

TEST CONTAMINATION

When using the Palintest 1000 Bromometer-Duo, it is vitally important to avoid contamination between the different test reagent systems. To achieve proper differentiation between free and combined chlorine, it is particularly important to avoid the DPD No 1 stage of the test being contaminated with DPD No 3 reagent.

Always ensure that test tubes, test tube caps and stirring rods are thoroughly washed between tests and when changing from one reagent system to another. Avoid handling the tablets as traces of the reagents on fingers can cause contamination.

CALIBRATION CHECK

Instrument calibration should not change in use. Certified colour standards are available for checking instrument optical system. Use only Series M2 Standards. Standards may differ in colour to actual test colours.

CARE AND MAINTENANCE

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

- 1 Prepare you workplace before use. Make sure you have sufficient space to work in and all the necessary reagent systems.
- 2 Wipe test tubes on a clean tissue to remove drips or condensation before placing in the photometer. Remember to cap the tube before reading in the instrument.
- 3 Immediately wipe up any drips or spillages onto the instrument or into the test chamber with a clean tissue.
- 4 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.
- 5 Keep the carrying case in a clean, dry condition. Make sure any solutions that have spilled or drained into the carrying case are dry before the case is closed up and the instrument is put away.

Replace the battery when the 'B' symbol remains on the display. To remove the battery compartment cover press gently on the sides of the cover and pull downwards. 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.

The Palintest 1000 Bromometer-Duo is 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 instrument serial number. This guarantee does not affect statutory rights.

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

TECHNICAL SPECIFICATION

Instrument Type	Pre-programmed colorimeter for direct-reading of bromine and chlorine residual
Optics	Palintest M2 optical system with pulsed blue-green LED, wavelength filter and photodetector
Operating Ranges	Bromine 0 – 10.00 mg/l Chlorine 0 – 5.00 mg/l
Operating Temp	0 – 40°C/32 – 104°F
Display	10 mm character LCD
Test Cells	For use with round test tubes 10 ml, 20 mm OD, 18 mm path length
Reagents	For use with Palintest DPD Bromine and DPD Chlorine test reagents
Operation	Two-button operation
Blank/Zero Setting	Optionally held in memory or reset for each reading
Internal Calibration	Factory set. Recalibration through internal software
Instrument Case	Splash-proof case with membrane keypad
Power Supply	2 x 1.5v batteries. Power management system with auto-switch off
Size	Instrument only 173 x 75/44 x 41 mm

For more information about Palintest products, visit our web site at www.palintest.com

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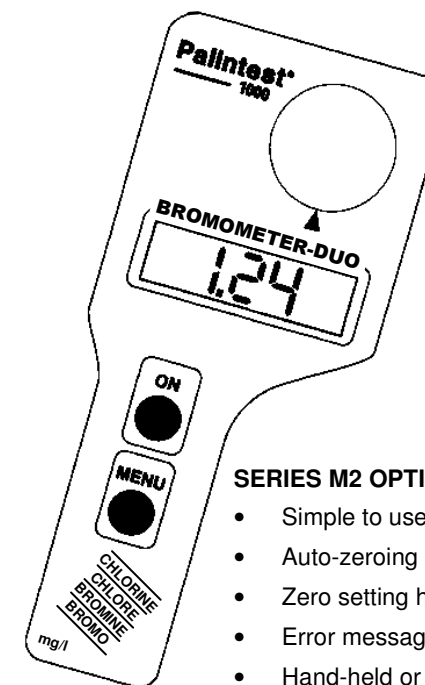
Palintest®

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BROMOMETER-DUO

PRECISION DUAL RANGE PHOTOMETER FOR MEASURING BROMINE AND CHLORINE CONCENTRATION IN WATER



SERIES M2 OPTICAL SYSTEM

- Simple to use
- Auto-zeroing
- Zero setting held in memory
- Error message display
- Hand-held or bench use

Ranges

Bromine	0 – 10.00 mg/l
Chlorine	0 – 5.00 mg/l

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OPERATING PROCEDURE

Blank and Sample Tubes

The Palintest 1000 Bromometer-Duo uses a BLANK tube to set the instrument to zero and a SAMPLE tube to take the test measurement.

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 below.

The zero setting is held in memory. It is not necessary to reset the zero each time a reading is taken or between different test ranges provided the conditions of use are the same. The zero setting can be confirmed if necessary by taking a reading on the blank tube.

To Select Test

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

DPD Bromine	(0 – 10.00 mg/l)	Br
DPD Chlorine	(0 – 5.00 mg/l)	Cl

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

To Set Zero

- 1 Insert the BLANK tube into the test chamber.
- 2 Press and hold down the ON key until the '---' symbol appears on the display (2 seconds).
- 3 Release the ON key when the display shows '0.00'. This zero setting will be held in memory.

To Take Test Reading

- 1 Insert the SAMPLE tube into the test chamber.
- 2 Press the ON key until the test range indication appears on the display (1 second). Release the key and the test result will be displayed. (Do not hold the key down or the instrument will attempt to blank on the sample and cause errors in the readings).
- 3 The display will show '**HI**' if the reading exceeds the maximum limit of the test range. In this case repeat the test on a diluted sample.

TEST PROCEDURE

DPD BROMINE TEST

0 – 10.00 mg/l

Reagents and Equipment

Palintest DPD No 1 Tablets – Photometer Grade
Round Test Tubes, 10 ml glass (PT 515)

Test Procedure

- 1 Rinse test tube with sample leaving two or three drops of sample in the tube.
- 2 Add one DPD No 1 tablet, crush and then fill the test tube with sample to the 10 ml mark. Mix to dissolve tablet.
- 3 Take photometer reading. The reading represents the **total bromine** concentration as parts per million (milligrams per litre).

For most purposes, it is sufficient to simply measure the total bromine residual since both free and combined bromine are active disinfectants. However, it is possible to separate between free and combined bromine in applications where this is required. A leaflet describing the separate determination of free and combined bromine is available on request.

Note that a too high bromine level (above 20 mg/l) can cause bleaching of the pink colouration formed in the DPD test and give a false negative or low result. If a colourless or weakly coloured test solution is obtained when bromine is known to be present, check for the possibility of bleaching by repeating the test on a sample diluted with bromine-free and chlorine-free water.

DPD CHLORINE TEST

0 – 5.00 mg/l

Reagents and Equipment

Palintest DPD No 1 Tablets – Photometer Grade
Palintest DPD No 3 Tablets – Photometer Grade
Round Test Tubes, 10 ml glass (PT 515)

Test Instructions

- 1 Rinse test tube with sample leaving two or three drops of sample in the tube.
- 2 Add one DPD No 1 tablet, crush tablet and then fill the test tube to the 10 ml mark. Mix to dissolve tablet.
- 3 Take photometer reading immediately. The reading represents the **free** chlorine residual as milligrams per litre (parts per million). Stop the test at this stage if only free chlorine determination is required.

- 4 If it is desired to measure combined or total chlorine residual, continue the test on the same test portion. Add one DPD No 3 tablet, crush and mix to dissolve.

- 5 Stand for two minutes to allow full colour development.

- 6 Take photometer reading. The reading represents the **total chlorine** residual as milligrams per litre (parts per million).

- 7 The **combined chlorine** residual is obtained by subtracting the free chlorine residual result from the total chlorine residual result :-

Combined Chlorine = Total Chlorine – Free Chlorine

Note that a too high chlorine level (above 10 mg/l) can cause bleaching of the pink coloration formed in the DPD test and give a false negative result. If a colourless test solution is obtained when chlorine is known to be present, check for the possibility of bleaching by repeating the test on a sample diluted with chlorine-free water.

Standard Methods

The DPD method is a published Standard Method in the UK, the European Community, the USA and in many other countries. The Palintest DPD free and total chlorine tests are approved by the USEPA as accepted versions of the Standard Method 4500-C1-G.

ERROR MESSAGES

The Palintest 1000 Bromometer-Duo displays error messages to assist the operator in the event of any problems with the sample or instrument.

Display	Cause	Action
E1	Coloured, dirty or scratched BLANK tube	Re-zero instrument on a correct BLANK in a clean, dry tube.
E2 or E3	a) Incorrect BLANK used to zero instrument. b) Electrical fault in instrument.	a) Re-zero instrument on a correct BLANK. b) Return instrument for repair.
E4	Battery voltage too low for correct reading.	Change batteries.
E5	Stray light has affected the reading.	a) Remove instrument from vicinity of spotlights or other bright light sources. b) Check instrument case for damage.