



Palintest

Water Analysis Technologies

Compact Ozone Meter

Instructional Manual

www.palintest.com



Table of Contents

1	GENERAL INFORMATION.....	2
	Introduction to Palintest Photometers.....	2
	Kit Contents	3
	Instrument Layout	4
2	BACKGROUND INFORMATION	5
	Introduction to Colorimetric Measurement.	5
	Blanks and Samples	7
	Taking a Reading.....	7
	Care and Maintenance	8
	Viewing the Instrument Memory	9
	Backlight Operation	9
3	TEST PROCEDURES	10
	Ozone.....	11
4	INSTRUMENT	12
	Technical Specification	14
5	TROUBLESHOOTING	16
	Chemistry Troubleshooting	16
	Compliance	17
	Sample Dilution and Collection.....	18
6	REORDER CODES and ACCESSORIES	19

1 GENERAL INFORMATION

Introduction to Palintest Photometers

Thank you for purchasing this Palintest product.

Palintest instruments and reagents are renowned as being simple to use, whilst providing rapid and reliable results for the testing of water. Our instruments are of the highest quality and fully waterproof.

Palintest's experience, built-up over the last 50 years, is the reason why our instruments and reagents are used in laboratories, treatment plants, leisure facilities and industrial premises throughout the world.

Our products are packaged carefully and the product should reach you in the state it left our factory; if this product has reached you in a state that is less than satisfactory, please contact your local Palintest branch or your local distributor.

This booklet describes the best way to use Palintest products, and provides instructions for the range of water tests that can be performed using this instrument.

Palintest instruments are calibrated for Palintest reagents. To guarantee the high accuracy and performance that our instruments give, you must ensure that only Palintest reagents are used with Palintest instruments. Failure to do so can lead to erroneous results.

Kit Contents

These instructions are designed for use with the Palintest Ozone meter.

The kit contains :-

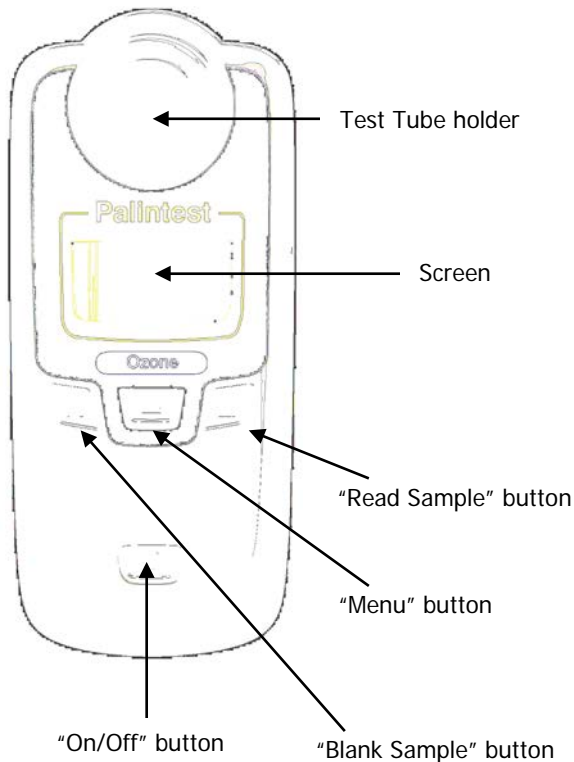
Ozone Instrument
Instrument Instructions
Crushing Rods
Test Tube Brush
Photometer Tubes

Reagents :-

DPD No 4 Tablets

For re-ordering codes and accessories, please see Section 6.

Instrument Layout



2 BACKGROUND INFORMATION

Introduction to Colorimetric Measurement.

Palintest tests are based on measuring the intensity of colours produced by Palintest reagents and using Palintest photometers to measure that intensity of colour. This is colorimetry and can be defined as any technique used to evaluate an unknown colour in reference to known colours.

To avoid subjective measurement between test samples and colour standards, a colorimeter can be used for quantitative measurement of the amount of coloured light absorbed by a sample (with reagents added) in reference to a untreated sample (blank).

White light is made up of many different wavelengths of light.

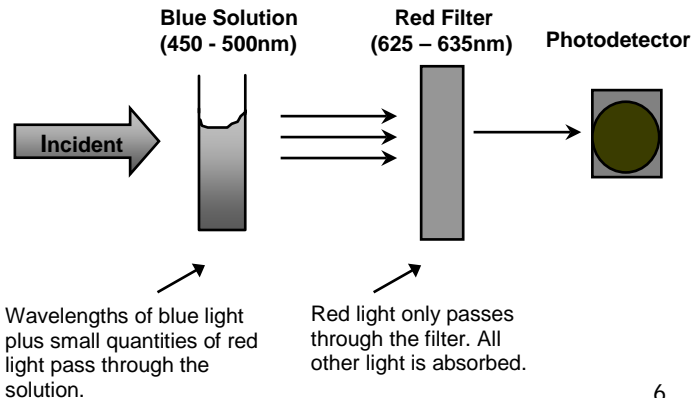
A colorimeter passes a white light beam through an optical filter which transmits only one particular band of wavelength of light to the photodetector where it is measured.

The difference in the amount of coloured light transmitted by a colourless sample (blank) and the amount of coloured light transmitted by a coloured sample is a measurement of the amount of coloured light absorbed by the sample.

The use of filters improves the sensitivity of this process and choice of the correct optical filter (and, therefore, the correct wavelength) of light is important.

It is interesting to note that the filter that gives the most sensitive calibration for a test factor is the complementary colour of the test sample. For example, the chlorine test produces a pink colour proportional to the chlorine concentration in the sample (the greater the chlorine concentration, the darker the pink colour). In this case, a green filter gives the greatest sensitivity as a pinkish-red solution absorbs mostly green light.

Palintest photometers calculate and then display the test results directly in milligrams per litre (mg/l) of the test factor, by comparing the amount of absorbed light to the calibration data programmed into the instrument.



Blanks and Samples

Palintest photometers use a BLANK tube to set the instrument to blank and a SAMPLE tube to take the reading.

A BLANK tube is a test tube filled with untreated water sample. A SAMPLE tube is a test tube containing the sample to which reagents have been added in accordance with the test procedure described.

The blank setting is held in memory. It is not necessary to reset the blank each time a reading is taken if the water samples to be tested are from the same body of water and the conditions of use are the same. The blank setting can be confirmed if necessary by taking a test reading on the blank tube.

Taking a Reading

- 1 Press the 'on/off' button to start the unit.
- 2 Press the 'menu' button until the test you wish to perform is indicated on the screen.
- 3 Insert your blank tube and press the 'blank sample' button.
- 4 An image displaying a blank tube will be displayed on screen. When this is replaced by 0.00 the instrument is finished blanking and ready to take a reading.
- 5 Remove your blank tube and replace it with the sample tube. Press the 'Read Sample' button to take a reading.
- 6 The result will be displayed on screen in mg/l.

Care and Maintenance

The handling of photometer tubes is important to ensure continuing accuracy. Scratches, finger-prints and water droplets on the tube or inside the light chamber can cause inaccurate results. It is imperative that the tubes and light chamber are clean and dry. The glassware must be clean and defect-free. Scratches and abrasions will permanently affect the accuracy of the readings. Tubes can be acid washed periodically.

Here are some hints on keeping the photometer clean, free from contamination and in good working order :-

- 1 Prepare your workplace before use. Make sure that you have enough space to work with the photometer and with the reagent systems.
- 2 Do not pour out samples or prepare the tests directly over the instrument.
- 3 Always cap the test tubes after preparing the blank and test sample.
- 4 Wipe test tubes on a clean tissue to remove drips or condensation before placing in the photometer.
- 5 Do not leave tubes standing in the photometer test chamber. Remove the tubes immediately after each test.
- 6 Immediately wipe up any drips or spillages onto the instrument or into the test chamber with a clean tissue.

- 7 Keep the instrument clean. Clean the test chamber regularly using a moistened tissue or cotton bud.
- 8 Keep the instrument in a clean, dry place when it is not in use. Keep it on a clean, dry bench away from chemicals, place it in a storage cupboard or keep it in a carrying case.

Viewing the Instrument Memory

To view the previous results (10 results are stored within the instrument memory), hold the 'menu' button down **for at least three seconds** whilst the display showing the selected test or result is on the screen.

To scroll through the 10 different results, simply press the 'menu' button. To exit the results menu, press the 'menu' button again for at least three seconds.

Backlight Operation

The backlight can be turned on and off by holding the 'On/Off' button for a two second period during power on.

3 TEST PROCEDURES

The methodologies listed here are for use with the Palintest Ozone instrument.

Before attempting to do any tests, ensure you read 'Blanks and Samples' and the 'Care and Maintenance' sections in Section 2.

To Select the Test

Press the MENU key. The selected test will appear on the display :-

- O₃ Ozone

Ozone

Range

O₃ : 0.01 – 3 mg/l

Wavelength – 530 nm

Method - DPD

Ozone

- 1 Rinse test tube with sample leaving two or three drops in the tube.
- 2 Add one DPD No 4 tablet, crush the tablet with the crushing rod and then fill the test tube with sample to the 10 ml mark. Mix gently with the rod to dissolve the tablet and ensure any remaining particles have settled.
- 3 Take photometer reading **immediately** as the result may drift on standing. Ensure the display shows the test range that you desire.

Reagents


AP 056 - DPD No 4 Tablets

4 INSTRUMENT

For an illustration on the instrument layout, see Section 1.

For information on performing a test, see Section 2.

Replacing the Batteries

Replace the battery when the  symbol remains on the display. Use 2 x 1.5v alkaline 'AA' batteries, MN 1500, LR6, E91, AM3 or equivalent. Remove batteries from instrument if it is to be stored or left unused for a long period of time.

Liability

Under no circumstances shall Palintest Ltd be liable for loss of life, property, profits or other damages incurred through the use or misuse of their products.

Disposal

Waste Electrical and Electronic Equipment (WEEE).

Natural resources were used in the production of this equipment. This equipment may contain materials that are hazardous to health and the environment.

To avoid harm to the environment and natural resources, the use of appropriate recycling systems is recommended. The crossed out wheeled bin symbol on the meter encourages you to use these systems when disposing of this equipment.

Error Messages

The photometer will display an error message in the unlikely event of malfunction. These error messages are mainly designed to assist service staff in diagnosing instrument faults. In the event of an error message appearing on the photometer display, contact your local Palintest Technical Services Department or your local distributor.

Error messages are coded 7, 8 and 9 and all relate to blanking the instrument. In the first instance, the user should check the operating technique and sample clarity. If these are in order, then these errors indicate a fault in the optics :-

Error 7 indicates too much light – remove the instrument from bright light.

Error 8 indicates a fault with one of the optics components, and requires service assistance.

Error 9 indicates not enough light – follow 'Cleaning the Optics' routine.

If the problem persists, contact your local Palintest branch or distributor.

Technical Specification

Instrument	Direct-reading colorimeter
Optics	Palintest dual LED light source optical system with narrow band wavelength filter and photodetectors
Wavelength	530nm
Wavelength Tolerance	$\pm 2\text{nm}$
Filter Bandwidth	10nm
LCD Display	128 x 64 pixel screen
Instrument Operating Temperature Range	0 – 50°C
Waterproof Rating	IP 67
Test Cells	25 mm diameter tubes
Blank/Zero Setting	Held in memory or reset for each reading
Power Supply	2 x 1.5V 'AA' batteries - auto switch-off setting
Size	150 x 65 x 42 mm
Weight	200g (including batteries)

Cleaning the Optics

Any build-up of dirt or deposits may interrupt light transmission and affect readings.

To clean the optics gently clean the internal surfaces of the optics with a soft, non-abrasive cloth. Do not use solvents. Deposits may be removed with a slightly dampened cotton bud.

The photometer is fitted with long-life light sources and contains no user-serviceable components. If the instrument requires servicing or repair, this can be arranged through our Technical Services Department.

Servicing and Warranty

Palintest Photometers are guaranteed for a period of two years from the date of purchase, excluding accidental damage or damage caused by unauthorised repair or misuse. Should repair be necessary, contact our Technical Services Department quoting the serial number. This guarantee does not affect your statutory rights.

An instrument failure due to test cell contamination is not covered by the Palintest instrument warranty.

5 TROUBLESHOOTING

Chemistry Troubleshooting

It is very important to specify Palintest Photometer Grade tablets when ordering replacement reagents for this instrument. Using an alternative grade of tablet may lead to a turbid sample which in turn leads to inaccurate results.

Ozone Method

Ozone, free and combined chlorine and bromine residuals all react with DPD No 4 reagent to produce a pink colour, proportional to the concentration present in the sample.

Glycine destroys ozone in the sample and the colour produced in the DPD test then corresponds to the chlorine and bromine only.

The ozone content is thus obtained by the difference between the test readings with and without glycine.

Procedure

- 1 Rinse test tube with sample leaving 2 - 3 drops of sample in the tube.
- 2 Add one DPD No 4 tablet, crush tablet and then fill the test tube with sample to the 10 ml mark. Mix to dissolve the tablet.

- 3 Take the reading using the Ozone Meter (Reading A). This represents the disinfectant residual of ozone plus chlorine and bromine, expressed in terms of ozone mg/l.

Correction for Chlorine and Bromine

- 1 Fill a test tube with sample to the 10 ml mark. Add one DPD Glycine tablet, crush and mix to dissolve.
- 2 Take a second clean test tube and add 2 - 3 drops of solution from the first tube. Add one DPD No 4 tablet, crush and then add the remainder of the solution to make up to the 10 ml mark. Mix to dissolve the tablet.
- 3 Take the reading using the Ozone Meter (Reading B). This represents the ozone equivalent of the chlorine plus bromine present :-

$$\text{Ozone mg/l} = \text{Reading A} - \text{Reading B}$$

Compliance

The Palintest photometer series has been independently tested and has earned the European CE Mark of Compliance for electro-magnetic compatibility (EMC).

Sample Dilution and Collection

When the test result is outside the concentration range of the test, the photometer will display the '>' symbol. In such cases it is necessary to dilute the pool water and repeat the test. A Palintest dilution tube (PT 512) is available to dilute samples accurately.

If the result is close to the top of the scale (eg ozone above 2.5 mg/l) and a more accurate result is required, a dilution may be used to increase the sensitivity of the test.

The following points should be observed when taking water samples from the pool. Take pool water samples from below the water surface. Collect in a clean plastic bottle and fill to the neck so as to avoid unnecessary airspace.

The free chlorine or bromine may drop during sample storage. Other parameters such as pH and alkalinity can also change. Samples should therefore be tested as soon as possible after sample collection.

6 REORDER CODES and ACCESSORIES

Reagent Description	Product Code	
	50 Tests	250 Tests
DPD No 4 Tablet Pack	PM 056	AP 056
DPD Glycine	-	AT 056

Accessories Description	Product Code
Test Tube Brush	PT 663
Replacement Photometer Tubes (x5)	PT 555
Photometer Tube Rack	PT 545
Crushing Rods (x10)	PT 502
Check Standards	PTC 043