Eagle Arsenic Oxide
PRODUCT DATA SHEET

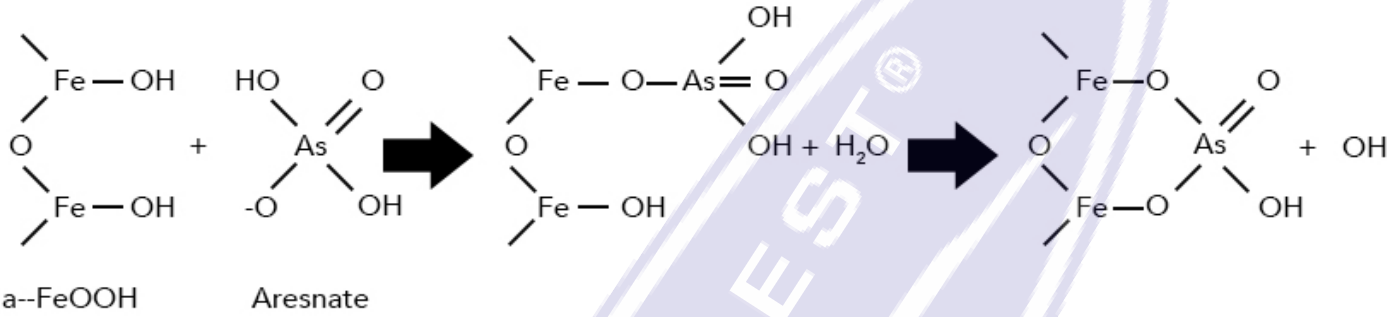
Iron Hydroxide reduces up to 99% of total Arsenic including Arsenic (III) and Arsenic (V). Iron Hydroxide is specifically designed for commercial and residential POE to meet the new EPA standard for Arsenic of 10ppb. The ferric oxide based media inside the media tank has been used in large-scale drinking water applications since 1999. This media is discardable when spent and requires no chemicals or regeneration. Prechlorination for oxidation purposes is recommended for water sources with As(III) which also have elevated iron levels (over 150 µg/L Fe). Oxidation ensures efficient arsenic removal as As(V) along with co-removal of iron.

Technical Specification Data		
Description	**Value**	
Fe_2O_3	>70%	by DIN 55913 (1972)
Bulk Density	0.75 kg/litre(min) 0.95 kg/litre(max)	by DIN ISO 787 part 11 (1995)
Specific Surface Area	250 m²/g (max) 200 m²/g (min)	by DIN 66 131 (1993)
Water Soluble Content	2.0% (max)	by DIN EN ISO 787 Part 3 (1995)
Water Content (ex works)	20% (max)	by Test Method SSP 27472
Sieve Analysis <0.5 mm	15% (max)	by Test Method K006-00
Sieve Analysis >2.0 mm	5% (max)	by Test Method K006-00
Informative Technical Data		
Description	**Value**	
Actual Density	3.6 to 4.1 kg/litre	by DIN ISO 787 Part 10 (1995)
Informative Chemical Data		
Description	**Value**	
Aluminum (Al)	<350 mg/kg	by AAS
Barium (Ba)	<10 mg/kg	by AAS
Cobalt (Co)	<150 mg/kg	by AAS
Chromium (Cr)	<250 mg/kg	by AAS
Chromium (Cr)	<100 mg/kg	by AAS
Manganese (Mn)	<3,000 mg/kg	by AAS
Nickel (Ni)	<300 mg/kg	by AAS
Lead (Pb)	<3 mg/kg	by AAS
Zinc (Zn)	100 mg/kg	by AAS

Arsenic Adsorption Chemistry

The Arsenic Removal Process is a fixed bed adsorption system using a granular ferric oxide media, or adsorbent, called Iron Hydroxide for the adsorption of dissolved arsenic onto the ferric oxide. It employs a simple "Pump & Treat" process that allows pressurized well water to flow through a fixed bed pressure vessel containing the media where the arsenic removal occurs.

In the process, both As(III) and As(V) oxyanions are removed from water via a combination of adsorption, occlusion (adhesion) or solid-solution formation by reaction with ferric oxide ions. Above pH 7, the primary mechanism is adsorption of the oxyanions to the surface hydroxyl groups of ferric oxide hydroxide as indicated below:



a--FeOOH Aresnate

Adsorption is a continuous process conducted at a specifi c fl ow rate or velocity, normally about 7 gpm/ft2, downward through the fi xed bed adsorber for operating periods of about 1 month on stream duration. In addition to velocity, the other key process parameter is empty bed contact time (EBCT). This is the variable which dictates the amount of water contact time within the bed required to effect complete arsenic adsorption; the normal design value is 4 minutes. The media adsorbs As(V) with rapid kinetics (adsorption). Unlike most other adsorbents, it will also adsorb As(III). Arsenite is nonionic at normal water pH's, and therefore, it will not be adsorbed as an anion. Adsorption kinetics for As(III) are slower than that of As(V), probably because it is first oxidized by the media before it is adsorbed. Prechlorination for oxidation purposes is recommended for water sources with As(III) which also have elevated iron levels (over 150 µg/L Fe). Oxidation ensures efficient arsenic removal as As(V) along with co-removal of iron. Another benefit is that some arsenic is adsorbed onto the iron oxide precipitate and removed, thus extending the media's arsenic capacity.

Physical Properties	**AD33 Media**
Matrix	Iron Oxide Composite
Physical Form	Dry granular media
Color	Amber
Particle Size Distribution	10x35 mesh
Moisture Content	< 15% by wt.
Packaged	Dry

Arsenic Removal Performance (POE)	
Arsenic concentration range [1,2]	10 – 100+ ppb
Arsenic species reduced	As (III) and As (V)
Removal efficiency	Up to 99%
Estimated media life	2 to 3+ years
Expected life bed volumes [3]	15,000 to 125,000
Spent media disposal [4]	Non-hazardous waste
Empty bed contact time	3 minutes typical

Notes:

1. Typical arsenic contamination in U.S. < 50 ppb.
2. Capable of removing higher As concentrations. Consult Crystal Quest for applications above 100 ppb.
3. Actual bed volumes based on water quality.
4. Reference US EPA TCLP protocol

Parameter	Value [1]
pH range [2]	5.5 - 8.5
Arsenic [3]	< 100 ug/L
Iron	< 0.3 mg/L
Manganese	< 0.05 mg/L
Phosphate	< 0.5 mg/L
Silica	< 30 mg/L
Sulfate	< 100 mg/L
Sulfides	< detect mg/L
TSS	< 5 mg/L
Fluoride	< 1 mg/L
Hardness	< 300 mg/L
Turbidity	5 NTU

WATER QUALITY CRITERIA

Notes:

1. Recommendations for best performance.

2. Water > 8.5 pH may require pH adjustment for best results. Contact Crystal Quest for technical support.

3. For all applications, complete Adedge POE profile sheet to pre-qualify site for proper use; consult Crystal Quest for details

4. Pretreat for tannins if present prior to adsorption

System Design Parameters	5 GPM dual tank	5 GPM single tank	10 GPM single tank
Typical Tank size (inches)	10 x 42	12 x 52	14 x 65
Media Volume (cubic feet)	(2) 1-ft^3 ea	2 ft^3	4 ft^3
Operation mode	2 in series	Single tank	Single tank
Media Type	AD33S	AD33S	AD33S
Underbedding	gravel	gravel	gravel
Typical Freeboard (%)	40	40	40
Backwash flow rate (gpm/ft^2)	4	5	10
Backwash cycles (per month)	2x	2x	2x
Est. gallons per day [3]	300	300	500
Est. gallons to breakthrough [2]	374,000	374,000	561,000
Estimated time to media changeout[1]	2-3+ years	2-3+ years	2-3+ years
Max flow rate (gpm)	5	6	10

RESIDENTIAL SIZING PARAMETERS

Notes:

1. Media life based on gallon usage and water profile (Above is example only; example assumes 40 ppb

2. Arsenic, 25,000 bed volumes); will vary by individual site based on water quality and usage

3. Crystal Quest recommends effluent testing and monitoring program to determine media breakthrough.

4. Average gallons per day will be site and usage specific.