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## **MAGNETIZED II**

More alluring facts about treating water with magnetics.

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*Editors note: This is the second part of a two-part Tech Notes column on the science behind treating pool water with magnets.*

Hard lime and scale forms where ever tap water evaporates or is heated. While it may not be noticeable for a long time, there are commercial appliances that show a white deposit after only a few days of use.

Steam cleaners, for instance, may become inoperable after two weeks due to heavy scale deposits. They have to be washed often with acid in order to avoid filter clogs. Also, dishwashers in restaurants need to be freed from the white scale deposits regularly. In the average residential home, it may take a couple of years until a layer of hard scale reduces the cross section of water pipes significantly. And in swimming pools a rough band of sediment often develops along the waterline, which may require mechanical grinding to be removed.

In many cases where the water has a high iron content, the scale deposits develop brownish tint. They may even acquire a deep brown color, as is often evident in toilet tanks. In dairy operations, fatty substances often mix with the sediment and create "butter stone." In regards to cooling towers, circulating water may mix with algacides, and the ensuing deposits may be toxic.

These examples indicate that lime scale may contain more than calcium carbonate. Other minerals dissolved in the water solidify, as well, and can produce unsightly or even dangerous substances.

### USING MAGNETS

Fortunately, a well designed magnetic treatment device will prevent such deposits from developing, as long as it is sized for the maximum water flow capability of the particular plumbing system. Safety inspections may be required, but in most cases inspection reveals nothing more than an accumulation of sludge, which can be removed easily.

Recently, a pool builder inspected my 30-year-old pool, which has been fitted with simple magnetic water treatment device that is clamped on one of the lines between the pump and the filter. He was astonished to feel not a trace of roughness on the waterline tiles, and he could hardly believe that we did nothing to clean the tiles since last summer.

During the resurfacing of my driveway, a small bulldozer happened to rip one of the feed lines for the lawn sprinklers out of the ground. A young plumber replaced the old galvanized iron piping with new PVC tubing. The next day he returned and asked my permission to saw off a little piece of the old pipe. The reason: He wanted to show his father, a long time plumber, that it was possible for the outside of a water pipe to accumulate a thick crust of rust deposits while the inside of the 30-year-old pipe was without any substantial deposits.

But how could the old water tubes of my sprinkler systems be free of the interior deposits? After all, these tubes had been in the ground for 18 years before I had magnetic water treatment device attached to the house's water supply line. At that time lumpy hard deposits of reddish brown stones had already reduced the inner diameter of the 1-inch piping to less than 3/4 inch.

The removal of these hard deposits was rather dramatic. On Feb. 28 1982, when the magnetic device was installed on my house, I had opened all the faucets, toilet flushers, drains and garden hose outlets. Soon I found it necessary to remove all faucet strainer heads because the brown water emerging carried lumps of brown matter with it. It took about 4 hours until the emerging water had become colorless and ran steadily.

This event can be explained using the same facts about crystallization in water that were detailed in part one of this column. The only difference between magnetically treated water and untreated water is that magnetically treated water enables minerals to crystallize in the water instead of on the surface of some pipe or container. As a result we have converted the water formerly saturated with dissolved minerals into a mixture of solid microcrystals and clean water. When this purified water flows past other minerals it is capable of dissolving a new load of minerals.

In large industrial installations, like cooling towers, this process is evident as large chunks of old lime scale break off the walls. The treated water does not dissolve the old scale only from the outer surface: it penetrates between the scale and the wall. This area is the weakest part of the scale, so the water can split the crystalline matter from the container wall. The dramatic speed of this process made some precautions necessary. In order to avoid clogs, filters and strainers should be temporarily taken out of the circulation system.

Clamp-on magnetic units typically have an efficiency rating off 20 to 40 percent although they are capable of removing old lime scale, this may take several weeks. But because they also prevent the formation of new scale, the units are always producing some benefit.

Corrosion prevention is another benefit of magnetic water treatment. Periodic acid washing of a pool is one of the reasons for the metal corrosion. In some cases, after long periods between acid washings, the hard deposits may cover up some weak spots, which turn into leaks when the deposits are dissolved by the next acid wash. Because magnetic water treatment makes acid washes unnecessary, a major cause of corrosive damage is eliminated.

Also after a long period of magnetic water treatment, the interior of pipes becomes covered with a thin continuous coating. This layer does not change over the years. Analyzed by a number of scientific institutes, it has been determined to be a corrosion preventing inert substance. In one case, it was found to be aluminum silicate.

The Steinbeis Institute in Reutlingen, Germany, has devoted years of research to the study of corrosion and has published numerous articles outlining the corrosion reduction experienced with water systems treated with magnetic devices.

#### IMPROVING WATER'S IMAGE

Effectively treated water looks sparkling clear, even if the water supply is murky. Some water experts claim they can recognize a specific silky appearance of magnetically treated water. This might be due to the multitude of microcrystals, which can reflect sunlight. The developing microcrystals, however are so small that they are visible only with high magnification.

In regards to smell, water that comes with a slight sulfur odor loses this smell after being treated with magnetic devices. Of significant interest to this industry, the chlorine odor of chlorinated water is greatly reduced by effective magnetic treatment. In fact, slight chlorination may become unnoticeable to the average user.

For aromatic brews such as teas or coffees, the desired aromas can be achieved with fewer ingredients if the water is effectively treated. The ensuing aromas appear cleaner to perceptive noses. It is said that in some eastern countries -- China for instance -- many people heat their tea water in a pot containing a magnet.

#### OTHER EFFECTS

One of the most obvious effects of magnetic water treatment is the enhanced ability of most cleaning chemicals and detergents. Magnetically treated water increases their effectiveness to the point where just one-third or even one-fourth of the cleaning agent is needed. In the cases of naturally contaminated water from lakes, an intense magnetic treatment has made the lake water fit for human consumption.

Magnetically treated water runs off a cleaned surface faster and in thinner sheets because surface tension is reduced. As a result one sees fewer water spots from drying. This has been applied successfully for the watering of decorative plants by sprinklers.

Surface tension in water is critical to biological life. Surface tension makes water rise in the fibers of the plants. It fills the capillaries in your body and it determines water's ability to penetrate soil and other materials. Therefore it is not surprising that wherever magnetic water treatment has been practiced, growth patterns have changed. Experiments with groups of growing farm animals and agricultural plants have been conducted at universities and federal institutions with stunning results. Some were hard to believe, so the scientists were reluctant to publish them immediately, pending confirmation. Following are some of the results of scientific research:

At a California university, two control groups of piglets of 24 piglets each with normal feeding were compared with two groups of 24 piglets that were getting their water from a magnetic treatment device. The latter groups consumed twice as much water and grew an average 12.5 percent faster.

Cotton plantings with various irrigation were compared in California. The cotton plants irrigated with magnetically treated water grew to larger sizes with larger and denser foliage. However, they produced one-third less cotton than the control plantings.

A Washington navel orange tree watered with the magnetically treated water carried less fruit, but each orange became unusually thick and juicy, weighing 20 ounces on average. Similarly, a Eureka lemon tree fed magnetically treated water carries lemons that grow up to one pound each.

One biologist suggests that the slightly reduced surface tension of the magnetically treated water may facilitate its penetration of cell walls. This could accelerate the normal dividing of the cells in growing parts of living individuals. This would account for the faster vegetative growth and the reduced reproductive cell division responsible for the number of flowers and fruit.

The accelerated growth of plants by the use of magnetically treated water is possible because the root tips secrete enzymes that dissolve crystals in the ground, enabling the roots to ingest the dissolved minerals. This is not the case for one-cell organisms that pollute pool water. Algae and bacteria have to ingest their food directly through their cell wall. They get plenty of water through it, but they cannot receive any nourishment in the form of crystallized minerals, which cannot penetrate the cell walls. Thus, bacteria in magnetically treated water starve.

Observations on swimming pools confirm this effect. The normal chlorine con-

tent of treated of swimming pools can be reduced by at least half if the water is efficiently magnetically treated. Even without any chlorination , no algae growth can be detected for about 36 hours. This is the normal duration of the affectivity of the magnetic treatment. After one to two days, the microcrystals formed by the treatment start to redissolve. After this time, a vigorous growth of algae occurs in the non-chlorinated pool if it is not replenished with treated water.

In short a swimming pool benefits by the application of magnetic water treatment for a number of reasons: Because the pool already has a circulation system, installing a magnetic clamp-on device is simple.

Chlorine content can be reduced by at least half, and chlorine odor is further reduced because much of the chlorine is incorporated into the microcrystals, which we cannot smell.

The treated water does not produce sediments on the pool's waterline.

No hard lime scale develops in the circulation system -- neither in the filter nor in the heater.

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