

# Get Rid of the Yuck, Make a Buck

*Next time you are installing a water system at a customer's house, take a look out their window. You might see red-to-brown stains on walls, sidewalks and plantings. If you think, "too bad about those stains," and continue about your business until the job is complete, you just missed an opportunity for revenue.*

**By Marshall Craig**

*Rust stain removal provides dealers additional business opportunities*

By thinking outside the box, you will see an opportunity to make money in those unsightly stains. As a water treatment professional, you have the capacity to take care of water issues from one end of the property to the other.

When groundwater is tapped for irrigating landscaping, iron stains can be an undesirable side effect. A number of forces have converged to increase the probability of iron stains across the U.S. Americans, for instance, currently have a growing interest in landscaping, leading to an increased use of home irrigation systems. But the increased use of irrigation has increased water demand, pushed city water prices

irrigation. The process is not complicated; you apply an acid solution, preferably with a surfactant added, to the iron oxide stain. The acid sequesters the iron and the stain disappears within minutes. It is best practice to flush off the treated surface with filtered water because, depending on the acid used, a white powdered residue can appear against a dark background after treatment.

Another issue that can arise with cleaning stains comes from the basic sequestering attribute of the acid. The acid is not smart enough to distinguish between the iron oxide on a surface that is left by well water and iron oxide that happens to provide color to the surface in question. There are unhappy

stream. This is a good method when addressing relatively low flow rates of water; however, most residential and commercial irrigation systems involve, at the minimum, a 1-hp well pump generating water flows upward of 10 gal per minute.

In the Midwest, a 1-hp submersible pump is fairly standard for residential applications, generating typically 15 to 18 gal per minute (gpm) in the sprinkler zones. In Florida, 1-hp centrifugal pumps, sucking up water from 20 ft down, can generate flow rates of 20 to 25 gpm. Under these flow rate conditions, a filtration system would be cumbersome and costly.

This leads to sequestering and chelating. There are chemical products that have an affinity for minerals, particularly iron and calcium, in an unoxidized state. If these products can be introduced to ferrous (unoxidized) iron, they form a complex with the iron based on charge in the case of sequestering and on physical positioning of the molecule in the case of chelating. When the ferrous iron particle is bound up in this fashion, it will resist its natural inclination to add molecules of oxygen and enter the ferric state when exposed to oxygen. Sequestered or chelated iron will remain bound up under most all conditions, the exception being if it is hit by a strong oxidizing agent with a pH of 10 or higher. Technically, chelated iron does not form a real compound with the chelating agent.

The bulk of the iron found in a well is ferrous. If we can manage to introduce a sequestering and chelating agent to secure the ferrous iron before it comes out of the sprinkler head we will eliminate, or greatly reduce, stains caused by irrigation. There remains the possibility of some staining because of ferric iron in the groundwater caused by iron bacteria, tannins or ferric iron generated by rusting galvanized pipe.

In addition to water treatment with a rust stain prevention agent, there are limited possibilities available to a homeowner faced with iron-rich well water but who wants to irrigate. For instance, they can either forget about the well and use municipal water; install a filtration system capable of dealing with flow rates in excess of 15 gpm; or they can pump the well water into a pond, permitting the iron to convert to ferric and settle out and then



**before**



**after**

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up and has stirred up the politics of water usage. In some U.S. communities, the use of city water for irrigation is even forbidden. Not only do wells provide free water for irrigation but they can be mandated.

Dealing with iron stains takes two forms: You can simply clean the stains, facing the certainty that they will return when irrigation resumes, or you can install a system to prevent future staining.

### Removing Stains

In Miami, Fla., businesses exist whose main activity is spraying rust stain remover on curbing stained by

homeowners in the Miami area that applied muriatic acid to their sand-colored brick pavers only to see the attractive sand color evaporate before their eyes. The operative rule in cleaning off stains: Try a small area first.

### Preventing Stains

The trick in preventing the yuck caused by sprinkler stains is to address the iron in the well water before it comes out of the sprinkler head. Water treatment professionals are used to treating iron by filtration methods, getting the iron particle to accrete enough mass that it can be trapped and excluded from the water

draw off the water surface.

Considering the cost and practicality issues raised by these alternatives, a treatment system that involves the use of sequestering and chelating agents is an attractive option. Different means can be used to feed these agents into a stream of well water, and they can be fed by either suction created by the venturi effect or by injection.

In areas of the U.S. where above-ground centrifugals are used for irrigation, simple siphoning systems can be used. Water treatment professionals are familiar with the chemical injection where a peristaltic or diaphragm-type metering pump pulls a solution from a feeder tank and injects it into a line. From an operating cost point of view, no one approach to feeding the chelating solution into an irrigation line is more cost-effective than another.

Installation of an injection pump and feeder tank is relatively straightforward. Because we want to feed chemical into the irrigation line when the irrigation system is operating, a pump start relay engaged by the system time clock initiates power to the metering pump. In the case of larger multi-zone systems where only specific zones need to be treated, a second timer can be used, addressed to the zones of interest. Most local codes require a backflow preventer on an irrigation system. The injection point for chemical should be downstream of the backflow preventer and before the first zone.

### Proper Dosage

The next issue to address is the choice of a particular chelating agent and the proper dosage. Key factors to consider include:

- Hardness;
- pH;
- Iron content in ppm;
- Approximate maximum flow rate (largest zone) of the irrigation system;
- Feed rate of metering pump; and
- Volume of feed tank.

The pH level is important because it can affect the choice of a chelating agent. Not all agents will perform well at the low pH levels found in some parts of the U.S. Some agents, such as polyphosphates, have a particular affinity for calcium and are affected by the hardness of the well water.

The remaining factors determine the amount of chemical that is to be put in the feed tank. Using the iron in ppm, you can refer to charts that present dosage at various metering pump feed rates with

feeder tank size and maximum flow rate of the irrigation system held constant. The metering pump feed rate and the size of the feed tank determine how long it would take to empty a tank.

For instance, a 30-gal tank full of solution, tapped by a metering pump feeding at 0.25 gph, would last for 120 hours of irrigation time. If 4 gal of chemical were needed at each refill (the rest of the

tank is filled with water) and cost \$15 a gallon, the operating cost of the system would be \$60 every 120 hours of watering, or \$0.50 per hour of watering.

The \$0.50 per hour cost can be compared to municipal water costs in excess of \$3 per thousand gallons. An irrigation system flowing at 20 gpm uses 1,200 gal of water an hour.

But the most attractive part of

installing rust stain prevention systems is that it fits into a service-oriented business model and represents a stream of income into the future. *wqp*

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