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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 instruments :-

- Compact Ammonia + Meter
- Compact Ammonia Duo Meter

The kits contain :-

Compact Ammonia +

Compact Ammonia + Meter
Instructions
16 mm Cuvette Adaptor

Reagents

None

Compact Ammonia Duo

Compact Ammonia Duo Meter

Instructions

16mm Cuvette Adapter

Crushing Rods

Test Cuvette Brush

Photometer Cuvettes

Reagents

Ammonia No. 1 Tablet (Indophenol)

Ammonia No. 2 Tablet (Indophenol)

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.

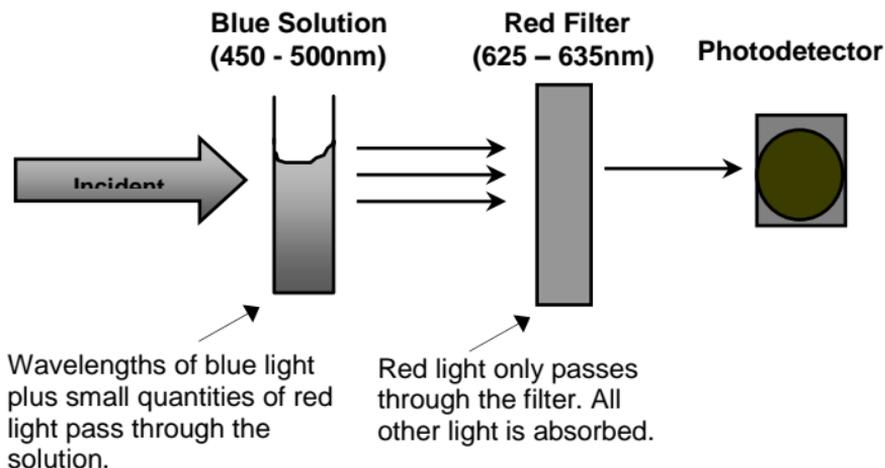
A colorimeter passes a white light beam through an optical filter which transmits only one particular band of wavelength of light to the photodetector where it is measured.

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 DPD 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 to set the instrument and a SAMPLE to take the reading.

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.

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 and press the 'blank sample' button.
- 4 An image displaying a blank cuvette 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 and replace it with the sample. Press the 'Read Sample' button to take a reading.

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

Care and Maintenance

The handling of the colorimeter cuvettes is important to ensure continuing accuracy. Scratches, finger-prints and water droplets on the cuvette or inside the light chamber can cause inaccurate results. It is imperative that the cuvettes 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. Cuvettes 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 cuvettes after preparing the blank and test sample.
- 4 Wipe test cuvettes on a clean tissue to remove drips or condensation before placing in the photometer.
- 5 Do not leave cuvettes standing in the photometer test chamber. Remove the cuvettes 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:

	Method	Test Name
1	Ammonia 15N (Nessler)	Nes 15N
2	Ammonia 50N (Nessler)	Nes 50N
3	Ammonia 100N (Nessler)	Nes 100N
4	Ammonia 1N (Indophenol)	Ind 1N*
5	Ammonia 12N (Indophenol)	Ind 12N*
6	Ammonia 50N (Indophenol)	Ind 50N*

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

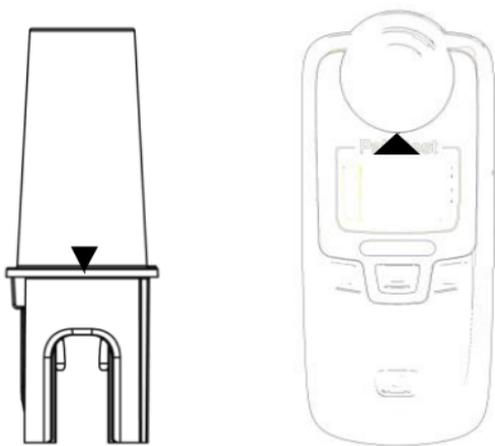
The ranges in each test refer to the lower limit of detection to the highest value meeting the analytical performance standard.

* = Only available on the Compact Ammonia Duo Meter.

To use the adaptor :-

The adaptor allows the use of 16 mm Tubetests in the Compact Ammonia +/-Ammonia Duo.

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



To set the blank :-

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

To take the test reading :-

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

Ammonia

Wavelength – 465nm

Method – Nessler Method

Range - Nes 15N = 0.06 - 15.0 mg/l N

- 1 Remove the cap of the Tubetests Ammonia/15N (Nessler) Cuvette and add 5.0 ml of sample by using the syringe. Cap cuvette and invert three times to mix.
- 2 Use this cuvette to Blank the instrument
- 3 Add 12 drops of Tubetests Ammonia (Nessler) Reagent. Replace cap and invert several times to mix.
- 4 Stand for one minute to allow colour development.
- 5 Select range Nes 15N
- 6 Take photometer reading in usual manner (see section 2).
- 7 The result is displayed as mg/l N.

Nes 50N = 0.5 - 50.0 mg/l

- 1 Remove the cap of the Tubetests Ammonia/50N (Nessler) Cuvette and add 1.0 ml of sample by using the syringe. Cap cuvette and invert three times to mix.
- 2 Use this cuvette to Blank the instrument
- 3 Add 12 drops of Tubetests Ammonia (Nessler) Reagent. Replace cap and invert several times to mix.
- 4 Stand for one minute to allow colour development.
- 5 Select range Nes 50N
- 6 Take photometer reading in usual manner (see section 2).
- 7 The result is displayed as mg/l N.

Nes 100N = 1.0 - 100.0 mg/l

- 1 Remove the cap of the Tubetests Ammonia/15N (Nessler) Cuvette and add 0.5 ml of sample by using the syringe. Cap cuvette and invert three times to mix.
- 2 Use this cuvette to Blank the instrument
- 3 Add 12 drops of Tubetests Ammonia (Nessler) Reagent. Replace cap and invert several times to mix.
- 4 Stand for one minute to allow colour development.
- 5 Select range Nes 100N
- 6 Take photometer reading in usual manner (see section 2).
- 7 The result is displayed as mg/l N.

Wavelength – 620nm

Method – Indophenol Method

Range - Ind 1N = 0.02 - 1 mg/l N

- 1 Fill test cuvette with sample to the 10 ml mark.
- 2 Use this cuvette to Blank the instrument
- 3 Add one Ammonia No 1 tablet and one Ammonia No 2 tablet, crush and mix to dissolve.
- 4 Stand for exactly 10 minutes to allow colour development.
- 5 Select range Ind 1N
- 6 Take photometer reading in usual manner (see section 2).
- 7 The result is displayed as mg/l N.

Ind 12N = 0.06 - 12.0 mg/l N

- 1 Remove the cap of the Tubetests Ammonia/12N/50N (Indophenol) Cuvette and add 1.0 ml of sample by using the syringe. Cap cuvette and invert three times to mix.
- 2 Use this cuvette to Blank the instrument
- 3 Add one Tubetests Ammonia tablet, crush and mix to dissolve. Replace cap and invert several times to mix.
- 4 Stand for exactly 10 minutes to allow colour development.
- 5 Select range Ind 12N
- 6 Take photometer reading in usual manner (see section 2).
- 7 The result is displayed as mg/l N.

Ind 50N = 0.1 - 50.0 mg/l N

- 1 Remove the cap of the Tubetests Ammonia/12N/50N (Indophenol) Cuvette and add exactly 0.2 ml of sample using the syringe. Swirl cuvette to mix.
- 2 Use this cuvette to Blank the instrument
- 3 Add one Tubetests Ammonia tablet, crush and mix to dissolve. Replace cap and invert several times to mix.
- 4 Stand for exactly 10 minutes to allow colour development.
- 5 Select range Ind 50N
- 6 Take photometer reading in usual manner (see section 2).
- 7 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	Dual wavelength, direct-reading colorimeter
Optics	Palintest Dual LED light source optical system with narrow band wavelength filters and photodetectors
Automatic Wavelengths	465nm and 620nm
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 cuvettes
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 rub 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 cuvette 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 Ammonia Conditioning Reagent (AT 170) can be used on samples with high calcium content that otherwise may cause turbidity.
- 5 The Indophenol method is temperature dependent. Samples should be $20^\circ \pm 2^\circ\text{C}$ for optimum results.

Disposal

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

Compliance

The Palintest Compact Meter 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) Tubetests, 0 – 15 mg/l N (25 pack)	PL 420
Ammonia (Nessler) Tubetests, 0 -50 mg/l N (25 pack)	PL 424
Ammonia (Nessler) Tubetests, 0 -100 mg/l N, (25 pack)	PL 425
Ammonia (Indophenol) Tubetests, 0 – 12/0 – 50 mg/l N	PL 400
Ammonia (Indophenol) Tablets, 0-1mg/l N	AP 152
Ammonia Conditioning Reagent	AT 170

Accessories Description	Product Code
Ammonia Calibration Check Standards	PTC 041
16 mm Cuvette Adaptor	PT 565

Tubetests is a registered trademark of Palintest Ltd.