

Water Chemistry Guidelines

The Balance

Parameter	Min.	Ideal	Max.	Pool Type
pH	7.2	7.4 - 7.6	7.8	All Types
Total Alkalinity (ppm)	60	80 - 100*	180	All Types
		100 - 120**		
Calcium Hardness	150	200 - 400	1,000	Pools, Waterparks
	100	150 - 250	800	Spas
Total Dissolved Solids (ppm)	NA	NA	1,500 over start-up***	All Types
Cyanuric Acid (ppm)	10	30 - 50	100	All Types
Temperature	78° F	80.5° F	82° F	Competition Pools
	-	-	104° F	Spas
	-	Personal Preference	104° F	Other Pools

* For calcium hypochlorite, lithium hypochlorite, or sodium hypochlorite

** For sodium dichlor, trichlor, chlorine gas, BCDMH

*** Start-up includes the TDS contribution of salt found in chlorine generating systems

The Disinfectant

Parameter	Min.	Ideal	Max.	Pool Type
Free Chlorine (ppm)	1.0	2.0 - 4.0	5.0	Pools, Waterparks
	2.0	3.0 - 5.0	10.0	Spas
Total Bromine (ppm)	2.0	4.0 - 6.0	10.0	All Types

The Contaminants

Contaminant	Min.	Ideal	Max.	Pool Type
Combined Chlorine (ppm)	0	0	0.2	Pools, Waterparks
	0	0	0.5	Spas
Heavy Metals	None	None	None	All Types
Visible Algae	None	None	None	All Types
Bacteria	None	None	Local Code	All Types

Chlorine Equivalents

Table 1:

Amount to add for 10,000 gallons of water

	10ppm	5ppm	1ppm
Bleach (10%)	1 gallon	.5 gallons	12.8 oz.
TriChlor (90%)	15 oz (2 tabs)	7.5 oz (1 tab)	1.5 oz
Cal Hypo (65%)	20 oz (1.25 lbs)	10 oz	2 oz
DiChlor (56%)	24oz (1.5lbs, $\approx \frac{1}{2}$ scoop)	12 oz	2.38 oz.

Table 2:

Another way to look at it

ppm increase per 1 lb (or gallon) added to 10,000 gallons of water

DiChlor (56%) one pound, $\approx \frac{1}{3}$ scoop	6.7 ppm
Cal Hypo (65%)	7.8 ppm
Bleach (10%) one gallon	10 ppm
TriChlor , one pound (\approx two tabs)	11 ppm

Table 3:

Cost (late 2009)

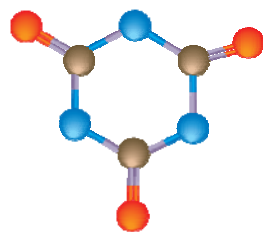
Cal Hypo per pound	\$1.64
TriChlor per pound (2tabs)	\$1.96
Bleach per gallon	\$2.72
DiChlor per pound ($\approx \frac{1}{3}$ scoop)	\$2.76 (\approx \$8.28 per scoop)

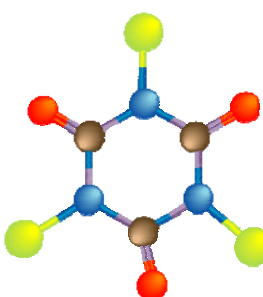
Table 4 (Table 1 with cost):

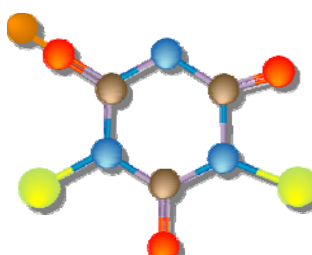
The cost comparisons adjusting a 10,000 gallon pool:

	10ppm		5ppm		1ppm	
	Amount	Cost	Amount	Cost	Amount	Cost
TriChlor	15 oz (2 tabs)	\$1.96	7.5 oz (1 tab)	\$.98	1.5 oz	\$.19
Cal Hypo	20 oz (1.25 lbs)	\$2.05	10 oz	\$1.02	2 oz	\$.20
Bleach	1 gallon	\$2.72	.5 gallons	\$1.36	12.8 oz.	\$.27
DiChlor	24oz (1.5 lbs, $\approx \frac{1}{2}$ scoop)	\$4.14	12 oz	\$2.07	2.38 oz.	\$.41

<u>Element</u>	<u>Atomic Weight</u>	<h1>Atomic Weights Of Organic Chlorine</h1>
Carbon	12.01	
Nitrogen	14.01	
Oxygen	16	
Sodium	22.99	
Chlorine	35.45	

<u>Cyanuric Acid</u>		$C_3N_3O_3$
Carbon	36.03	
Nitrogen	42.03	
Oxygen	48	
<u>Total</u>	<u>126.06</u>	

<u>TriChlor</u>		$C_3N_3O_3Cl_3$
CYA	126.06	
Chlorine (3)	106.35	
<u>Total</u>	<u>232.41</u>	
%Chlor	45.76%	
%CYA	54.24%	

<u>DiChlor</u>		$NaCl_2C_3N_3O_3$
CYA	126.06	
Sodium (1)	22.99	
Sub-Total	149.05	
Chlorine (2)	70.9	
<u>Total</u>	<u>219.95</u>	
%Chlor	32.23%	
%CYA	57.31%	
%Sodium	10.45%	