

# **POOLMASTER®**

We Make Water Fun!

# **DPD 5-Way Test Kit**

**To test for:**

DPD Free Chlorine

Bromine

pH

Alkalinity

Acid Demand



**Regular Testing Helps Maintain  
a Clean, Clear Sparkling Pool.**

NOTE: The cap must always be used with the test kit vial.  
Do not cover the test kit vial with fingers during use.

**CAUTION: MAY CAUSE SKIN AND EYE IRRITATION.  
COMBUSTIBLE. MAY BE HARMFUL IF SWALLOWED.**

Read carefully other cautions in the Table of Contents.



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**CAUTION: MAY CAUSE SKIN AND EYE IRRITATION. COMBUSTIBLE. MAY BE HARMFUL IF SWALLOWED. KEEP OUT OF REACH OF CHILDREN.** Keep away from heat, sparks, open flames, and hot surfaces. No smoking. Avoid eye contact. May be harmful if swallowed. Wear gloves and eye protection. Remove contaminated clothing and wash before re-use.

**First Aid:** If inhaled, seek fresh air. If on skin or in eyes, rinse thoroughly with water. Remove contact lenses, if present and easy to do and continue rinsing. If swallowed, rinse out mouth and then drink plenty of water. If any of the above occurs, contact a physician or Poison Control Center immediately. **DO NOT INDUCE VOMITING. Contains: Boric Acid, Citric Acid, Hydrochloric Acid, Isopropyl Alcohol, N,N-Diethyl-p-phenylenediamine sulfate, Phenol Red, Sodium Thiosulfate. May damage metal objects.** In case of fire use dry chemical or CO<sub>2</sub> to extinguish. Store locked up. Store in a well-ventilated place. Keep cool. Dispose of contents in accordance to applicable law. 24-Hour Emergency - 1-800-255-3924

## INTRODUCTION

Your swimming pool is a source of enjoyment and relaxation for the entire family. It is a pleasure to have a clean, clear, sparkling pool. And, it is important to have sanitary and “comfortable” pool water.

To be sure that pool water is attractive, sanitary and “comfortable” to swim in, it must be free from dust, algae, mineral deposits, bacteria and other foreign matter, which regularly enter the pool water from wind, rain, pollen, leaves, dust and the bodies of swimmers. If untreated, these contaminants cannot only create a serious health hazard, but can also cause water cloudiness and discoloration, slimy conditions and unpleasant odors. Further, trouble can arise with pool equipment, accessories and the pool’s interior finish because of improper water treatment.

So, water must be treated. In order to treat a pool properly, it is necessary to test the water for key pool water measurements. These key measurements can be easily made with your Poolmaster test kit. This easy-to-use test kit gives you tests for Free Chlorine, Bromine, pH, Alkalinity and Acid Demand.

That, along with taking the necessary steps to maintain your pool water through proper filtration and “chemical feeding”, will ensure clean, clear sparkling pool water.

## KEY POOL WATER MEASUREMENTS

There are four essential measurements of a pool's "health":

1. **Free Chlorine / Bromine:**

- ▶ **Free Chlorine** - The amount of free chlorine in pool water, measured on a ppm basis (parts per million).
  - ▶ **Bromine** - Similar to chlorine, it is used to sanitize water and measured on a ppm basis.
2. **pH** - The balance of acidity versus alkalinity in the water. This is measured on a scale from 0 to 14, with 0 being the most acidic, 7 being neutral and 14 being the most alkaline.
3. **Total Alkalinity** - The amount of certain alkaline buffering materials in the water, usually measured on a ppm basis.
4. **Acid Demand** - Determines for you the amount of acid to be added to the pool water to return it to the proper pH level based on the size of your pool.

These measurements are made with your test kit. Prevent pool problems before they develop by using your test kit regularly.

### FREE CHLORINE

When chlorine is added to a pool, it immediately goes to work to attack and kill bacteria, algae and other foreign materials in the water. In the course of destroying these organisms, the chlorine literally gets "used up". It is also dissipated by sunlight and lost by water splash-out. The chlorine that is left to protect the pool water against incoming bacteria and algae is called the "free chlorine". For proper disinfection, the free chlorine residual should be maintained at 2.0 parts per million (ppm).

This can and should be determined through regular use of your test kit. The free chlorine can exist as free (active) chlorine and/or combined (less effective) chlorine. You can distinguish between free and combined chlorine by following the test procedures outlined in step 4 of the Free Chlorine Test. Regular use of chlorine will normally keep the chlorine residual at the proper level. However, once in a while, during periods of high bather load, heavy rains or extremely high temperatures, a “shock treatment” or “super chlorination” of three to four times the normal chlorine application may be needed to kill the abnormal amounts of algae and bacteria which may have entered the pool.

## **BROMINE**

Bromine is another effective pool and spa sanitizer, although it is somewhat different from chlorine. Pool or spas using bromine do not require a conditioner. Like chlorine, bromine combines with nitrogen and ammonia compounds to form bromamines (not chloramines). Unlike chloramines, bromamines do not irritate eyes or have an offensive odor.

## **pH BALANCE**

pH is the relative measure of acidity versus alkalinity in the pool water.

High pH (too much alkaline or a reading over 7.6) will cause loss of chlorine effectiveness and may cause cloudy water and scale formation on pipes and the sides of the pool. Low pH (too much acid or a reading under 7.2) may cause irritation to the eyes, ears, noses and throats of swimmers and may result in corrosion of pipes and fixtures and deterioration of the filter.

The pH of pool water should be maintained between 7.2 and 7.6 on the pH scale. At that level, with proper chlorination, most algae, corrosion and scale problems will be avoided.

## **TOTAL ALKALINITY**

It is important not to confuse total alkalinity with pH. Total alkalinity refers to the quantity of alkaline materials in the pool water, while pH measures the balance point between these alkaline materials and acidic materials. Total alkalinity could be too high or too low even if pH was normal.

High alkalinity may cause cloudy water, calcium deposits on pool walls and pipes and irritation to the body tissues of swimmers. Low alkalinity may cause eye irritation and corrosion of pool equipment.

Swimming pool water is most satisfactory when the total alkalinity level is between 80 and 100 ppm. At that level, the alkalis help stabilize the pH and allow the chlorine to do its job.

Once the proper level of alkalinity is achieved, it will hold steady for weeks without further treatment, although it is recommended that test readings be taken a least twice a month.

## TEST 1: DPD Free Chlorine or Bromine

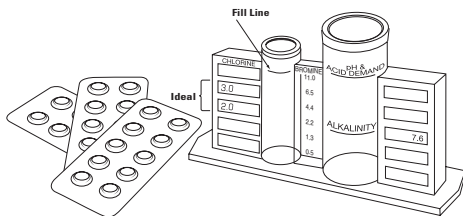
### DPD FREE CHLORINE TEST

1. Fill small test vial to line with pool water.
2. Add DPD #1 tablet.
3. Place cap on vial and invert several times to dissolve tablet.
4. Compare color with the pink chlorine standards on the left. The result is read in ppm (parts per million).
5. A desirable free chlorine reading is 2.0. However, additional chlorine may be needed to maintain a proper level.

If Chlorine residual is above 1.5, be sure to add 1 additional drop of Solution 4 to test vial during tests 2 and 4 to assure accurate results of the remaining tests.

### TO TEST BROMINE

1. Rinse test vial marked BR and fill to mark with spa or pool water.
2. Add 1 DPD #1 tablet.
3. Place cap on vial and invert several times to mix.
4. Match color in vial with bromine standards on the right within 30 seconds (make sure the BR marked side of the test block is being read). The results are read in ppm (parts per million). A desirable reading is 4.4 ppm. However, additional bromine may be needed to maintain proper level.

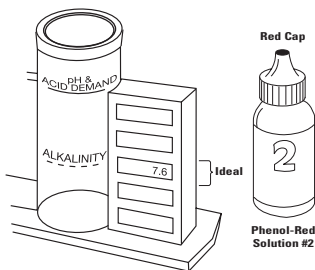


## TEST 2: pH Level

(for degree of acidity or alkalinity of pool water)

1. Fill the large vial with pool water to the top (solid) line marked "pH & Acid Demand".
2. Add 1 drop of Solution #4.
3. Add 5 drops of Solution #2. Place cap on vial and swirl to mix.
4. Compare color with pH color standards on the right.
5. A desirable pH reading is 7.2 to 7.6. If reading is 7.8 or above, acid is required. Perform Test 3 for ACID DEMAND using this same water sample.

If reading is below 7.2, raise it by adding soda ash. See your local pool supply dealer for recommended dosage.





## TEST 3: Acid Demand

(when pH reading is 7.8 or above)

1. Use sample water from the pH test. Counting each drop, add Solution #3 (swirling between drops) until the color matches approximately the 7.4 color standard. Do not count the drop which lowers the pH to 7.2 or below.
2. Refer to **Acid Demand Table** on Page 10 for proper amount of acid to be added based on the capacity of your pool or spa.
3. If more than 1 pint of acid per 10,000 gallons is required, add it in two or more doses. Allow about 1 hour between doses and do not add more than 2 quarts in one day. Test again in 24 hours. Additional acid may be needed to maintain correct pH.
4. **IMPORTANT** – Add acid only when the filter is running and avoid acid concentrations in any one place. Add slowly to deep end of pool away from the vicinity of the surface skimmer and 12 to 18 inches out from the pool walls. Leave filter on for at least one hour.
5. If the first drop of Solution #3 lowers the pH to 7.2 or below, it is an indication that the total alkalinity is too low (Test 4). Don't add acid. Proceed to Test 4 to determine your TOTAL ALKALINITY.

## TEST 4: Total Alkalinity

1. Rinse the large vial with pool water and fill to the lower (dashed) line marked "Alkalinity".
2. Add 1 drop Solution #4.
3. Add 2 drops Solution #5 and swirl to mix. The test solution will now be violet in color.
4. Add Solution #3 counting each drop and swirling between drops, until the color makes a permanent change to light yellow or clear.
5. Multiply the number of drops of Solution #3 used by 10 to determine the total alkalinity.

Example: 8 drops = 80 ppm.

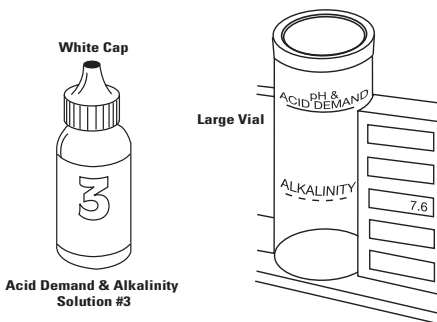
6. Total alkalinity of 80-100 ppm is desirable.

If alkalinity is less than 80 ppm, raise it by adding sodium bicarbonate. See Raising Total Alkalinity Chart on Page 9 for details.

If alkalinity is more than 120 ppm, pH and Acid Demand test should be performed more than once a week. Make the proper additions according to the test results.

Add up to, but no more than, one quart if acid daily until the alkalinity level drops below 120 ppm. Do not add acid if the pH level is below 7.6. A total alkalinity range above 200 ppm indicates one or more daily additions of acid may be needed to adjust pH and destroy the excess alkalinity.

This test should be performed about once a week until the alkalinity is adjusted to the desired range. Thereafter, twice a month should be sufficient.



**Green Cap****Chlorine Neutralizer  
Solution #4****Blue Cap****Total Alkalinity Test  
Solution #5**

<b>Raising Total Alkalinity with Sodium Bicarbonate*</b>									
<b>U.S.</b>					<b>METRIC</b>				
Gallons	10PPM	20 PPM	30 PPM	Liters	10PPM	20 PPM	30 PPM	10PPM	30 PPM
5,000	12 oz	1 1/2 lb	2 1/4 lb	20,000	360 gr	720 gr	1,080 gr	360 gr	1,080 gr
10,000	1 1/2 lb	3 lb	4 1/2 lb	40,000	720 gr	1,440 gr	2,160 gr	720 gr	2,160 gr
20,000	3 lb	6 lb	9 lb	75,000	1,360 gr	2,720 gr	4,080 gr	1,360 gr	4,080 gr
25,000	3 3/4 lb	7 1/2 lb	11 1/4 lb	95,000	1,700 gr	3,400 gr	5,100 gr	1,700 gr	5,100 gr
50,000	7 1/2 lb	15 lb	22 1/2 lb	190,000	3,400 gr	6,800 gr	10,200 gr	3,400 gr	10,200 gr

\* See your dealer for recommended products

## ACID DEMAND TEST

### Amount of Muriatic Acid Required

oz = Ounce    C = Cup    P = Pint    Q = Quart    G = Gallon    2 Cups = 1 Pint    2 Pints = 1 Quart    4 Quarts = 1 Gallon

**DROPS OF SOLUTION 3 TO OBTAIN IDEAL pH RANGE**

Pool Capacity in Gallons	1	2	3	4	5	6	7
250	1/5 oz	2/5 oz	3/5 oz	4/5 oz	1 oz	1-1/5 oz	1-2/5 oz
500	2/5 oz	4/5 oz	1-1/5 oz	1-3/5 oz	2 oz	2-2/5 oz	2-4/5 oz
750	3/5 oz	1-1/5 oz	1-4/5 oz	2-2/5 oz	3 oz	3-3/5 oz	4-1/5 oz
1,000	4/5 oz	1-3/5 oz	2-2/5 C	3-1/5 oz	4 oz	4-4/5 oz	5-3/5 oz
2,500	1/4 C	1/2 C	3/4 C	1 C	1-1/4 C	1-1/2 C	1-3/4 C
5,000	1/2 C	1 C	1-1/2 C	1 P	2-1/2 C	3 C	3-1/2 C
10,000	1 C	1 P	1-1/2 P	1 Q	2 1/2 P	3 P	3-1/2 P
15,000	1-1/2 C	1-1/2 P	2-1/4 P	3 P	2 Q	2-1/4 Q	2-1/2 Q
20,000	1 P	1 Q	3 P	2 Q	2-1/2 Q	3 Q	3-1/2 Q
25,000	1-1/4 P	2-1/2 P	2 Q	2-1/2 Q	3 Q	1 G	4-1/2 Q
30,000	1-1/2 P	3 P	2-1/4 Q	3 Q	1 G	4-1/2 Q	1-1/4 G
35,000	1-3/4 P	3-1/2 P	2-3/4 Q	3-1/2 Q	4-1/2 Q	1-1/4 G	1-1/2 G
40,000	1 Q	2 Q	3 Q	1 G	1-1/4 G	1-1/2 G	1-3/4 G
45,000	2-1/4 P	4-1/2 P	3-1/2 Q	4-1/2 Q	5-1/2 Q	1-3/4 G	2 G
50,000	1-1/4 Q	2-1/2 Q	1 G	1-1/4 G	1-1/2 G	2 G	2-1/4 G

**Dry Acid Equivalents**    4/5 oz Muriatic Acid = 1 oz Dry Acid    1 oz Muriatic Acid = 1-1/4 oz Dry Acid    1 Cup Muriatic Acid = 10 oz Dry Pool Acid  
 1 Pint Muriatic Acid = 20 oz Dry Pool Acid    1 Quart Muriatic Acid = 40 oz Dry Pool Acid

**NOTES:** Use only Clean Plastic measuring cups or spoons with liquid or dry acid. See page 7 for important information on Acid Demand.

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## Testing Hints

- ▶ Conduct tests before adding chemicals.
- ▶ Test on a regular basis to assure proper and healthful pool maintenance.
- ▶ Keep test vials clean by rinsing with pool water before and after each test.
- ▶ Take pool water samples from a depth of at least 12 to 18 inches below the surface away from return lines.
- ▶ To save time, fill both small and large vials at the same time, capping the large vial until needed for the pH Test.
- ▶ Slowly add drops of test solution to water samples while holding dropper bottle and test vial vertically to ensure full size drop.
- ▶ Read all test results immediately after swirling unless directed otherwise.
- ▶ For accurate color comparisons during daytime, perform tests out of bright sunlight facing away from the light.
- ▶ It is recommended that colors be matched against a light background.
- ▶ As with all chemicals, store your test kit in a cool, dark place and keep the test kit block and solutions in the original case. Too much heat or freezing temperatures may alter the indicator solutions.
- ▶ For accuracy, check color standards once a year and use fresh solutions to start each season.
- ▶ Know the size (capacity) of your pool. See next page for easy-to-use formulas.

## HOW TO ESTIMATE THE CAPACITY OF YOUR POOL IN GALLONS OF WATER

### Rectangular or Square Pools:

Average depth x length x width x 7.5.

Example: Length: 40'

Width: 20'

Depth: 5'

$5 \times 40 \times 20 \times 7.5 = 30,000$  gallons

### Round Pools:

Diameter of the pool x the diameter of the pool x the average depth of the pool x 5.9.

Example: Diameter: 20'

Depth: 4'

$20 \times 20 \times 4 \times 5.9 = 9,440$  gallons

### Oval Pools:

Average depth x length x width x 5.9 = total gallons

### Free Form Pools:

Estimate as closely as you can the number of cubic feet and multiply this by 7.5, the number of gallons is each cubic foot.

If pool has sloping sides, multiply gallonage by 0.85. In many instances, your pool contractor knows how many gallons there are in your pool. Give him a call; he will be pleased to be of service.

Number of gallons in pool \_\_\_\_\_

**Observe These Common Sense Precautions When  
Handling Pool Chemicals:**

1. Store all chemicals out of the reach of children.
2. If you get any chlorine on yourself, rinse the area of contact with plenty of water. If you spill chlorine outside the pool, clean it up and wash the area.
3. **Never** mix different kinds of chemicals.
4. Chlorine and acid should not be added to your pool at the same time. Allow approximately one hour between application of chlorine and acid.
5. When you add chlorine or acid to the pool water, do it carefully. When the product is powder or granular, add it close to the surface of the water so that particles won't be blown by the wind.
6. When you add chlorine or acid to the water, be sure filter is in operation to assure adequate dispersal. Leave filter on for at least one hour.

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Need Assistance?

Call our Toll Free Consumer

Service Number: 1-800-854-1492

Assembled in USA with global components

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