

KATALOX – PLUS

0 – FRACK - SOL

Media to treat water obtained from
FRACKING OPERATIONS

and also

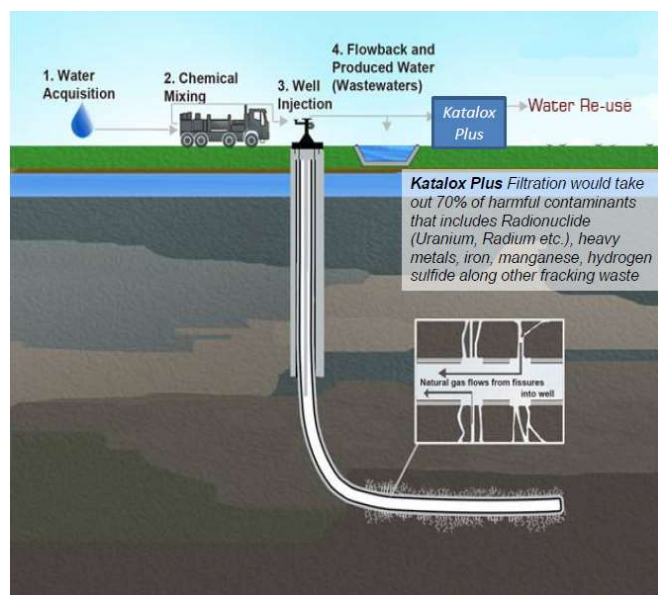
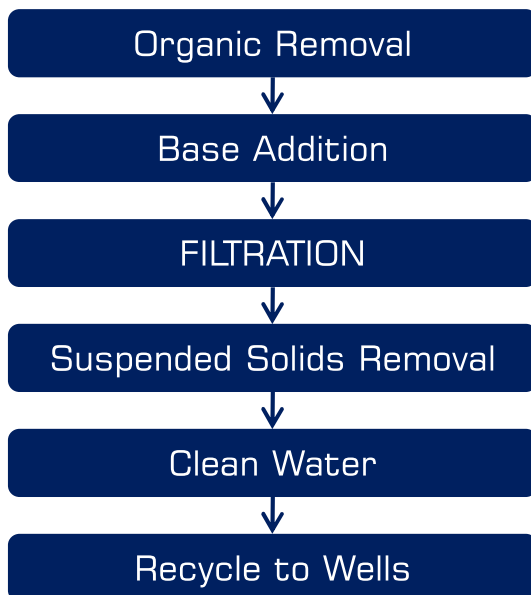
Removal of Contaminants
from

- Industrial Wastewater
- Brackish Water
- Municipal Wastewater
- Acidic Drinking Water

and **SPECIALY WATERS** obtained from **FRACKING**



ALL IN ONE



Introduction:

Katalox-Plus is the first media for systems to recover, purify & reuse of contaminated water produced by hydraulic fracturing or Fracking operations. **Fracking** for Oil & Gas well has dramatically increased well water production capacity. **Fresh water** consumption is producing very high amount of wastewater with significant concentrations of mineral and chemical contaminants. Many million gallons of water per well is required to accomplish the fracking procedure. **Fresh fracking water** used to perform the procedure comes in contact with heavy metals becomes contaminated by Acidic water, which dissolves Iron, Manganese, Arsenic and also Radium and Uranium.

Flow-back water:

Flow-back water is contaminated water that returns to the surface shortly after the Fracking procedure is completed. This water is heavily contaminated having several metals including acids and chemicals. During the production contaminated water flows up the bore well where it is separated from oil and gas and collected as **produced water**.

SO THERE ARE THREE TYPES ON WATER

1. FRACKING WATER
2. FLOWBACK WATER
3. PRODUCED WATER

Produced water are typically stored at the drilling site in lined pits or tanks to transport or disposal.

IMPORTANT *What can you do with* recovery and disposal methods are very costly including considerable energy costs for Evaporation or Reverse Osmosis costs of concentrate water and sludge.

Description:

Watching accordingly, Watch® has developed an improved **Recovery and Purification** technique, which is capable of removing Heavy-metal contaminants from all three types of waters with no energy expenditures, disposal costs and adding up the ability to Re-use the purified water. This unique **Katalox-Plus** can be used to remove contaminants from wastewater from industries, Brackish water, Municipal waste water and particularly waters from Fracking operations.

Contaminated water will be dosed with **Redoxy** and contacting the feed water with non-soluble Manganese dioxide coated (min 20% MnO₂ coating) on ZEOSORB. Increasing the pH of the Katalox-Plus treated solution to form a contaminant precipitation and alkaline solution without adding any kind of chemicals. Filtering the water down to 5 microns and separating the alkaline solution and all contaminant precipitates. All kinds of organics are removed at the same process. All kind of suspended solids are trapped at the same time, wherein the treated water is purified relative to the feed water composition. Feed water source includes **Fracking Water**, **Flow-back Water** and **Produced water** or any kind of wastewater and Acidic water with heavy-metals dissolved at high concentration.

This process with **Katalox-Plus** may be performed at any desired temperature for example temperature form 4°C to 90°C (40°F to 194 °F).

RO concentrate?

...and THIS is the problem!

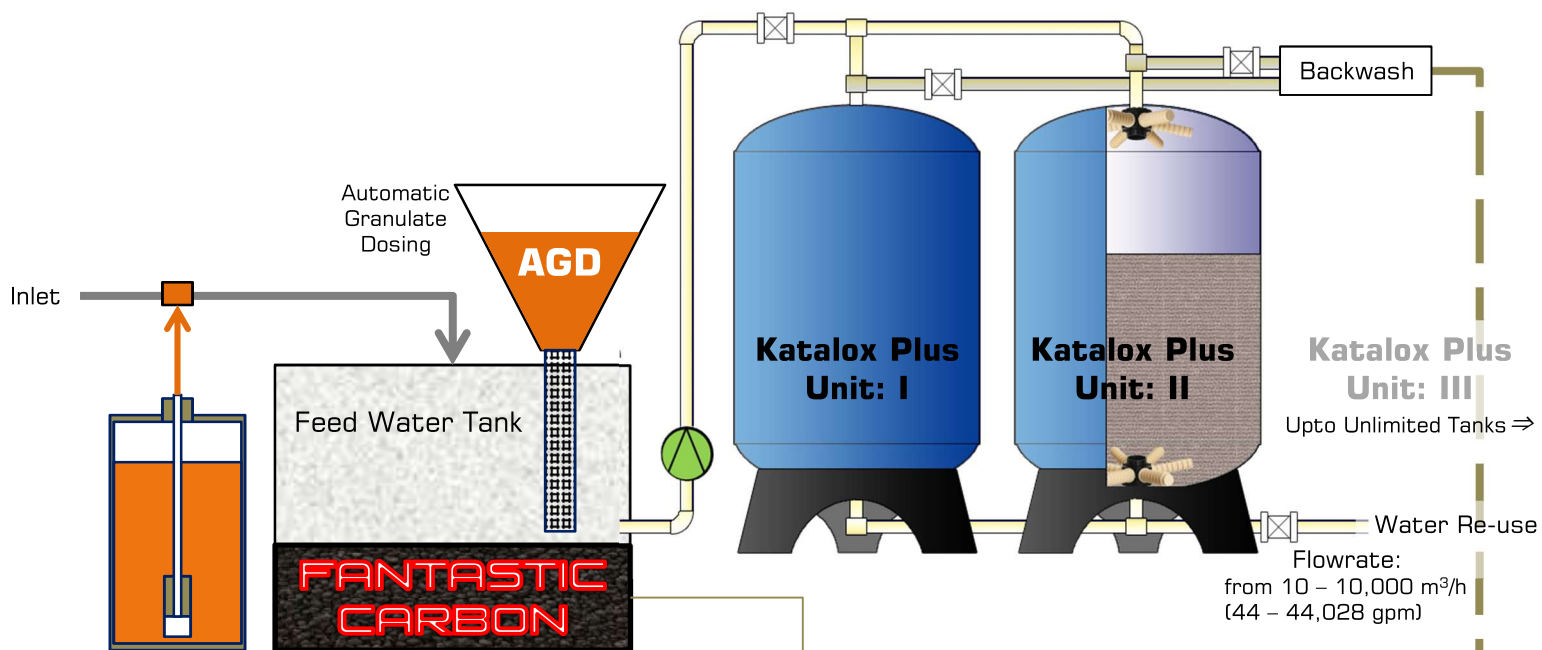
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Increasing the pH of feed-water composition from pH 5 to about pH 11.5, without adding any chemicals. Increasing the pH of a **Katalox-Plus** treated feed-water composition sufficient to form a contaminant

precipitation. The system is backwashed to separate precipitated contaminants and collect that in a settling tank and natural evaporation.

Katalox-Plus: Treatment Process Diagram



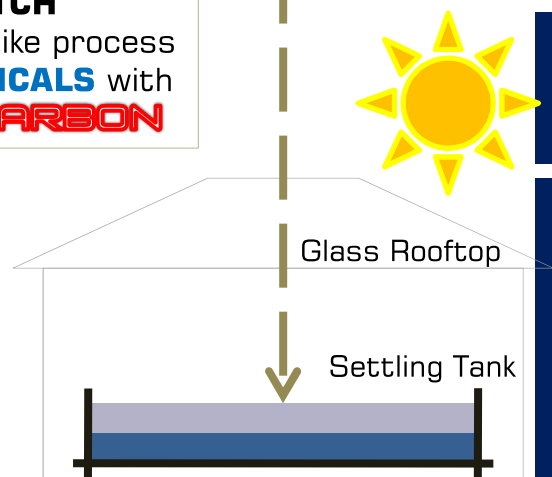
REDOXY
Dosing

OPTION WATCH
FENTON'S Reaction like process
For **HYDROXIL RADICALS** with
FANTASTIC CARBON

Benefits:

- All Organic removals
- No Addition of Hydroxides
- 5 Micron Filtration
- Suspended Solids removals
- Backwash water use **1:450**
- No Chlorine
- No extra Backwash Pumps
- Very less energy consumption
- Equipment can be installed as very compact skids
- No concentrated water or sludge like

- ✗ Evaporation or
- ✗ Reverse Osmosis



Green concept: Backwash water is collected in an open basin in a secured place where the water can naturally evaporate and the precipitated waste can be collected.

1 m³ (264 gallons) of backwash water against every **450 m³** (118877 gallons) of treated water. Wastewater use: 0.2 %

Composition of KATALOX-PLUS®:

Compounds	Typical value	Specifications
ZEOSORB (Naturally Mined)	75%	>75%
Manganese dioxide	20%	> 19.5%
Hydrated Lime	5%	<5%

Physical Properties:

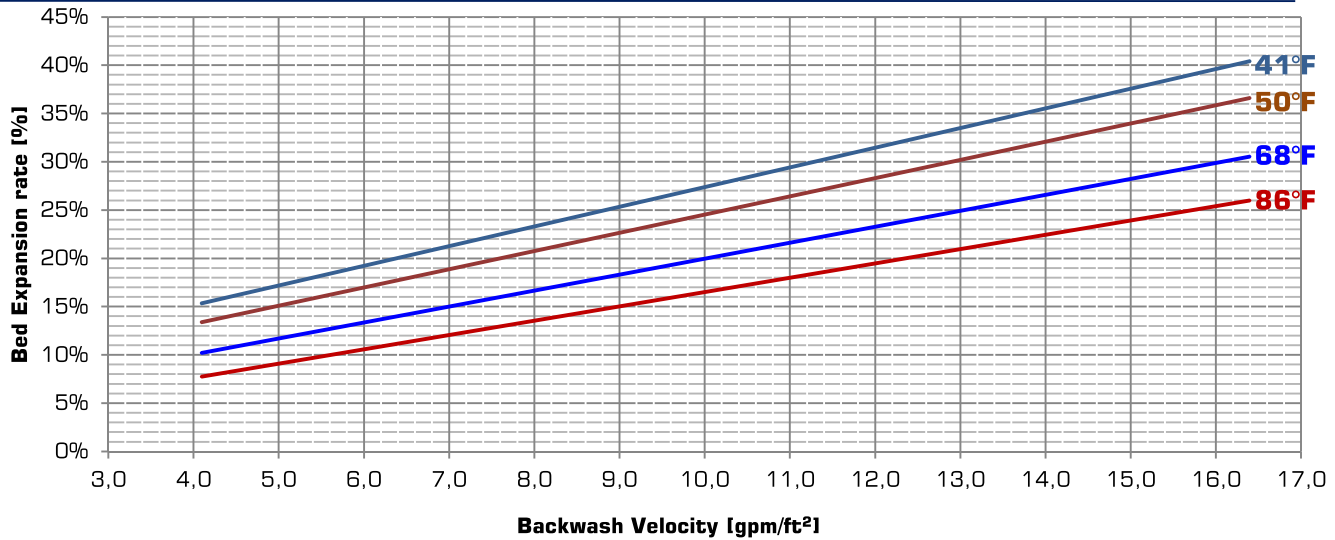
Appearance		Granular black beads
Odor		none
Mesh size	US	14 x 30
	SI	0.6 - 1.4 mm
Uniformity Coefficient		≤ 1.75
Bulk density	US	71 lb/ft ³
	SI	1140 kg/m ³
Moisture Content		<0.5% as shipped
Filtration		≤ 5 micron
Loading Capacity (per unit volume of the media)	for Fe ²⁺ alone	3000 mg/l 85000 mg/ft ³ (aprx)
	for Mn ²⁺ alone	1500 mg/l 42500 mg/ft ³ (aprx)
	for H ₂ S alone	500 mg/l 14000 mg/ft ³ (aprx)

System Operating Conditions

Inlet water pH		5 - upto any pH
Freeboard		40%
Min. Bed Depth	US	29.5 inches
	SI	75 cm
Optimal Bed. Depth	US	47 inches
	SI	120 cm
Filtration rate		15 BV/h (@EBCT 4 min)
		10 BV/h (@EBCT 6 min)
Service flow*	US	4 - 6 gpm/ ft ²
	SI	10 - 15 m/h
Backwash velocity	US	8 - 10 gpm/ ft ²
	SI	20 - 25 m/h
Backwash time		10 - 15 minutes
Rinse time		1 - 2 minutes

*Service flow must be adjusted in the chosen pressure vessel to meet the typical filtration rate (Bed Volume/h) to assure sufficient bed contact time (minimum EBCT 4 min).

Backwash velocity gpm/ft² vs. Media Bed Expansion [%]



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