An Aquatic Therapy & Rehab Institute, Inc. Publication

Aquatic Therapy Journal

October 2007 • Volume 9 • Issue 2

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Therapy Pool "Bathtub" Ring

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Question: ***How do you prevent the "bathtub" ring from forming on the walls around the edge of the pool? How do you remove it?***

The "bathtub" scum ring that forms on the pool walls at the waterline is usually caused by a combination of two problems: oversaturated water and concentrated oils at the water surface.

Scum rings form as organic debris, detergents, oils, and bather waste products (including body fats and oils, sunscreen lotions, personal hygiene and hair care products) which are lighter than water and float at or near the water surface, come into contact with rough pool surfaces. In addition to forming scum lines at the water surface, they contribute to the build-up of total dissolved solids (TDS), reduce sanitizer effectiveness which promotes bacterial and algae growth, cloud water, clog cartridge filters and diatomaceous earth filter elements, and contribute to mudball formation in sand filters causing reduced filter effectiveness.

To prevent scum ring formation, consider using enzymes or absorbent foam products. Enzymes are catalysts that start or speed up chemical reactions. Enzymes are protein-like substances that form naturally in animal and plant cells, but synthetic enzymes have been developed for pool use. Over several days, enzymes slowly digest and destroy oils in pool water by converting them to carbon dioxide and water. An initial dose is added and then maintenance doses are added to the pool on a weekly basis.

Absorbent foam products can be used in addition to, or instead of, enzymes to physically remove oils from the water and prevent scum lines from forming. Absorbent foam can be placed in the pool skimmer baskets, hair and lint strainer, filter tank, or other location which is inaccessible to pool patrons. Manufacturers of the products say the patented molecular structure and cell design of the foam allows it to absorb many times its own weight in oil. When the foam is saturated with oil, it turns a dark color, becomes heavy and sinks. The foam can be replaced, or for a period of time can be cleaned and reused.

When water is unbalanced and has a higher than desirable mineral saturation, excess calcium will precipitate out of solution and leave calcium scale deposits, visible as unsightly, rough, white stains on the interior pool walls. This is especially noticeable on the waterline tiles of pools with perimeter overflow systems designed with skimmers rather than rimflow, or fully or partially recessed gutters. If body fats and oils, and other organic debris are also present, they will readily adhere to the rough surface.

In addition to aesthetic problem of waterline stains, the excess calcium damages heater elements, pool circulation system equipment, and restricts water flow though the recirculation lines. Calcium carbonate build-up inside pipes will cause an increase in velocity as water is forced through a smaller diameter opening. Friction losses will increase, pressure will increase, flow will be reduced, and energy consumption will increase. Water may become cloudy and take on a "milky" appearance, particularly if pH is also high. Sanitizer effectiveness will be reduced, and algae growth may increase. This is particularly a problem in warm water therapy pools because unlike most elements, calcium is less, rather than more, soluble as temperature increases.

To prevent the problems caused by excess calcium, monitor the water balance and calculate the Langelier Saturation Index regularly. The LSI is used to keep the pH, total alkalinity, calcium hardness, water temperature, and total dissolved solids in balance, preventing the water from becoming aggressive or oversaturated. Dr. Langelier , a professor at the University of California, Berkeley devised his formula and chart in the 1930s to help prevent scale build-up in closed systems like boilers, but the formula was adapted and has been used successfully by pool operators for decades.

To find the LSI, use your test kit and testing instruments to find each of the five values (pH, total alkalinity, calcium hardness, water temperature and TDS). Saturation index equals pH plus the alkalinity factor, plus the calcium hardness factor plus the temperature factor minus the TDS factor. Write down the actual pH value found. Then for the remaining four values, find the corresponding factor on the chart. Add or subtract the factors to or from the pH value. If an actual value is not found on the saturation index chart, do not interpolate since there is no direct linear relationship between the values. Rather, move to the next higher value and use its factor. If cyanuric acid has been added to stabilize the water , divide the cyanuric acid level by 3, then subtract this interference factor from the total alkalinity reading prior to calculating the saturation index. (see chart below)

If the sum obtained is zero, the water is balanced and chemical equilibrium has been achieved. A tolerance of plus or minus 0.3 is allowable for commercial pools. Negative values indicate corrosive water, while positive values indicate likely calcification and scale formation. If the saturation index formula indicates that the pool water is not balanced (not equal to zero, plus or minus 0.3), make the appropriate chemical corrections, starting with total alkalinity, then followed by pH, temperature, calcium hardness, and TDS.

Example:	pH 7.8
Total Alkalinity	130
Calcium Hardness	300
Water Temperature	92° F
TDS	750

SI = pH +af + cf + tf - TDSf

SI = 7.8 + 2.2 + 2.1 + 0.8 - 12.1 = +.8

Water is oversaturated. The water could be balanced by adding sodium bisulfate to drop the total alkalinity to 100 ppm, and by reducing the pH level to 7.2 using muriatic acid or carbon dioxide. Well balanced water will increase bather comfort, will help prevent the formation of "bathtub" ring, and will dramatically extend the life expectancy of the pool and its components.

If calcium carbonate deposits and scum rings still form on pool walls despite your attempts to remove oils and keep the water balanced , they can be removed by scrubbing with tri sodium phosphate (TSP), or with a non abrasive chlorine bleach based liquid cleanser, using a 3M Scotch Brite® pad. If that doesn!t work, try using a fine grit sandpaper or pumice stone. Do not use muriatic acid to scrub off the stains, because over time, acid will damage the grout, will remove the plaster surface and expose the gunite below, and may etch the ceramic tile. Power grinding may be the only way to remove the calcium build-up if you ignore it for any length of time. ◆

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Langelier Saturation Index

SI = pH + alkalinity factor + calcium hardness factor + temperature factor - TDS factor

Temperature		Calcium Hardness		TDS		Total Alkalinity	
degree	factor	ppm	factor	ppm	factor	ppm	factor
66	0.5	75	1.5	<1000	12.1	50	1.7
77	0.6	100	1.6	>1000	12.2	75	1.9
84	0.7	150	1.8			100	2.0
94	0.8	200	1.9			150	2.2
105	0.9	300	2.1			200	2.3
		400	2.2			300	2.5
		800	2.5			400	2.6
		1000	2.6				