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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 the transportation company.

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 following instrument :-

- Ammonia Meter

The kit contains :-

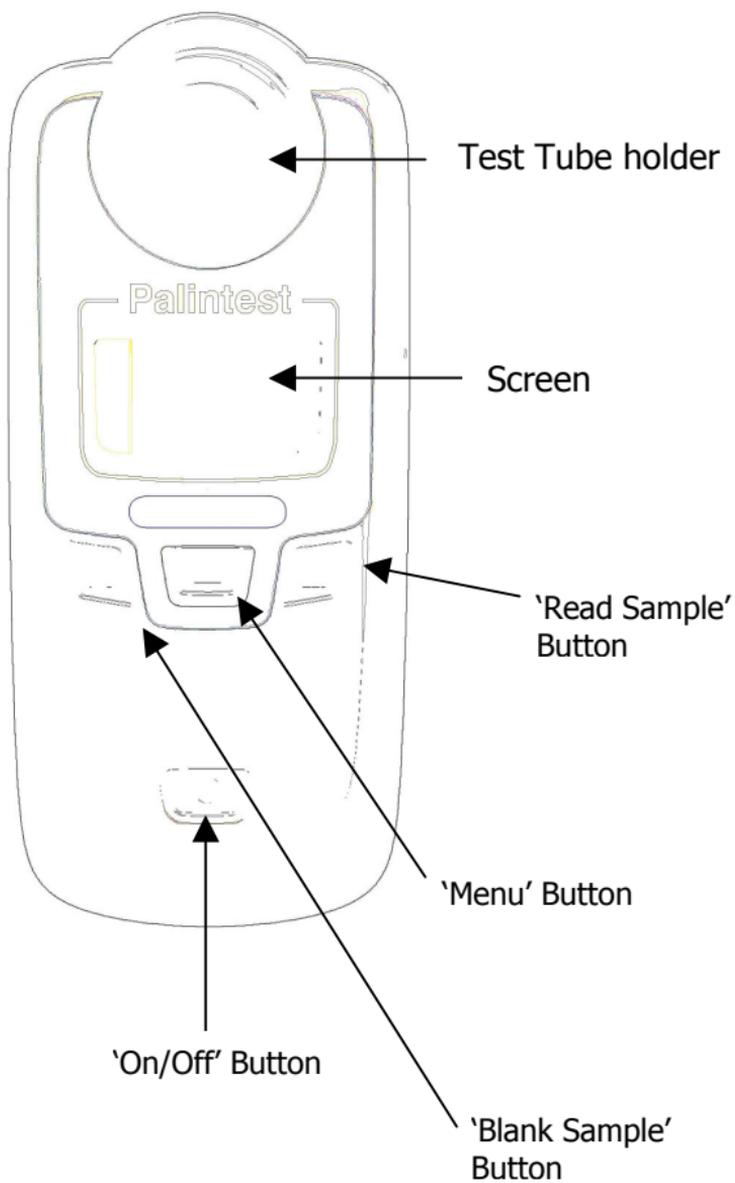
Palintest Ammonia Meter

Instructions

16 mm Tube Adaptor

For re-ordering reagents 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 an untreated sample (blank).

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

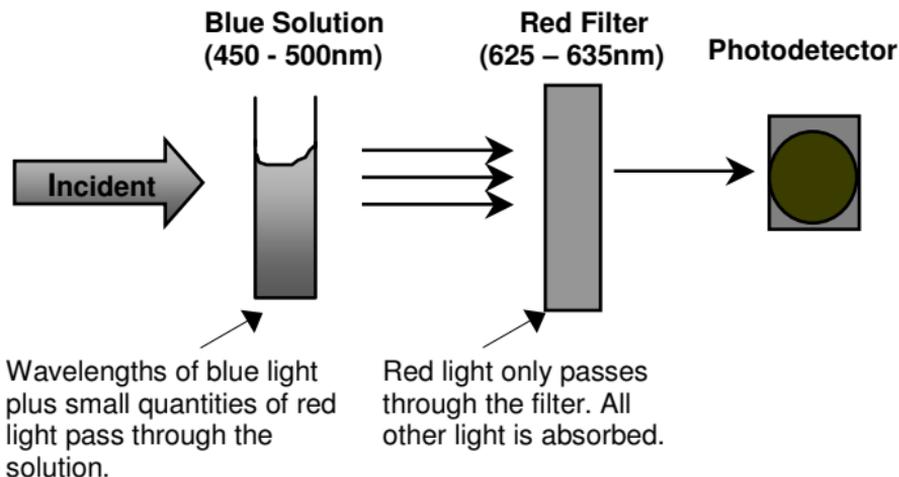
A colorimeter passes a white light beam through an optical filter which transmits only one particular band of wavelength of light to the photodetector where it is measured.

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 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.

For the BLANK tube use an unused Tubetests Ammonia (Nessler) tube. Alternatively a Tubetests tube containing deionised water only may be used. For the SAMPLE tube use a Tubetests Ammonia (Nessler) tube in which the test colours have been developed in accordance with the test instructions.

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 are similar 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.

The result will be displayed on screen in mg/l.

Care and Maintenance

The handling of the colorimeter 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

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 currently selected test will appear on the display :-

- 1 Ammonia/15N N 15
- 2 Ammonia/50N N 50
- 3 Ammonia/100N N 100

To change the test selected, press the MENU key until the required test appears on the display.

The ranges in each test refer to the lower limit of detection to the highest value the unit can guarantee accuracy up to.

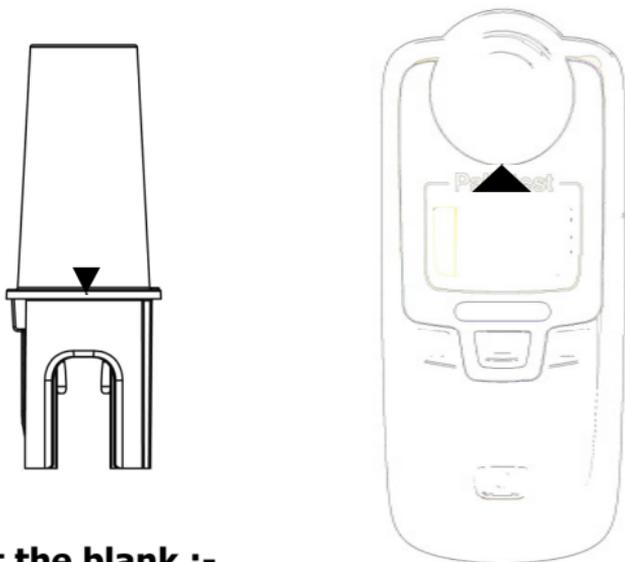
The Compact Ammonia Meter is for use in conjunction with Palintest Tubetest Ammonia (Nessler) Reagents.

These tests are supplied in the form of prefilled tubes and instructions for using these are supplied with the reagent packs. These instructions only cover the use of the instrument itself.

To use the adaptor:

The adaptor allows the use of 16 mm Tubetests in the compact photometer.

Insert the adaptor (shown below) into the test tube holder. It can only be inserted in one way (the small arrow on the front of the tube should line up with the small arrow on the test tube holder :-



To set the blank :-

- 1 Insert the BLANK tube into the adaptor
- 2 Press the 'Blank Sample' button

To take the test reading :-

- 1 Insert the SAMPLE tube into the adaptor
- 2 Press the 'Read Sample' button

Ammonia

Wavelength – 430nm

Method – Nessler Method

Range

N 15 = 0.06 - 15.0 mg/l

- 1 Remove the cap of the Tubetests Ammonia/15N (Nessler) Tube and add 5.0 ml of sample by filling the tube to the 10 ml line using the Pasteur pipette provided. Cap tube and invert three times to mix.
- 2 Add 0.5 ml of Tubetests Ammonia (Nessler) Reagent. Replace cap and invert several times to mix.
- 3 Stand for one minute to allow colour development.
- 4 Select range N 15 on Ammonia Meter.
- 5 Take photometer reading in usual manner (see Photometer instructions). Use an unused Tubetests Ammonia/15N (Nessler) Tube to set the blank on the photometer. Alternatively, a Tubetests tube containing deionised water only may be used.
- 6 The result is displayed as mg/l N.

N 50 = 0.5 - 50.0 mg/l

- 1 Remove the cap of the Tubetests Ammonia/50N (Nessler) Tube and add 1.0 ml of sample using the pipettor or Pasteur pipette. Cap tube and invert three times to mix.
- 2 Add 0.5 ml of Tubetests Ammonia (Nessler) Reagent. Replace cap and invert several times to mix.
- 3 Stand for one minute to allow colour development.
- 4 Select range N 50 on Ammonia Meter.
- 5 Take photometer reading in usual manner (see Photometer instructions). Use an unused Tubetests Ammonia/50N (Nessler) Tube to set the blank on the photometer. Alternatively, a Tubetests tube containing deionised water only may be used.
- 6 The result is displayed as mg/l N.

N 100 = 1.0 - 100.0 mg/l

- 1 Remove the cap of the Tubetests Ammonia/100N (Nessler) Tube and add 0.5 ml of sample using a pipettor. Cap tube and invert three times to mix.
- 2 Add 0.5 ml of Tubetests Ammonia (Nessler) Reagent. Replace cap and invert several times to mix.
- 3 Stand for one minute to allow colour development.
- 4 Select range N 100 on Ammonia Meter.
- 5 Take photometer reading in usual manner (see Photometer instructions). Use an unused Tubetests Ammonia/100N (Nessler) Tube to set the blank on the photometer. Alternatively, a Tubetests tube containing deionised water only may be used.
- 6 The result is displayed as mg/l N.

4 INSTRUMENT

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

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 take-back 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	Single wavelength, direct-reading colorimeter
Optics	Palintest Dual LED light source optical system with narrow band wavelength filters and photodetectors
Automatic Wavelength	430nm
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	16 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

- 1 Nessler's reagent is toxic. Handle with care. This reagent is for use in professional water testing applications only.
- 2 Nessler's reagent is sensitive to air. Replace cap when not in use.
- 3 Ammonia concentrations can be expressed in a number of different ways. The following factors may be used for the conversion of readings :-
 - To convert from N to NH_4 - multiply by 1.3
 - To convert from N to NH_3 - multiply by 1.2
- 4 Interferences. Sufficient Rochelle salt is present to prevent turbidity due to at least 1,000 mg/l hardness. The test can be used on sea or salt water without the need for pre-treatment of the sample.
- 5 The Palintest Tubetests Ammonia/15N (Nessler) test is based on the Nessler method. Nessler's reagent (potassium tetraiodomercurate (II)) reacts rapidly with ammonia under alkaline conditions to form an orange-brown product

Disposal

Used Ammonia (Nessler) tubes contain alkaline mercury salts - which are toxic. Care must therefore be exercised in their disposal. The tubes must be disposed of in accordance with current waste legislation and consent limits. Used tubes must always be treated using a proper waste disposal system. A tube disposal service is available through Palintest Ltd (UK only). The tubes must not be reused as they are designed for single use only.

Compliance

The Ammonia (Nessler) method is a published standard method in the UK, USA [Standard Methods for the Examination of Water and Wastewater 4500-NH₃ C (17th Edition)] and in many other countries. The tests are approved by the USEPA as accepted methods.

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

6 REORDER CODES & ACCESSORIES

Reagent Description	Product Code
Ammonia (Nessler) Reagent Pack/15N	PL 420
Ammonia (Nessler) Reagent Pack/50N	PL 424
Ammonia (Nessler) Reagent Pack/100N	PL 425

Accessories Description	Product Code
Ammonia Check Standards	PTC 040
16 mm Tube Adaptor	PT 565