POOL & SPA WATER TESTS

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

Instr. #5870

*Free, Combined & Total Chlorine / Total Bromine Test**

IDEAL FC 2-4 pools / 3-5 spas
IDEAL Br 4-6 pools and spas

1. Rinse and fill chlorine / bromine cell to mark with water to be tested.
2. Add 5 drops R-0001 and 5 drops R-0002. Cap and invert to mix.
3. Match color with color standard. Record as parts per million (ppm) free chlorine (Cl_2) or total bromine (Br_2). For chlorine: See Treatment Tables for adjustment or go to website. For bromine: See manufacturer's instructions for adjustment. For total chlorine: See Step 4.
4. Add 5 drops R-0003. Cap and invert to mix.
5. Match color immediately. Record as ppm total chlorine (Cl_2).
6. Subtract free chlorine (FC) from total chlorine (TC). Record as ppm combined chlorine (CC) as Cl_2. Formula: TC - FC = CC. Eliminate CC by breakpoint chlorination. Dosage equals 10 times the amount of CC.

*pH Test***

IDEAL 7.4-7.6 pools and spas

1. Rinse and fill pH cell to mark with water to be tested.
2. Add 5 drops R-0014. 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 below or go to website. To RAISE pH: See Base Demand Test below or go to website.

Acid Demand Test

1. Use treated sample from pH test.
2. Add R-0015 dropwise. After each drop, count, cap and invert to mix, and compare with color standards until desired pH is matched. See Treatment Tables to continue.

Base Demand Test

1. Use treated sample from pH test.
2. Add R-0016 dropwise. After each drop, count, cap and invert to mix, and compare with color standards until desired pH is matched. See Treatment Tables to continue.

*Total Alkalinity (TA) Test***

IDEAL 80-120 pools and spas

1. Rinse and fill sample tube (#9198) to 25 mL mark with water to be tested.
2. Add 2 drops R-0007. Swirl to mix.
3. Add 5 drops R-0008. Swirl to mix. Sample will turn green.
4. Add R-0009 dropwise, swirling and counting after each drop, 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 ($CaCO_3$). See Treatment Tables for adjustment or go to website.

*Calcium Hardness (CH) Test***

IDEAL 200-400 pools / 150-250 spas

1. Rinse and fill sample tube (#9198) to 25 mL mark with water to be tested.
2. Add 20 drops R-0010. Swirl to mix.
3. Add 5 drops R-0011L. Swirl to mix. If calcium hardness is present, sample will turn red.
4. Add R-0012 dropwise, swirling and counting after each drop, until color changes from red to blue.
5. Multiply drops in Step 4 by 10. Record as parts per million (ppm) calcium hardness as calcium carbonate ($CaCO_3$). To RAISE CH: See Treatment Tables for adjustment or go to website. To LOWER CH: Partially drain and refill with fresh water of lower hardness.

Cyanuric Acid (CYA) Test

IDEAL 30-50 pools and spas

1. Rinse and fill bottle (#9191) to 7 mL mark with water to be tested.
2. Add R-0013 to 14 mL mark. Cap and mix for 30 seconds.
3. Slowly transfer cloudy solution to test tube (#9197) until black dot on bottom just disappears when viewed from the top.
4. Read tube at liquid level. Record as parts per million (ppm) cyanuric acid (CYA). To lower CYA either partially drain water and refill with fresh, or switch to unstabilized chlorine for a time.

* When test values for free chlorine or total bromine are within the ideal ranges shown above, water should be adequately SANITIZED.
** When test values for pH, TA, and CH are within the ideal ranges shown above, water should be BALANCED.
When adjustments are needed, see Treatment Tables on reverse or visit www.swim-care.com and plug in your pool test results for recommendations.

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TROUBLE PREVENTION CHART

SYMPTOM	*CAUSE*	*POTENTIAL SOLUTION*
Plaster etching, concrete pitting, grout dissolving.	Imbalanced water.	Have pH, total alkalinity & calcium hardness levels tested. Balance water with treatment chemicals recommended by your supplier.
Scale on walls & fixtures. (Common in new inground pools.)		
Corrosion of metal fixtures in contact with pool water. Rust & copper stains.	Imbalanced water.	Have pH, total alkalinity & calcium hardness levels tested. Balance water with treatment chemicals recommended by your supplier. Add chelating or sequestering agent per instructions to prevent more stains.
Bleached hair or bathing suits. Eye irritation.	Excessive chlorine.	Add sodium thiosulfate or sodium sulfite to neutralize.
Eye irritation and / or itchy skin. Water has foul odor. Complaints of "too much chlorine" in water.	High combined chlorine, low free chlorine.	Adjust pH to 7.2-7.8.* Perform breakpoint chlorination to eliminate combined chlorine. Do not reenter water until free chlorine level drops below 5 ppm.
Skin / eye irritation.	Improper pH.	Adjust pH to 7.2-7.8.*

SYMPTOM	*CAUSE*	*POTENTIAL SOLUTION*
Hazy, cloudy water. No sparkle.	Early algae growth.	Superchlorinate or shock.
	Poor filtration.	Check filter for proper operation.
	High pH.	Lower pH to 7.2-7.8.*
	High total alkalinity.	Lower total alkalinity to 80-120 ppm.
Red-brown water.	Iron.	Seek expert advice on source of metals & treatment solution.
Purple-black water.	Manganese.	
Blue-green water.	Copper.	
Green, slippery pool surfaces & cloudy or green water. Black spotty patches on pool surfaces. Yellow powdery deposits on shady side of pool.	Algae.	Adjust pH to 7.2-7.8.* Superchlorinate to 30 ppm. Concrete: Brush sides & bottom with stainless steel brush. Vinyl liner: Use soft nylon brush. Repeat if necessary. Use algaecides.

*Always bring total alkalinity into recommended range before adjusting pH.

TREATMENT TABLES

Treatment table values below are based on specific strength chemicals (e.g., sodium carbonate, 100% or calcium chloride, 77%). If the specific treatment chemical used in your pool or spa is a different strength, **you must adjust the treatment amount given.** You can also get pool water treatment recommendations by plugging your test results into the water analysis program available at **www.swim-care.com**.

To Raise Chlorine Level by 1 ppm

Volume of Water (gallons / liters)	% AVAILABLE CHLORINE IN PRODUCT					
	10%	35%	45%	65%	75%	90%
100 gal / 400 L	0.13 fl oz / 4.00 mL	0.04 oz / 1.14 g	0.03 oz / 0.89 g	0.02 oz / 0.62 g	0.02 oz / 0.56 g	0.02 oz / 0.44 g
1,000 gal / 4,000 L	1.28 fl oz / 40.0 mL	0.38 oz / 11.4 g	0.30 oz / 8.89 g	0.21 oz / 6.15 g	0.20 oz / 5.63 g	0.15 oz / 4.44 g
10,000 gal / 40,000 L	12.8 fl oz / 400 mL	3.82 oz / 114 g	2.97 oz / 88.9 g	2.05 oz / 61.5 g	1.77 oz / 56.3 g	1.48 oz / 44.4 g

Superchlorination for Algae Removal (30 ppm Chlorine)

Volume of Water (gallons / liters)	% AVAILABLE CHLORINE IN PRODUCT					
	10%	35%	45%	65%	75%	90%
100 gal / 400 L	3.84 fl oz / 120 mL	1.14 oz / 34.3 g	0.89 oz / 26.7 g	0.62 oz / 18.5 g	0.57 oz / 17.0 g	0.45 oz / 13.3 g
1,000 gal / 4,000 L	1.20 qt / 1.20 L	11.4 oz / 343 g	8.90 oz / 267 g	6.17 oz / 185 g	5.66 oz / 170 g	4.45 oz / 133 g
10,000 gal / 40,000 L	3.00 gal / 12.0 L	7.15 lb / 3.43 kg	5.56 lb / 2.67 kg	3.85 lb / 1.85 kg	3.53 lb / 1.70 kg	2.78 lb / 1.33 kg

To Raise pH with Soda Ash (Sodium Carbonate – 100%)

Volume of Water (gallons / liters)	DROPS OF BASE DEMAND REAGENT ADDED				
	1	2	3	4	5
100 gal / 400 L	0.05 oz / 1.54 g	0.10 oz / 3.07 g	0.15 oz / 4.61 g	0.21 oz / 6.14 g	0.26 oz / 7.68 g
1,000 gal / 4,000 L	0.51 oz / 15.4 g	1.03 oz / 30.7 g	1.54 oz / 46.1 g	2.05 oz / 61.4 g	2.56 oz / 76.8 g
10,000 gal / 40,000 L	5.13 oz / 154 g	10.3 oz / 307 g	15.4 oz / 461 g	1.28 lb / 614 g	1.60 lb / 768 g

To Lower pH with Muriatic Acid (Hydrochloric Acid – 20° Baumé)

Volume of Water (gallons / liters)	DROPS OF ACID DEMAND REAGENT ADDED				
	1	2	3	4	5
100 gal / 400 L	0.09 fl oz / 2.86 mL	0.18 fl oz / 5.73 mL	0.28 fl oz / 8.59 mL	0.37 fl oz / 11.5 mL	0.46 fl oz / 14.3 mL
1,000 gal / 4,000 L	0.92 fl oz / 28.6 mL	1.83 fl oz / 57.3 mL	2.75 fl oz / 85.9 mL	3.67 fl oz / 115 mL	4.58 fl oz / 143 mL
10,000 gal / 40,000 L	9.16 fl oz / 286 mL	1.15 pt / 573 mL	1.72 pt / 859 mL	1.15 qt / 1.15 L	1.43 qt / 1.43 L

To Lower pH with Dry Acid (Sodium Bisulfate – 93.2%)

Volume of Water (gallons / liters)	DROPS OF ACID DEMAND REAGENT ADDED				
	1	2	3	4	5
100 gal / 400 L	0.12 oz / 3.69 g	0.25 oz / 7.38 g	0.37 oz / 11.1 g	0.49 oz / 14.8 g	0.62 oz / 18.5 g
1,000 gal / 4,000 L	1.23 oz / 36.9 g	2.46 oz / 73.8 g	3.70 oz / 111 g	4.93 oz / 148 g	6.16 oz / 185 g
10,000 gal / 40,000 L	12.3 oz / 369 g	1.54 lb / 738 g	2.31 lb / 1.11 kg	3.08 lb / 1.48 kg	3.85 lb / 1.85 kg

To Raise Total Alkalinity with Baking Soda (Sodium Bicarbonate – 100%)

Volume of Water (gallons / liters)	DESIRED INCREASE IN PARTS PER MILLION (PPM)				
	10 ppm	20 ppm	30 ppm	40 ppm	50 ppm
100 gal / 400 L	0.22 oz / 6.71 g	0.45 oz / 13.4 g	0.67 oz / 20.1 g	0.90 oz / 26.9 g	1.12 oz / 33.6 g
1,000 gal / 4,000 L	2.24 oz / 67.1 g	4.48 oz / 134 g	6.72 oz / 201 g	8.97 oz / 269 g	11.2 oz / 336 g
10,000 gal / 40,000 L	1.40 lb / 671 g	2.80 lb / 1.34 kg	4.20 lb / 2.01 kg	5.60 lb / 2.69 kg	7.00 lb / 3.36 kg

To Lower Total Alkalinity with Muriatic Acid (Hydrochloric Acid – 20° Baumé)

Volume of Water (gallons / liters)	DESIRED DECREASE IN PARTS PER MILLION (PPM)				
	10 ppm	20 ppm	30 ppm	40 ppm	50 ppm
100 gal / 400 L	0.26 fl oz / 7.99 mL	0.51 fl oz / 16.0 mL	0.77 fl oz / 24.0 mL	1.02 fl oz / 32.0 mL	1.28 fl oz / 39.9 mL
1,000 gal / 4,000 L	2.56 fl oz / 79.9 mL	5.11 fl oz / 160 mL	7.67 fl oz / 240 mL	10.2 fl oz / 320 mL	12.8 fl oz / 399 mL
10,000 gal / 40,000 L	1.60 pt / 799 mL	1.60 qt / 1.60 L	2.40 qt / 2.40 L	3.20 qt / 3.20 L	3.99 qt / 3.99 L

To Lower Total Alkalinity with Dry Acid (Sodium Bisulfate – 93.2%)

Volume of Water (gallons / liters)	DESIRED DECREASE IN PARTS PER MILLION (PPM)				
	10 ppm	20 ppm	30 ppm	40 ppm	50 ppm
100 gal / 400 L	0.34 oz / 10.3 g	0.69 oz / 20.6 g	1.03 oz / 30.9 g	1.37 oz / 41.2 g	1.71 oz / 51.5 g
1,000 gal / 4,000 L	3.44 oz / 103 g	6.87 oz / 206 g	10.3 oz / 309 g	13.7 oz / 412 g	1.07 lb / 515 g
10,000 gal / 40,000 L	2.15 lb / 1.03 kg	4.30 lb / 2.06 kg	6.45 lb / 3.09 kg	8.59 lb / 4.12 kg	10.7 lb / 5.15 kg

To Raise Calcium Hardness with Calcium Chloride – 77%

Volume of Water (gallons / liters)	DESIRED INCREASE IN PARTS PER MILLION (PPM)				
	10 ppm	20 ppm	30 ppm	40 ppm	50 ppm
100 gal / 400 L	0.19 oz / 5.76 g	0.39 oz / 11.5 g	0.58 oz / 17.3 g	0.77 oz / 23.0 g	0.96 oz / 28.8 g
1,000 gal / 4,000 L	1.92 oz / 57.6 g	3.85 oz / 115 g	5.77 oz / 173 g	7.69 oz / 230 g	9.61 oz / 288 g
10,000 gal / 40,000 L	1.20 lb / 576 g	2.40 lb / 1.15 kg	3.61 lb / 1.73 kg	4.81 lb / 2.30 kg	6.01 lb / 2.88 kg