

Dealing with Iron

Iron in irrigation water could be an essential nutrient to plants but instead it oxidises on contact with the air and blocks drippers, filters and spray nozzles and contributes to scale build up in the pipes resulting in decreased efficiency, increased maintenance and expensive replacement of dripper nozzles.

Dissolved iron as found in ground water is present as Ferrous (Fe^{++}) iron. Ferrous iron compounds are soluble and are colourless when dissolved in water.

When ground water containing ferrous iron is pumped to the surface it is oxidized to Ferric (Fe^{+++}) iron. This Ferric Oxide (Fe_2O_3) is insoluble and reddish/brown in colour. Its common name is rust. As the particles of rust are very tiny they remain in suspension for a considerable time and the water takes on a reddish/brown colour. If this water is left to settle most of the rust particles will sink to the bottom of the storage vessel over time.

Traditional Approach

The basic approach is to oxidize the dissolved iron so that it becomes insoluble and then either flock out the iron into a dam/tank or run the water through a sand filter to remove the Ferric Oxide particles.

Problems with this approach occur because not all of the dissolved iron is oxidized before filtering or flocking.

When this water is then pumped out to irrigation the remaining dissolved iron is oxidized in the drippers and sprays. This, together with the fact that the flocking/filtering is not 100% efficient, means that over time the Ferric Oxide builds up and blocks the drippers or sprays. This is exacerbated by the presence of dissolved Calcium and Magnesium in the water which combines with the iron to form a reddish scale, that not only blocks drippers and sprays but forms a layer of scale on the inside of the irrigation pipes and equipment, reducing pumping efficiencies and increasing maintenance.

Hydrosmart Solution

When the water containing dissolved Ferrous ions (Fe^{++}), is treated with Hydrosmart's resonance frequency technology, the highly specific frequencies resonate the outer shell electrons of the iron atom. This prevents the loss of the third electron necessary for the transition of Ferrous iron (Fe^{++}) to Ferric iron (Fe^{+++}). The result is that the formation of Ferric Oxide is stopped and the Ferrous iron (Fe^{++}) remains in solution. The iron can now pass easily through the irrigation system without causing any problems.

The treated iron is now much more available to plants than before and is an essential nutrient in the manufacture of chlorophyll which is essential for plant photosynthesis and healthy plants.

Note: Once the oxidation process has taken place the Hydrosmart system will not reverse the oxidation.

Before



After



Above is a vineyard dam with equally high levels of iron and salinity. Here the unit has been switched off and on purely for demonstration purposes. The effect is in fact instantaneous when the unit is switched on. The pictures clearly show the high-level watermark of the dam and show how the treated water has removed the staining from the concrete below the water line.



Smithfield Cemetery had been experiencing severe iron staining on the headstones, paved areas and boundary walls, caused by the high iron levels of the bore water that fed the irrigation system. This was oxidising on contact with the air causing the discolouration seen in the left picture.

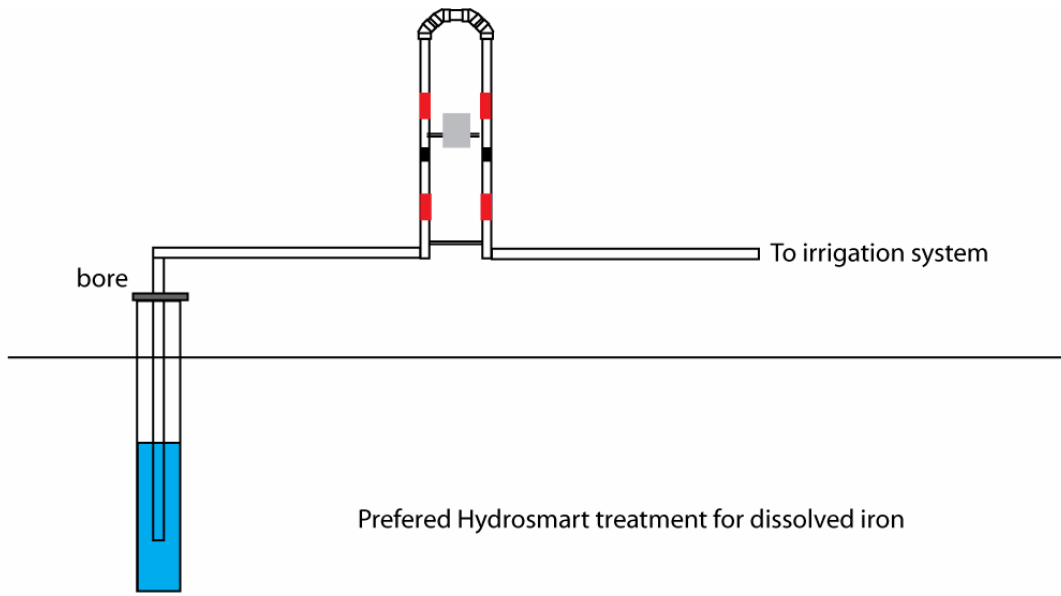
Installation of Hydrosmart for Iron Problems

The ideal setup for treating dissolved iron in ground water is to take the water from the bore head through the Hydrosmart then immediately out to irrigation. (see Figure 1)

This, however, is not always possible. In many situations water is first pumped into a tank or dam and then pumped out of the tank/dam to the irrigation system.

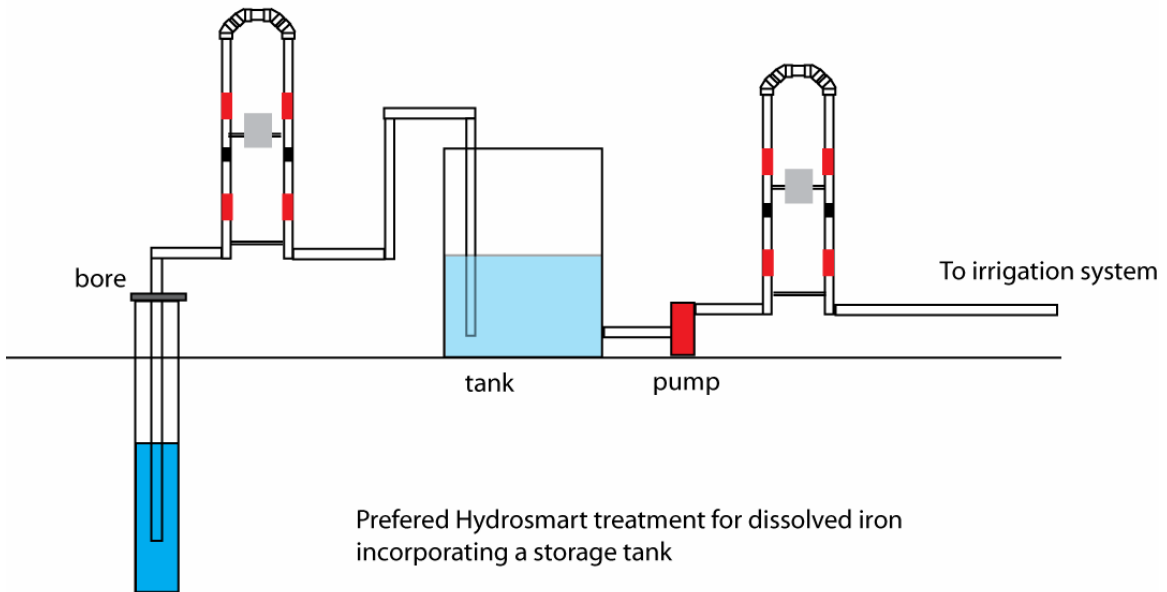
In this situation it is necessary to treat the water into the tank to prevent oxidation of the soluble Ferrous iron to insoluble Ferric iron while the water is sitting in the tank. The resonance remains in the water for at least 7 days, so it is advisable to use the water in the tank within that period.

The resonance frequencies in the water are degraded by the Electromagnetic interference generated by electrical pump motors. Because of this when the water is pumped out of the tank/dam it is necessary to retreat the water to top up the treatment preventing the iron from oxidizing in the irrigation lines drippers and sprays. (see figure 2)



Preferred Hydrosmart treatment for dissolved iron

FIG 1



Preferred Hydrosmart treatment for dissolved iron incorporating a storage tank

FIG 2