

## FII “IRON STOPPER”

### Iron Removal Treatment System Featuring DEFERUM™ Iron Removal Technology

Numerous ground water remediation sites experience challenging water conditions, including high levels of dissolved Iron in the water. Iron in water results in the fouling of piping, as well as the fouling of various treatment components (e.g. Air strippers get “plugged” with iron oxide, bag filters prematurely blind off with the iron fines, activated carbon will oxidize the iron resulting in the carbon beds becoming saturated with iron). This fouling can result in an unacceptably high number of maintenance concerns, in addition to operational issues.

Filter Innovations has designed a unique treatment solution for removing Iron in ground water. The “IRON STOPPER” Treatment System has combined “DEFERUM™” iron removal technology with Filter Innovation’s automated controls and separation technology to create a unique an effective Iron removal system. An overview of this system follows.



**“IRON STOPPER” Containerized Treatment System, including the “DEFERUM™” hydro-automatic filter**

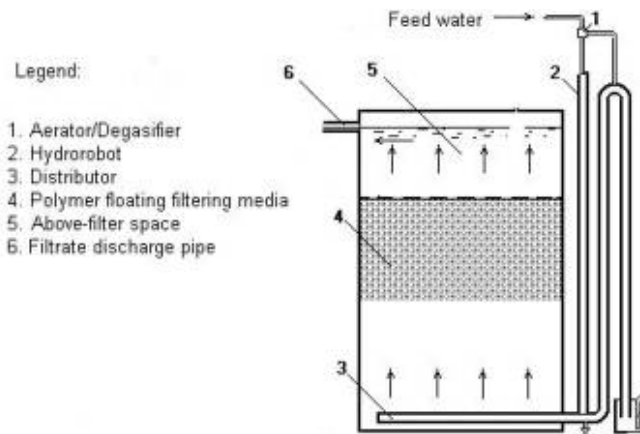


**Coagulated Iron being removed from Self-indexing Filter**

## “DEFERUM™” IRON REMOVAL TECHNOLOGY

### (Automatic self-back flushing treatment component for removal of Iron)

- Feed water is pumped from the collection tank at 65 PSI (0.45 MPa) to the aerator-degasifier (1) where dissolved gasses are removed from the water and atmospheric air oxidizes bivalent iron and partially ions of manganese.
- The feed water then flows down the hydro-robot (2) and through the distribution system (3) into the hydro-automatic filter containing the floating filtering media (4) where the oxidized iron particles are removed throughout the depth of the filtering bed.
- After filtration, treated water gravity-flows into a filtrate collector via the discharge pipe (6), and a pump forwards the purified water to the next treatment process free of iron (this water can also be sent by gravity flow).
- As fouling of the filter increases, the water level in the hydro-robot rises, causing the filter to switch into backwash mode.
- Iron free water from the above-filter section (5) flows downward, pushing the media down and expands the filtering bed, washing out the accumulated particulates.
- When the water level in the above-filter section drops down to a pre-set point, the hydro-robot stops the backwash and switches the filter into a new filtration cycle.
- Backwash water is discharged from the system and is then additionally treated with coagulants and flocculants to generate an agglomerated particle. This large iron coagulated floc is now easily removed in our automatic self-indexing filter. The collected iron on the paper media is collected in a hopper and sent to landfill.



**Figure 1. Simplified Schematic of the “DEFERUM™” hydro-automatic filter based on the polymer floating filtering media.**

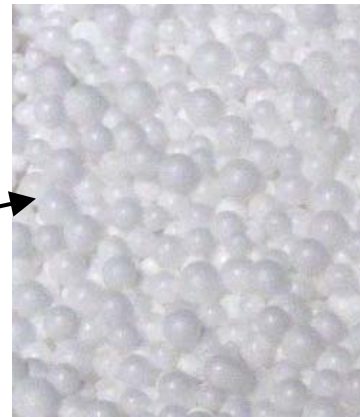
The “IRON STOPPER” Treatment system design is common for all flow-rates. However, individual systems may vary in configuration or add-ons depending on the quality of initial water and/or customer’s requirements. Tanks and vessels will change in diameter based on flow rates.

The customers are requested to complete our questionnaire and the provided answers enable us to design a system that would provide a tailored solution to each customer’s needs.

The following pictures illustrate some of the operational stages of the “DEFERUM™” Iron Removal Component of the system:



**Image 1. Permanent Media Filtration within DEFERUM™ hydro-automatic filter.**



**Image 2. Close-up of media prior to contact with Iron**



**Image 3. Automatic Backwash Stage within DEFERUM™ hydro-automatic filter.**



**Image 4. Close-up of media following absorption of Iron**



**Image 5. Dewatering of coagulated iron in the Self Indexing Filter.**



**Image 6. Blinded Filter Paper Indexing From Filter.**

## RESULTS

Through the use of the Filter Innovation’s “IRON STOPPER” treatment system, the levels of Iron in the water have been reduced to almost zero.



**Unfiltered raw  
water prior to  
DEFERUM™**

**Iron greater than  
20 ppm**

**Filtered water  
from  
DEFERUM™**

**Iron less than  
1 ppm**

**Back flushed water  
from DEFERUM™**

**Iron greater than  
100 ppm**

**Treated back flushed  
water ready for  
indexing filter**

**Iron in filtered water  
0 ppm**

**Image 7. Sample Water At various stages of treatment with the “IRON STOPPER” system.**

