



Ensure tubes are dry on the outside before placing them in the instrument.

6



Ensure that your Lumiso Instrument is clean and dry. Place tubes in the instrument with white diamond aligned to the mark on the instrument.

## Blanking

The blank is a sample of the water to be tested that sets the zero value on the instrument. This ensures that any colour or cloudiness in the sample does not affect the final result.

In the test instructions, blanking is not described specifically. However, it is important that the photometer is blanked using the water that is being tested.

## Sample Dilution



If a result is above the range of the test a '>' symbol will appear in front of the result. In this case it will be necessary to dilute the sample with deionised water and repeat the test.



A dilution tube is available from Palintest to simplify this.

**Example for a x2 dilution:**  
Fill with sample to x2 line and top up to 100 mL with deionised water. Mix and use this as the new blank and sample for the test. Multiply result by x2.

Depending upon model, any of the following tests may be present in the menu.

Test / Parameter	Menu Abbreviation	Reagent System	Range	Lumiso Chlorine	Lumiso Chlorine Dioxide	Lumiso Ozone	Page
<b>Chlorine Free &amp; Total</b>	Cl <sub>2</sub> (0-5)	Tablet	0 - 5 mg/L (Cl <sub>2</sub> )	●	●		31
		Liquid	0 - 5 mg/L (Cl <sub>2</sub> )	●	●		35
<b>Chlorine High Range</b>	Cl <sub>2</sub> (0-250)	Tablet	0 - 250 mg/L (Cl <sub>2</sub> )	●			39
<b>Chlorine Dioxide</b>	ClO <sub>2</sub> (0-10)	Tablet	0 - 10 mg/L (ClO <sub>2</sub> )		●		41
<b>Ozone</b>	O <sub>3</sub> (0-3)	Tablet	0 - 3 mg/L (O <sub>3</sub> )			●	44

**Free & Total Chlorine (DPD Tablet Method) -  $\text{Cl}_2$  (0-5)****Colour Change:** Colourless to Pink**Range:** 0 – 5 mg/L**1**

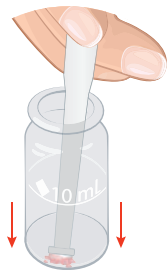
Rinse tube with sample leaving **a few drops**.

**2**

Add **one DPD 1** Tablet.

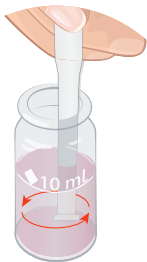
**3**

**Crush** tablet to form a paste.



4

Fill with further sample to the **10mL** line.



5

**Stir.**

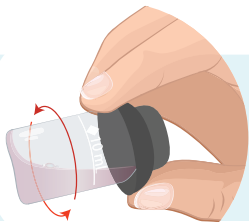
6

Cap the tube.



7

Remove any bubbles by holding the tube and rotating as shown.





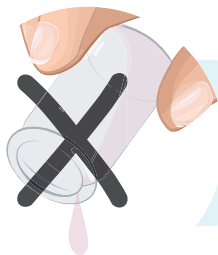
8

Take the **Photometer Reading**.

**Result** = Free Chlorine

9

**Keep** tube and contents to measure Total Chlorine.

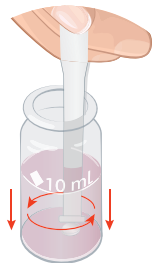


10

Add **one DPD 3** tablet.

11

Crush and stir.



12

Cap the tube.





13



Remove any bubbles by holding the tube and rotating as shown.

14

**Wait 2 minutes.**

Alternatively, to use the automatic timer, immediately place tube in the cell holder and press back  then select  $\text{TCl}_2(0-5)$ , then press read 



15

Take the **Photometer reading**.

**Result** = Total Chlorine



**NB:** Combined Chlorine =  
Total Chlorine – Free Chlorine

**Free & Total Chlorine (DPD Liquid Method) - Cl<sub>2</sub> (0-5)****Colour Change:** Colourless to Pink**Range:** 0 – 5 mg/L

1

Rinse tube with sample leaving **a few drops**.



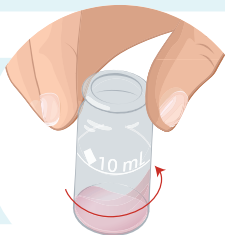
2

Add **3 drops** of **DPD A** liquid  
(DPD No1 Indicator)



3

Add **3 drops** of **DPD B** liquid  
(DPD No1 Buffer)



4

Swirl thoroughly to mix



5

Fill tube with sample to the **10mL** line.

6

Swirl to mix.



7

Cap the tube.

8

Remove any bubbles by holding the tube and rotating as shown.





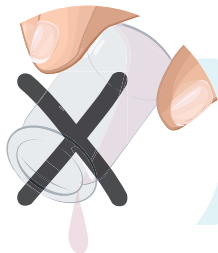
9

Take the **Photometer** reading.

**Result** = Total Chlorine

10

**Keep** tube and contents to measure Total Chlorine.



11

Add **3 drops** of **DPD C** Liquid.

12

Swirl to mix.



13

Cap the tube.





14

Remove any bubbles by holding the tube and rotating as shown.



15

**Wait 2 minutes.**

Alternatively, to use the automatic timer, immediately place tube in the cell holder and press back  then select  $\text{TCl}_2(0-5)$ , then press read 



16

Take the **Photometer reading**.

**Result** = Total Chlorine



**NB:** Combined Chlorine =  
Total Chlorine – Free Chlorine

**Chlorine High Range - Cl<sub>2</sub> (0 - 250)****Colour Change:** Colourless to Yellow to Brown**Range:** 0 - 250 mg/L**1**

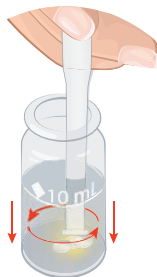
Fill tube with sample to the **10mL** line.

**2**

Add, **one Acidifying GP** tablet and **one Chlorine HR** tablet.

**3**

Crush both tablets and stir to mix.



4

Replace cap.



5

Take the **Photometer reading**.

**Result** = Total Chlorine

**Chlorine Dioxide -  $\text{ClO}_2$  (0 - 10)****Colour Change:** Colourless to Pink**Range:** 0 - 10 mg/L**1**

Gently add **10 mL** of sample to a clean tube.

Avoid any agitation of the sample.

**2**

Add **one Glycine** tablet.

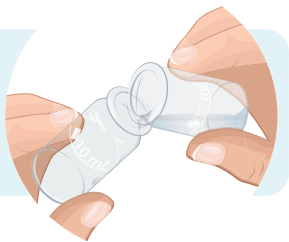
**3**

Crush very gently and stir.



4

Gently pour a few drops of this prepared sample into a clean tube.

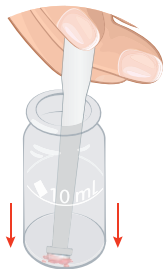


5

Add **one DPD1** tablet to those few drops of sample.

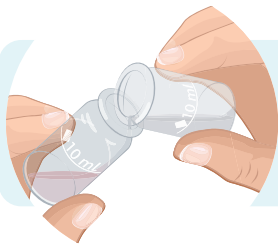
6

Crush tablet to form a paste.



7

Gently pour the rest of the prepared sample into this tube.



8

Cap the tube.



9

Remove any bubbles by holding the tube and rotating as shown.

10

Take the **Photometer reading**.

**Result** = Chlorine Dioxide



**Ozone – O<sub>3</sub> (0-3)****Colour Change:** Colourless to Pink**Range:** 0 – 3 mg/L**1**

Rinse tube with sample leaving **a few drops**.

**2**

Add **one DPD 4** Tablet.

**3**

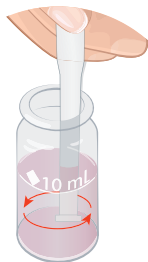
**Crush** tablet to form a paste.

**4**

Fill with further sample to the **10mL** line.

5

Stir.



6

Cap the tube.

7

Remove any bubbles  
by holding the tube and  
rotating as shown.



8

Take the **Photometer Reading**.**Result** = Ozone

If chlorine is present, use a glycine tablet, as in steps 1 to 7 of the chlorine dioxide method using a DPD 4 tablet in place of the DPD 1

# 46 Technical Specification

<b>Instrument</b>	Single wavelength, direct-reading colorimeter
<b>Optics</b>	LED light source optical system with narrow band wavelength filters and photodetectors
<b>Wavelengths</b>	Automatic wavelength selection of 530 nm
<b>Wavelength Tolerance</b>	± 2 nm
<b>Filter Bandwidth</b>	5 nm
<b>LCD Display</b>	226 x 138 pixel with adjustable backlight
<b>Results Log</b>	50 results, with date, time and label
<b>Operating Conditions</b>	0 – 50°C 90% Relative Humidity (non-condensing)
<b>Waterproof Rating</b>	IP67 (Waterproof)
<b>Test Cells</b>	25 mm diameter tubes
<b>Blank/Zero setting</b>	Held in memory, but instrument will prompt for re-blanking after 50 minutes
<b>Power Supply</b>	3 x 1.5V AA batteries USB Port 6V max, 200mA max (DC)
<b>USB Port</b>	Micro USB Type B
<b>Size</b>	163 x 70 x 45 mm
<b>Weight</b>	275g (including batteries)

Please take care when changing the three AA/LR6 batteries in order to maintain the waterproof rating of the instrument.

1



To change the batteries, first disconnect the USB lead.

Then use a suitable screwdriver to loosen the captive screw

2

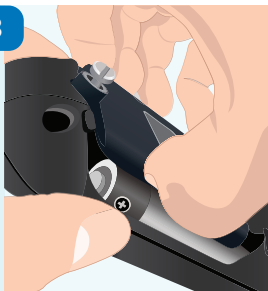


The watertight seal built into the battery cover means that a firm pulling force needs to be applied to remove it.

This is best done by gripping the sides of the cover, as shown, as close as possible to the end with the captive screw.

**Please note:** Levering the cover off with a screwdriver or sharp implement risks damaging the cover and seal.

3



The cover will lift and, if necessary, the captive screw can be further loosened so the cover can be removed completely.



4



The batteries are held firmly in place by the clips to enhance Lumiso's resilience to physical shock.

To remove the batteries, push them towards the negative contact and lift the positive end.

5



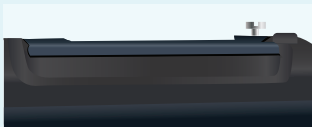
Insert new batteries in the same way, pushing towards the negative contact, but this time, down at the positive end.

Note the polarity guidance in the compartment.

6



Replace the cover, hinge end first. Then firmly push the cover down until it is parallel to the case as below. This ensures that the waterproof seal is complete.



7



Secure the captive screw so that it gently holds the cover in place, do not overtighten the hold.

**Please Note:** Incorrect fitting can impact IP67 seal and void your warranty.

Thank you for choosing your Palintest Lumiso Photometer. For any further questions or information on Lumiso consumables and accessories please visit [www.palintest.com](http://www.palintest.com)

# Palintest

Water Analysis Technologies

A **Halma** company

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