



# FERROLOX

## IRON HYDROXIDE BASED GRANULES

### Ferrolox

**FERROLOX<sup>®</sup> (IRON HYDROXIDE) BASED GRANULES** is one of the best Adsorber to load major worst contaminants in drinking water treatment with high capacity and also because of its chemical activity, ferric (III) hydroxide is quite appropriate to bind arsenate, phosphate or sulfide ions in aqueous media.

**Watch Water<sup>®</sup>** using a patented process now produces ferric hydroxide in a granular form with various bead diameters by combination of advanced crushing and sieving procedures. This gives access to a great variety of new applications of ferric (III) hydroxide.

The **FERROLOX<sup>®</sup>** filter media, containing iron hydroxide **Fe(OH)<sub>3</sub>** has an amorphous structure. The ferric ions content in the filter media is about 40% by weight. It is optimally shaped and highly porous, thus ensuring maximum loading capacity at low costs.

### Operation Principles

#### Arsenic and Phosphate removal

In the first step, arsenate or phosphate ions in aqueous solutions were bounded to the surface of **FERROLOX<sup>®</sup>** by adsorption. Second step, is a chemical conversion to stable ferric arsenate or ferric phosphate to the surface of **FERROLOX<sup>®</sup>**



#### Hydrogen Sulfide Removal

Sulfide ions formed from hydrogen sulfide in water are removed in a similar way under precipitation of hardly soluble ferric sulfide.



### Applications

Drinking Water

Waste Water

Well Water

Reverse  
Osmosis

Surface Water

Aquariums

Sea Water

Concentrate

### Water Treatment

**FERROLOX<sup>®</sup>** media is applicable in a wide range of water treatment processes, from large-scale municipal systems to small-scale residential treatment units. Regardless of the system size, there are operational design parameters that must be considered to ensure effective, trouble free performance of the **FERROLOX<sup>®</sup>** media.

Groundwater or surface water is simply pumped in up flow mode through a single or multiple up-flow pressure vessels containing the **FERROLOX<sup>®</sup>** media, but it can be also successfully used in down flow filtration. In down flow filtration it is recommended to use oxygen dosing for better oxidation. It is also being used in systems to remove Chromium, Copper and Selenium.

### Removal of



Arsenic



Phosphates



Selenium (IV & VI)



Chromium



Copper



Hydrogen Sulfide

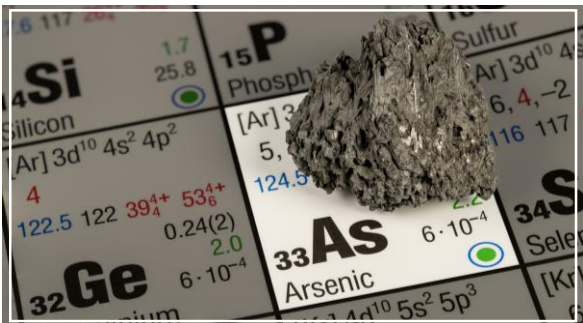


# FERROLOX SYSTEM

The multiple pressure vessel design is either assembled in "**Parallel Flow**" or "**Series flow**". Flow to each vessel is measured and totalized to record the volume of water treated. Pressure differential through each vessel is also monitored. Periodic backwashing is typically performed at start-up and after each pressure drop of 0.5-1.0 Bar thereafter depending on usage and water quality.



**Arsenic** in drinking-water and food has a major impact on long term health effects and can cause cancer and skin lesions. It has also been associated with cardiovascular disease and diabetes. [Read more..](#)



**Chromium:** (Hexavalent Chromium - "it's a slow poison") A recently-released report by the **Environmental Working Group** has found that the water supplies of almost all major cities and small communities are contaminated with hexavalent chromium, an industrial chemical toxin that does not get filtered out by ordinary consumer filter except from Granulated Ferric hydroxide **FERROLOX**<sup>®</sup>. According to the **National Toxicology Program**, hexavalent chromium is linked with gastrointestinal tumors

and other forms of cancer. International governing bodies have stated that it is toxic when inhaled.

**Copper:** Long term exposure to copper can cause irritation of the nose, mouth and eyes and it causes headaches, stomach-aches, dizziness, vomiting and diarrhea. There are scientific articles that indicate a link between long term exposure to high concentrations of copper and a decline in intelligence with young adolescents.

**Hydrogen Sulfide:** Brief exposure to high concentration of hydrogen sulfide (**>500 ppm**) can cause loss of consciousness and possibly death. In most cases, the person appears to regain consciousness without any other effects. However, in many individuals, there may be permanent or long term effects such as headaches, poor attention span, poor memory and poor motor function. Exposure to low concentration may cause irritation to the eyes, nose or throat and fatigue. It may also cause difficulty in breathing for some asthmatics.

**Phosphates:** Dosing Sodium Phosphate in drinking water has caused very serious problems and effecting public health. People get affected; have to be treated with dialysis. Some people develop kidney problem within a few days if city water is dosed with phosphate to protect pipes from scaling and corrosion. [Read more](#)

**The best effective way for the removal of above major worst water contaminants is by Watch Water FERROLOX<sup>®</sup> adsorption media**

**F**errolox adsorbent can  
**E**liminate all Ion-Exchange systems without  
**R**egeneration and waste products from  
**E**verse osmosis concentrates, it is the  
**L**only solution to adsorb and  
**O**oad six worst contaminants in  
**L**our drinking water problem having  
**X**XL capacity



# FERROLOX SYSTEM

The **Watch Water**<sup>®</sup> **UP FLOW Adsorption** system is an advanced design that uses best innovation and **Watch Water**<sup>®</sup> extensive **Adsorption** experience to deliver a very compact design. When compared to all conventional filter systems, this up-flow system provides the following advantages:

## Compact Design

The construction of **Watch Water**<sup>®</sup> UP-FLOW Adsorber systems permit a very smooth flow rates up to 2000 litres per minute in a single pressure vessels (1200 m<sup>3</sup> /hr). The result?



The construction of **Watch Water**<sup>®</sup> UP-FLOW Adsorber systems permit a very smooth flow rates up to 2000 litres per minute in a single pressure vessels (1200 m<sup>3</sup> /hr). The result? Very few pressure vessels can accommodate your flow requirements. In fact, the **Watch Water**<sup>®</sup> **UP-FLOW Adsorbers** require 50% less number of tanks. Using less pressure vessels enables a reduction in the size of building required for conventional down flow systems. The result is lower capital investment costs

### **IMPORTANT:**

Concentration of Arsenic & other contaminants can be expressed as Micrograms per liter, abbreviated as  $\mu\text{g/L}$ , milligram per liter (mg/L), parts per billion (ppb) or parts per million (ppm).

1 microgram per liter ( $\mu\text{g/L}$ ) = 1 parts per billion (ppb)

1 milligram per liter (mg/L) = 1 parts per million (ppm)

10 microgram per liter ( $\mu\text{g/L}$  or ppb) is same as 0.01 milligram per liter (mg/L or ppm)

## EASE OF USE

The **Watch Water**<sup>®</sup> **UP-FLOW Adsorber** systems are designed with ease of use in mind. **NO valves, NO electricity, NO backwash, NO chemicals** it absolutely user friendly that makes Adsorber installation and removal to exchange Adsorber material easier without the use of special tools or labour. Open the tanks on top let the media flow out and fill it back with new media, it's so easy. **UP-Flow Adsorbers** minimizes labour, operator and maintenance costs. Reproduce **NO effluent**, while no backwash. **UP-FLOW** pressure vessels are **50% smaller** than down-flow system.

## DISPOSAL OF SPENT MEDIA

The exhausted or spent **FERROLOX**<sup>®</sup> media is a non-toxic solid waste. Its disposal is not problematic at all. Under normal environmental conditions no leaching of **Arsenic** takes place out of the spent media. All other technologies like ion-exchange or **Reverse osmosis**, the regenerated effluents on concentrate are of big concern worldwide. After the expiration of capacity, **FERROLOX**<sup>®</sup> can be advantageously utilized as a very useful component for manufacturing bricks. So **FERROLOX**<sup>®</sup> is supposed to be the safest technology to remove arsenic, copper, chromium, phosphates and hydrogen sulfide from water and waste water. As the **FERROLOX**<sup>®</sup> technology is applied in **UP-FLOW adsorption**, the adsorbent is **utilized 100% of its capacity**. This technology is not only the most economical but also the most effective. It can be used in **POE Residential** applications in rural areas with hand tube-wells, as well as for large scale applications in towns with community water works. Several arsenic, chromium or phosphates elimination plants with **FERROLOX**<sup>®</sup> in **UP-FLOW systems** are operational in Argentina, Vietnam, Portugal, India, Bangladesh, Chile and are successfully in-service in other countries.



## Loading Instruction of FERROLOX<sup>®</sup> Adsorber

**1st:** Watch Water<sup>®</sup> recommends to fill the pressure vessel with water up to 1/3 of its height to avoid any damage on **bottom distributor** and the media itself. Keep water level all the times minimum 15 cm above the media. The media should never become dry.

**2nd:** It's recommended to use **good quality quartz** sand for under bed. It should just cover the bottom distributor and should be 3cm over it.

**3rd:** FERROLOX<sup>®</sup> should be filled from top of the vessel leaving **30 cm of freeboard** that the media can expand and fluidized easily.

**4th:** Inert Resin on the Top of the media should be maximum **20 cm** in height, covering the top distributor to avoid clogging.

**5th:** Close the top of the tank with **distributor** and fill the water from bottom till top and leave it **soaked for at least 4 hours** before doing any backwash. Begin backwashing at very slow-rate for 15 minutes. Note the valve at the outlet is closed and the drain is open.

### Physical Properties

|                     |                             |
|---------------------|-----------------------------|
| Bulk weight         | 630 - 640 kg/m <sup>3</sup> |
| Porosity            | min. 75%                    |
| Humidity            | 08%                         |
| Fe(OH) <sub>3</sub> | min. 75%                    |
| Specific surface    | 290 m <sup>2</sup> /gram    |
| Mesh size           | 0.5-2.0 mm x 2.0-4.0 mm     |
| Color               | Dark brown                  |

### Material Properties:

#### Chemical formula and composition:

Amorphous Fe(OH)<sub>3</sub>

#### Mineralogical composition:

Up to 40% of Ferric Ions from its weight.



### Operation Conditions and Exchange Capacity

|  |  |
|--|--|
| Bed depth up flow                              | 70 - 75%                               |
| Freeboard up flow                              | 10 - 20%                               |
| Bed depth down flow                            | 420 - 1500 mm                          |
| Freeboard down flow                            | 30 - 40%                               |
| Service flow rate                              | 10 - 20 m/h                            |
| Back wash flow rate                            | 25 - 30 m/h                            |
| Total adsorption capacity for P <sup>5+</sup>  | 16 g/kg                                |
| Total adsorption capacity for As <sup>5+</sup> | 13 g/kg                                |
| Oxidation capacity for H <sub>2</sub> S pH     | Up to 22% of its dry weight<br>5 - 9.5 |

**Disclaimer:** The information and recommendation in this publication are true and based on data we believe to be reliable. They are offered in good faith but do not imply any warranty, liability or performance guarantee. Specifications are subject to change without notice. Watch Water<sup>®</sup> will not be liable under any circumstance for consequential or incidental damages, including but not limited to, lost profits resulting from the use of our products.

⚠ Beware of fake products