

PERFORMANCE DATA

A NEW WAY TO TEST WITH DPD

Over the last few years the use of portable colorimetric meters for water quality testing has grown rapidly. This is easy to understand, given the current attention of providing the safest water possible to consumers. What is difficult to understand is why colorimetric meters have remained relatively unchanged and unimproved for so long. The more sophisticated photometers/colorimeters have only become larger and more expensive, and their focus has been on a large menu of tests. Nothing really new has happened with portable colorimeters and colorimetric tests until now.

N,N-diethyl-p-phenylenediamine (DPD) is universally accepted as the indicator of choice for routine colorimetric free and total chlorine testing. A variety of DPD reagent delivery methods are commercially available. Each delivery method has benefits and drawbacks.

DPD liquid reagents have a short shelf life and can be inconvenient since pipettes are required to deliver the liquid reagents. DPD reagent powder pillows have a longer shelf life, but technicians complain of irritating dust and spillage of powder when delivering the reagent powder to the test vial. Incomplete delivery can also cause questionable results. DPD tablets avoid both of these issues but come with the inconvenience of having to crush the tablet and they dissolve slowly when the sample is cold.

A test for free chlorine using a **NEW** DPD delivery method was introduced in 2005. The Industrial Test Systems, Inc. eXact™ Strip DPD-1, when used with an EPA, ISO, or DIN-compliant meter, delivers data acceptable for compliance reporting.

The DPD-1 ReagentStrip™ delivers the chemicals for Free Chlorine DPD Colorimetric determination as specified in Standard Methods for the Examination of Water and Wastewater Method 4500-Cl G (published by APHA, AWWA, and WEF): Monobasic Phosphate, Dibasic Phosphate, EDTA Sodium salt, and DPD Sulfate. Potassium Iodide is d for Total Chlorine testing.

The eXact™ EZ photometer system was especially designed for use with the eXact™ Strip DPD-1 without the need for vials or cells; further streamlining the testing process.



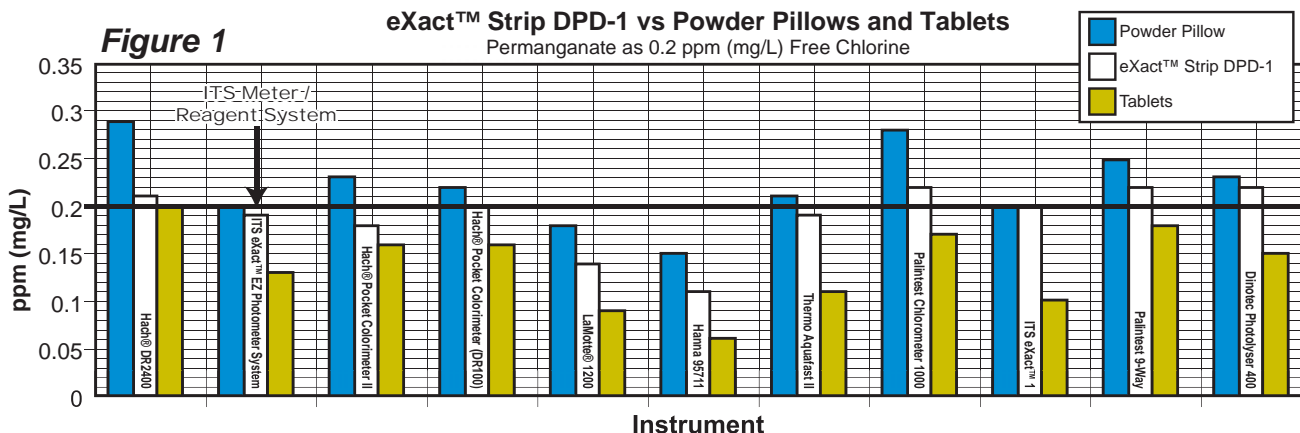
The eXact™ Strip DPD-1 was functional in all EPA Compliant 10ml test volume portable colorimeters tested. The following study was performed to demonstrate this compatibility. Eleven different meters manufactured by nine different companies were evaluated using several chlorine standards. The data reported below (Table 1, Figure 1) shows how the meters perform against one another with identical test samples. The study compares two standard levels across the instruments using powder pillows, tablets, and the eXact™ Strip DPD-1. Because of its stability, Permanganate standards as 0.2 and 0.8 ppm (mg/L) Free Chlorine were analyzed on each instrument below using powder pillows (Hach® Company), eXact™ Strip DPD-1, and tablets (Palintest, Ltd.); according to the DPD reagent manufacturer's instructions.

Table 1

DPD Delivery Method Compatibility	0.2 ppm (mg/L)			0.8 ppm (mg/L)		
	Powder Pillow	eXact™ Strip DPD-1	Tablets	Powder Pillow	eXact™ Strip DPD-1	Tablets
Hach® DR2400	0.29	0.21	0.20	0.80	0.89	0.76
ITS eXact™ EZ Photometer System	0.20	0.19	0.13	0.73	0.76	0.68
Hach® Pocket Colorimeter II	0.23	0.18	0.16	0.79	0.81	0.73
Hach® Pocket Colorimeter (DR100)	0.22	0.20	0.16	0.83	0.86	0.76
LaMotte® 1200	0.18	0.14	0.09	0.68	0.73	0.63
Hanna 95711	0.15	0.11	0.06	0.74	0.74	0.66
Thermo Aquafast II	0.21	0.19	0.11	0.78	0.77	0.73
Palintest Chlorometer 1000	0.28	0.22	0.17	0.90	0.92	0.83
ITS eXact™ 1	0.2	0.2	0.1	0.8	0.8	0.7
Palintest 9-Way	0.25	0.22	0.18	0.93	0.99	0.88
Dinotec Photolyser 400	0.23	0.22	0.15	0.84	0.92	0.77
Mean	0.22	0.19	0.14	0.80	0.835	0.74
% difference from expected	10.91	5.45	31.36	0.23	4.43	7.61

Figure 1

eXact™ Strip DPD-1 vs Powder Pillows and Tablets
Permanganate as 0.2 ppm (mg/L) Free Chlorine



In this study the tablets gave a lower value for the 0.2ppm Permanganate data set compared to the powder pillows and the eXact™ Strip DPD-1. Overall, the results for all three delivery methods are comparable.

ITS eXact™ EZ FREE CHLORINE TEST SYSTEM COMPARED TO A LEADING COMPETITOR'S SYSTEM

This independent study was performed by the Catawba Analytical Research Laboratory at the request of ITS, Inc. A third-year chemistry student at Catawba College performed the entire study. Samples were tested in duplicate.

Purpose: To compare the performance of the Hach® DPD Free Chlorine powder pillows/DR 890 meter system and the ITS eXact™ Strip DPD-1/eXact™ EZ meter system.

Study Design: Samples of tap water from Catawba College in Salisbury, NC were spiked with chlorine and adjusted to the desired levels with distilled water, if necessary. The samples were tested using the systems below:

1. Hach® Free Chlorine powder pillows for 10 ml samples (# 21055-69) and the Hach® DR 890 meter (SN: 971190000757), program #9.
2. ITS eXact™ Strip DPD-1 for 10 ml samples (#481647) and the eXact™ EZ meter (SN: 270112) in Free Chlorine mode.

Test Procedures:

Hach® DR 890:

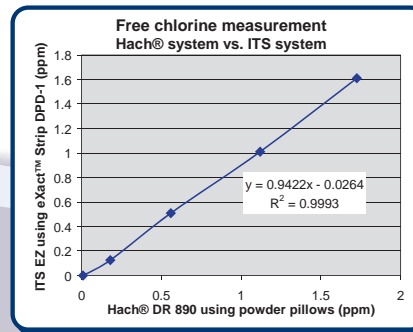
1. Rinse the cell and then fill with sample to the 10ml line.
2. Dry outside of cell. Place cell into chamber and replace the cover. Blank the DR 890 meter.
3. Remove the cell from the meter. Add the contents of one powder pillow to the cell. Mix as directed for 20 seconds.
4. Return the cell to the chamber and replace the cover.
5. Press read

eXact™ EZ:

1. Rinse the integrated cell with the sample to be tested, then fill the cell to the top with the sample.
2. Cover with cap and blank the meter.
3. Dip one eXact™ Strip DPD-1 in the sample for 20 seconds with a gentle back-and-forth motion. Discard the strip.
4. Cover with cap and press read.

Conclusion:

When testing free chlorine, the ITS eXact™ EZ meter / eXact™ Strip DPD-1 system shows good correlation to the Hach® DR 890/ powder pillow system.



Hach® is a registered trademark of Danaher Corporation.

ITS EXPANDS INTO EUROPE

Industrial Test Systems, Inc., manufacturer of accurate colorimetric water test kits including instrumentation, ReagentStrips™, SenSafe™ strips, and test strips for over 28 parameters, is proud to announce the opening of its new sales and distribution center located in the United Kingdom – ITS Europe, LTD. "With the need for testing alternatives rapidly growing around the world, ITS Europe is strategically placed to better facilitate the sales and distribution of products while limiting lead times and transit costs to the customer," says Ivars Jaunakais, President of Industrial Test Systems. Heading up the ITS Europe division is industry veteran Steve Cooper, formerly with Tintometer UK. For more information, or to contact ITS Europe, please visit www.sensafe.com or email sales@sensafe.com.



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