

The Use Of Magnesium in Swimming Pools

Watermaid Pty Ltd has observed, since 1971, that salt chlorination Cells used in sea water conditions rarely foul up with hard crystalline deposits. The soft mushy deposit in such Cells can always be cleaned with a strong jet of water or a dilute acid solution.

By contrast, Cells used in marblesheen, pebbled, quartzon or tiled pools that have had Calcium Hypochlorite, other Calcium hardness chemicals or Hydrochloric Acid ("pool acid") added, continually foul and form deposits that are hard, crystalline and difficult to clean and can stop the Cell from working within a few days. Sea water contains around 1700 ppm of Calcium and 400 ppm of Magnesium whereas home swimming pools normally contain up to 400 ppm of Calcium but no Magnesium.

Watermaid Pty Ltd has noted that after the addition of Magnesium at about 20 ppm, Cells begin to mimic the sea water experience and the effect can last some 6 to 9 months.

Watermaid Pty Ltd recommends the use of Magnesium Chloride at the rate of 25 Kg per year as a means of changing the chemistry balance of the water when salt Cells foul up with deposits that are hard to clean and the Magnesium content of the water is low.

An example of a pool in balance using Magnesium Chloride after 12 months:

Total Chlorine	1.0 ppm		
Free Chlorine	0.5 ppm		
pH	7.5		
Total alkalinity (CO ₂)	120 ppm	Af value = 2.0 (Alkalinity Factor)
Temperature	20°C	Tf value = 0.5 (Temperature Factor)
Hardness			
(i) Calcium	150 ppm		
(ii) Magnesium	100 ppm		
Total Hardness	250 ppm	Cf Value 2.0 (Hardness Factor)

Langelier Index calculation = pH + Af + Tf + Cf (see over page for more information)
 = 7.5 + 2.0 + 0.5 + 2.0 = 12

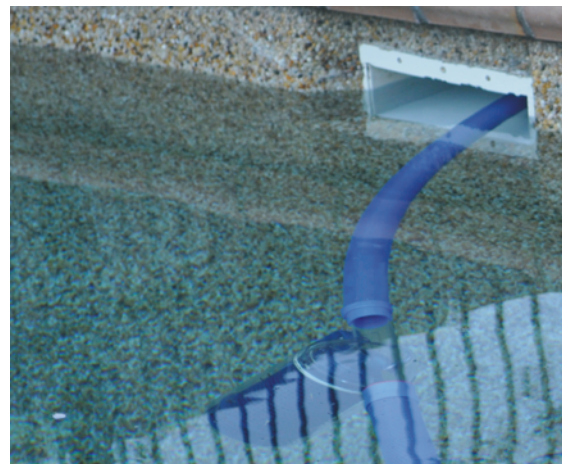
Subtract the relevant Total Dissolved Solids Factor, in this case it is 12.1 (see over page for more information)

Result = -0.1 (which is in balance)

Below are a couple of pictures from the above-mentioned pool:



The only localised deposit that formed after 12 months use in this pebble surfaced pool.



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LANGELIER INDEX

The Langelier Index calculation table (below) can be used to check pool water balance.

Readings of pH, water temperature, calcium hardness and total alkalinity are needed. These readings are used to obtain the corresponding factor readings from the table below and then perform the Langelier Index calculation. Add pH, TF, HF and AF together.

Then subtract the relevant Total Dissolved Solids Factor:

Less than 1,000 ppm	1,000 ppm or Greater
12.1	12.2

LANGELIER INDEX CALCULATION TABLE						
Pool Water Temperature (°C) (°F)		Temp Factor (TF)	Calcium Hardness as CaCO ₃	Hardness Factor (HF)	Total Alkalinity as CO ₃	Alkalinity Factor (AF)
0	32.0	0.0	5	0.3	5	0.7
3	37.4	0.1	25	1.0	25	1.4
8	46.4	0.2	50	1.3	50	1.7
12	53.6	0.3	75	1.5	75	1.9
15	59.0	0.4	100	1.6	100	2.0
19	66.2	0.5	150	1.8	150	2.2
24	75.2	0.6	200	1.9	200	2.3
29	84.2	0.7	300	2.1	300	2.5
34	93.2	0.8	400	2.2	400	2.6
40	104.0	0.9	800	2.5	800	2.9
53	127.4	1.0	1000	2.6	1000	3.0

RESULTS

If the result is **between -0.2 and +0.2**, then the **pool water is in balance**.

If the result is **lower than -0.2**, then the pool water is **corrosive**.

If the result is **higher than +0.2**, then the pool water is **scale-forming**.

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