

## TEST DESCRIPTION & RECOMMENDED RANGES

### CHLORINE & BROMINE

Chlorine and bromine sanitize pool water by killing over 99% of the bacteria present in the water. They're also effective oxidizers that burn up organic waste such as urine, perspiration and dead bacteria. A weekly shock treatment is required to eliminate weak, ineffective chloramines that are formed during this process.

#### RECOMMENDED RANGE:

Chlorine: 1.0 to 3.0 ppm / Bromine: 2.0 to 4.0 ppm

#### WHEN TO TEST:

Twice daily (or as bather load demands)

#### POTENTIAL PROBLEMS:

- Too low – inadequate sanitation / bacteria & algae growth
- Too high – uneconomical use of sanitizer

### pH

pH is a measurement of the relative acidity or basicity of pool water. 7 is neutral and pool water should be slightly basic (7.2 – 7.6). A low pH can cause corrosion and skin and eye irritation. A high pH can cause scale formation and reduce the effectiveness of chlorine. Maintaining a proper pH helps ensure bather comfort and maximizes the effectiveness of your chemicals.

#### RECOMMENDED RANGE:

pH: 7.2 to 7.6

#### WHEN TO TEST:

Daily

#### POTENTIAL PROBLEMS:

- Too low – corrodes surfaces / irritates eyes and skin
- Too high – scale deposits / cloudy water / poor sanitizer efficiency

### TOTAL ALKALINITY

Total alkalinity is a measurement of all the alkaline materials in your pool water. These act as buffering agents, neutralizing acids and bases to help prevent a condition known as "pH bounce" which can cause corrosion and scale formation. Maintaining proper alkalinity is the best way to save on corrective chemicals.

#### RECOMMENDED RANGE:

Total alkalinity: 80 to 120 ppm

#### WHEN TO TEST:

Weekly

#### POTENTIAL PROBLEMS:

- Too low – pH difficult to maintain / corrosion tendency
- Too high – pH difficult to adjust / potential for scaling

## POOL & SPA WATER TEST PROCEDURE

### CHLORINE / BROMINE TEST

- 1 – Rinse and fill chlorine /bromine cell to mark with water to be tested.
- 2 – Add 5 drops OTO-50. Cap and invert to mix.
- 3 – Match color with color standard. Record as parts per million (ppm) total chlorine or total bromine. For Chlorine: See dosage chart for adjustment. For Bromine: See manufacturer's instructions for adjustment.

When contaminants are introduced into pool water, they react with free chlorine to produce combined chlorine or chloramines. Combined chlorine is less effective than free chlorine, usually has a foul smell, and is an eye irritant. A shock treatment or superchlorination can increase free chlorine.

### pH TEST

- 1 – Rinse and fill pH cell to mark with water to be tested.
- 2 – Add 5 drops pH-Red. Cap and invert to mix.
- 3 – Match color with color standard. Record as pH units and save sample if pH needs adjustment. If sample color is between two values, pH is average of the two. To LOWER pH: See acid demand test. To RAISE pH: See dosage chart.

### ACID DEMAND TEST

- 1 – Use treated sample from pH test.
- 2 – Add AD-40 dropwise. After each drop, count, mix, and compare with color standards until desired pH is matched. See dosage chart to continue.

### TOTAL ALKALINITY TEST

- 1 – Rinse and fill sample tube to 25mL mark with water to be tested.
- 2 – Add 2 drops ALK-10. Swirl to mix.
- 3 – Add 5 drops ALK-20. Swirl to mix. Sample should turn green.
- 4 – Add ALK-30 dropwise. After each drop, count and swirl to mix until color changes from green to red.
- 5 – Multiply drops in step 4 by 10. Record as parts per million (ppm) total alkalinity as calcium carbonate. See dosage chart for adjustment.

## TEST DESCRIPTION & RECOMMENDED RANGES

#### REMEMBER !

- 1 – Keep test kit out of reach of children
- 2 – Read precautions on all labels.
- 3 – Store test kit in a cool, dark place.
- 4 – Replace solutions once each year.
- 5 – Do not dispose of solutions in pool or spa.
- 6 – Rinse cells before and after each test.
- 7 – Obtain samples 45cm/18" below water surface.
- 8 – Hold bottle vertically when dispensing.

### CHLORINE DOSAGE CHART

Volume of Water (gallon)	TO RAISE CHLORINE 1 PPM USING CHLORINE COMPOUND*				
	5%	10%	12%	60%	75%
250	0.64 fl oz	0.32 fl oz	0.27 fl oz	0.06 oz	0.04 oz
400	1.02 fl oz	0.51 fl oz	0.43 fl oz	0.09 oz	0.07 oz
1,000	2.56 fl oz	1.28 fl oz	1.07 fl oz	0.22 oz	0.18 oz
5,000	12.8 fl oz	6.40 fl oz	5.33 fl oz	1.13 oz	0.89 oz
10,000	16.0 pts	12.8 fl oz	10.7 fl oz	2.23 oz	2.05 oz
15,000	1.20 qts	1.20 pts	1.00 pts	3.34 oz	3.08 oz
20,000	1.60 pts	1.60 pts	1.33 pts	4.45 oz	4.11 oz
75,000	1.51	1.51	1.25	115 g	100 g

### pH DOSAGE CHART

Volume of Water (liter)	TO RAISE pH TO 7.5 USING SODA ASH (SODIUM CARBONATE 100%)**			TO LOWER pH USING MURIATIC ACID (20% BAUME / 31.4% HCl)		
	FROM 7.2	FROM 6.8	FROM 6.5	1	2	3
1000	0.3 oz	0.9 oz	1.2 oz	0.31 fl oz	0.62 fl oz	0.92 fl oz
1500	0.5 oz	1.5 oz	2.0 oz	0.46 fl oz	0.92 fl oz	1.38 fl oz
5000	1.4 g	4.2 g	5.6 g	1.29 oz	2.46 oz	3.70 oz
20000	4.5 g	13.9 g	18.4 g	4.08 oz	8.16 oz	12.24 oz
40000	9.0 g	27.8 g	36.8 g	8.16 oz	16.32 oz	24.48 oz
60000	13.5 g	41.7 g	55.2 g	12.24 oz	24.48 oz	36.72 oz
75000	17.0 g	51.1 g	67.6 g	15.68 oz	31.36 oz	47.04 oz

### ALKALINITY DOSAGE CHART

Volume of Water (liter)	TO RAISE ALKALINITY USING SODA ASH (SODIUM CARBONATE 100%)		TO LOWER ALKALINITY USING MURIATIC ACID (20% BAUME / 31.4% HCl)	
	Desired change in ppm	10 ppm	Desired change in ppm	10 ppm
1000	0.86 oz	17 g	0.63 oz	20 ml
1500	0.90 oz	25 g	1.02 fl oz	30 ml
5000	2.24 oz	84 g	2.56 fl oz	100 ml
20000	11.2 oz	336 g	12.8 fl oz	400 ml
40000	1.40 lbs	671 g	1.60 pts	800 ml
60000	2.10 lbs	1.01 kg	1.20 qts	1.20 L
75000	2.80 lbs	1.26 kg	1.60 qts	1.50 L

### CHLORINE & BROMINE

Effective use of chlorine is largely dependant on pH. At high pH (>7.6), chlorine's ability to disinfect is significantly reduced. But at a lower pH (7.2 to 7.6), chlorine's disinfecting ability is enhanced. Therefore, at lower pH levels, you get more disinfection for your money.

#### Remember:

- Keep the pH at 7.6 or below.
- Keep the CHLORINE level between 1.0 and 3.0 ppm.
- Superchlorinate to increase FREE CHLORINE.

\* Chlorine products contain different amounts of available chlorine. Adjust treatment amounts accordingly.

### pH

To LOWER pH to desired value, add either dry acid (sodium bisulfate) or muriatic acid according to chart.

To RAISE pH to 7.5, add soda ash (sodium carbonate) according to chart.

#### Note:

An adjustment in pH can change total alkalinity. Recheck total alkalinity after pH adjustments.

\* Sodium bisulfate percentage may vary. Adjust treatment amounts accordingly.  
 \*\* Dosage obtained experimentally using pool water with the following values: Total alkalinity – 100ppm CaCO3  
 Calcium hardness – 200ppm CaCO3  
 Total dissolved solids – 500  
 Temperature – 75°F/24°C

Dosage can vary if actual values differ from experimental values.

### TOTAL ALKALINITY

To LOWER total alkalinity, add either dry acid (sodium bisulfate) or muriatic acid according to chart.

To RAISE total alkalinity, add baking soda (sodium bicarbonate) according to chart.

#### Note:

An adjustment in total alkalinity can change pH. Recheck pH after total alkalinity adjustments.

\* Sodium bisulfate percentage may vary. Adjust treatments amounts accordingly.

## TROUBLE PREVENTION CHART

TROUBLE	SYMPTOM	CAUSE	SOLUTION
SCALE FORMATION	Scale on pool walls & fixtures. Escourt in new pool around seats.	High pH	Lower pH to 7.2 – 7.6 with sodium bisulfate or muriatic acid.