USEFUL CONVERSIONS & FORMULAS

AMOUNT CONVERSIONS

Ounces to Pounds = Ounces \div 16 = Pounds

Fluid Ounces to Gallons = Fluid Ounces ÷ 128 = Gallons

DISTANCE CONVERSIONS

Yards to Feet = Yards x 3 = Feet
Meters to Feet = Meters x 3.28 = Feet

Sq. Inches to Sq. Feet Square Inches \div 144 = Square Feet

SURFACE AREAS

Rectangle / Square = Length x Width = Square Feet

Circle = Radius x Radius x 3.14 = Square Feet

**RADIUS = diameter ÷ 2

POOL VOLUME

Rectangle = Length x Width x Average Depth x 7.5 = Gallons

**AVERAGE DEPTH = (shallow + deep) \div 2

Circle = Radius x Radius x 3.14 x Avg. Depth x 7.5 = Gallons

TURNOVER RATE

Pool: Pool Volume (gallons) \div Flow Rate (gallons per minute) \div 60 = Hours Spa: Pool Volume (gallons) \div Flow Rate (gallons per minute) = Minutes

FLOW RATE

Pool: Pool Volume (gallons) \div Turnover Rate (hours) \div 60 = Gallons Per Minute Spa: Pool Volume (gallons) \div Turnover Rate (minutes) = Gallons Per Minute

FILTER SURFACE AREA (FILTER SIZE REQUIRED)

Flow Rate ÷ Filter Media Rate = Square Feet

HEATER SIZING

Pool Volume x 8.33 x Temperature Adjustment = BTU

SPA WATER REPLACEMENT FREQUENCY

Spa Volume ÷ 3 ÷ Average Users Per Day = Replacement Interval (Days)

REPLACEMENT & MAKE-UP WATER

Length x Width x $0.0833 \times 7.5 \times 10^{-2} = 0.0833 \times 10^{-2} = 0.0833$

TOTAL DYNAMIC HEAD

Multiply pump PRESSURE gauge reading by 2.31 = feet of head on pressure sideMultiple pump VACUUM gauge reading by 1.13 = feet of head on vacuum sideAdd these two results together for Total Dynamic Head of system

B-1 Water Chemistry Guidelines

These commonly accepted chemical parameters do not supersede local or state codes and regulations.

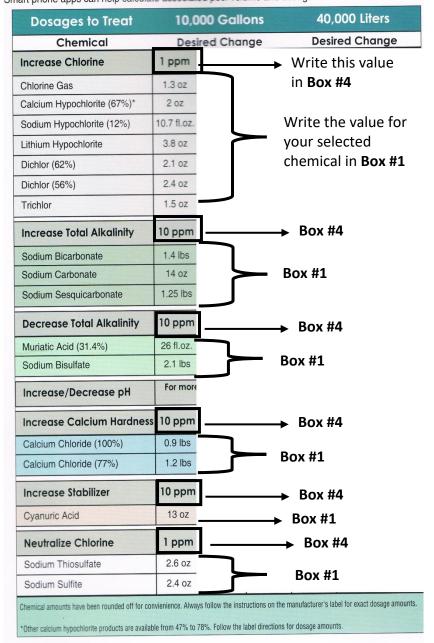
Parameter	Min.	Ideal	Max	Pool Type
Free Chlorine (ppm or mg/L)	1.0	2.0 - 4.0	5.0	Pools, Waterparks
	2.0	3.0 - 5.0	10.0	Spas
Combined Chlorine (ppm or mg/L)	0	0	0.4	Pools, Waterparks
	0	0	0.5	Spas
Total Bromine (ppm or mg/L)	2.0	4.0 - 6.0	10.0	All Types
PHMB (ppm or mg/L)	30	30 - 50	50	All Types
pH	7.2	7.4 – 7.6	7.8	All Types
Total Alkalinity as CaCO ₃ (ppm or mg/L)	60	80 - 100* 100 - 120**	180	All Types
Total Dissolved Solids (ppm or mg/L)	NA	NA	1500 over start-up	All Types
Calcium Hardness as CaCO ₃ (ppm or mg/L)	150	200 - 400	1,000	Pools, Waterparks
	100	150 - 250	800	Spas
Heavy Metals	None	None	None	All Types
Visible Algae	None	None	None	All Types
Bacteria	None	None	Local Code	All Types
Cyanuric Acid (ppm or mg/L)	***	30 – 50	****	All Types
Temperature °F/°C	78°F (25.5°C)	80.5°F (26.9°C)	82°F (27.8°C)	Competition Pools
		_	104°F	Spas
		Personal Preference	104°F	Other Pools
Ozone (ppm or mg/L)		50 ST. 70	0.1 over 8-hr. time wtd. avg.	All Types
ORP	Calibrate to Disinfectant Level****			All Types

- * For calcium hyphchlorite, 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
- **** Dictated by local codes. Typically 100 ppm (mg/L). (Some codes are higher, some are lower)
- **** Some local codes may dictate a minimum and maximum

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B-2 Water Chemistry Adjustment Guide

These commonly accepted chemical parameters do not supersede manufacturers' instructions. Smart phone apps can help calculate associated pool volume and dosage.



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