

MANUFACTURED IN GERMANY

KATALOX – LIGHT

RADIONUCLIDE REMOVAL

Radium and Uranium Removal Systems

INTRODUCTION

Radionuclide removal with Katalox Light is the most economical way to get rid of ^{226}Ra , ^{228}Ra and ^{238}U in water for Drinking and Water Re-use. During the Filtration of Ground water, Surface Water and waste water, ferrous iron (Fe^{2+}) is oxidized to ferric iron (Fe^{3+}) and raising pH with Katalox Light forms the insoluble iron hydroxide complex $\text{Fe}(\text{OH})_3$. Same way Mn^{2+} is oxidized to $\text{Mn}(\text{OH})_4$, which further forms insoluble MnO_2 (Manganese dioxide)

The Watch Water system for Radium and Uranium removal is the most advanced Technology for complete water treatment industry. A highly adsorptive MnO_2 coated media with ANSI/NSF 61 certified by WQA.

**System Flow ranges from 20 gpm to 20000 gpm
(4.5 m³/h to 4542 m³/h)**

Highlights

- Lowest operation costs
- Minimum Maintenance
- No Acid Dosing
- No Caustic Dosing
- Oxidant Pretreatment
- Design/Build Systems
- One system kit for 2 to 20 Pressure Vessels
- Total system as Kit

KATALOX LIGHT

Watch-Water process, that includes Katalox Light, the PROPRIETARY Filter Media that does not require regeneration (IR) with KMnO_4 or pretreatment (CRI) with KMnO_4 and offers flow rate up to 2.5 gpm per ft³ of Katalox Light media. Our media is a permanent Katalytic Adsorption & Filtration media "TWO in ONE" which the highest Manganese content on Zeosorb that will also remove heavy metals such as Arsenic, Iron, Manganese, Radium/Uranium and Hydrogen sulfide. In addition to permanent Katalytic Adsorption, Katalox Light provides 3 Micron filtration.

How it works?

The chemistry of Radium is controlled by co-precipitation. With elements and adsorption process. Iron hydroxide $\text{Fe}(\text{OH})_3$ and $\text{Mn}(\text{OH})_4$ have very high Adsorption capacities for divalent metal ions. Katalox Light has proved to be the best adsorbent for all divalent metal cations (Ra^{2+} , Ba^{2+} , Mg^{2+} , Ca^{2+} , Mn^{2+} , Cu^{2+}) and due to the fact that differently from Hydrous iron oxide particles, which are Positive charged and the Hydrous Manganese Oxide particles have a Negative charge.

Important to know

Katalox Light mechanism of sorption of Metal Ions (cations) on Oxides and Hydrous oxides and the exchange of bound H-ion on the MnO_2 Katalox surface with cations is described by the following:
$$\text{M}^{n+} + x [\text{=R-OH}] = \text{M}[\text{R-O}] x^{(n-x)+} + x\text{H}^+$$
Where **M** is the metal to be sorbed **X** is the number of moles in Oxide or hydroxide.

And $[\text{=R-OH}]$ and $[\text{=R-O}]$ are the OXIDE SURFACE SITES

This also apply to the special case of RADIUM.

SYSTEMS

Standard features and Equipment

PILOT SYSTEM

A pilot testing program is available with Watch-Water and its distributors to ensure the proper design and operation of every system. The cost of pilot system is deducted from the purchase price.



- Canature Pressure Vessels (ASME CODE) with top and bottom distributors (0,5 mm)
- OXYDES, Iron or PAC Dosing equipment (if required). No dosing pumps, only injection and dilution tank for OXYDES
- REDOXY (Iron)
- AIDOXY (AluPAC)
- Katalox Light media
- Complete Kit with electrically or Pneumatically operated butterfly valves on stainless steel frame. (One complete Kit can operate 2 to 20 Tanks in Parallel)
- A PLC based control panel provides automatic operation of the Katalox Light system and includes flexibility in the simple adjustment of various filter cycles.
- Filter flow control valves, Air-relief valves
- Start Up instructions.
- System available as Mobile or Container system. Min flow 20 m³/h up to 500 m³/h per container.

KATALOX- LIGHT

RADIONUCLIDE - SOLUTION

Contamination of Drinking water including water for re-use (Fracking) and mining water with radionuclide has become a significant issue today. Worldwide Problems with water containing Radium/Uranium is treated with several processes. Application of Ion-Exchange and modern membrane processes for Radionuclide removal create huge problems

with RO concentrate or regeneration of resins with radioactive waste. There is no answer for disposal of this waste in near future. However, the most advanced radionuclide removal process is Katalox Light and is also most natural and economical way for RADIUM and also for URANIUM removal.

Dosing or Injection (REDOXY)

If natural Iron (Fe^{2+}) is not available/insufficient in the water to be treated (raw water), Ferric hydroxide – $Fe(OH)_3$ is then fed to remove the Uranium by adsorption on to the Ferric Hydroxide Adsorption [Same is for Copper, Lead, Phosphate, Arsenic, Fluoride, Chromium and Cadmium]

“SIMPLE REDOXY DOSING”

If natural (raw water) does not contain manganese then $KMnO_4$ is needed to clean Katalox Light surface and remove Radium from Katalox Light media surface. Sufficient chlorine can also be used for regeneration. This is only for Radium Removal Process.

Watch Katalox Light series are designed to efficiently remove suspended solids and fine turbidity particles down to 3 micron from incoming water. Our residential system series features (manual backwash valves) for simple operation and efficient manual backwashing.

Pressure Vessel			KL media amount			Service flow rate				Backwash	
Vessel Model	Area M ²	Freeboard %	volume		Bed Height mm	Standard flow-rate		Maximum flow-rate		flow-rate	
			liters	ft ³		m ³ /h	gpm	m ³ /h	gpm	m ³ /h	gpm
08x44	0.03	30	24	0.8	0.72	0.6	2.9	1.0	4.3	0.8	3.6
10x54	0.05	30	42	1.5	0.84	1.0	4.5	1.5	6.7	1.3	5.6
12x52	0.07	30	56	2.0	0.77	1.5	6.4	2.2	9.6	1.8	8.0
14x65	0.10	30	98	3.5	0.99	2.0	8.7	3.0	13.1	2.5	10.9
16x65	0.13	30	126	4.5	0.97	2.5	11.4	3.9	17.1	3.2	14.3
18x65	0.16	30	170	6.0	1.03	3.5	15.5	4.9	21.7	4.1	18.1
21x60	0.22	30	224	8.0	1.00	4.5	19.7	6.7	29.5	5.6	24.6
24x69	0.29	30	308	11.0	1.05	6.0	26.3	8.8	38.6	7.3	32.1
30x72	0.46	30	510	18.0	1.12	10.0	44.2	13.7	60.2	11.4	50.2
36x72	0.66	30	764	27.0	1.16	15.0	66.0	19.7	86.7	16.4	72.3
42x78	0.89	30	935	33.0	1.05	20.0	86.6	26.8	118.1	22.3	98.4
48x82	1.17	30	1300	46.0	1.11	25.0	110.0	35.0	154.2	29.2	128.5

No Service – No Repairs – Very Economical

www.watchwater.de

RADIUM/URANIUM REMOVAL

Please complete the following water analysis form each water supply to be treated and return to Watch Water GmbH for evaluation in preparing our system design and quotation.

General Water Analysis

Project Name		
Flow rate	min	
	max	
Working Pressure	psi	
	bar	
Number of wells*		
New Well?	Yes	<input type="radio"/> No <input type="radio"/>

General Mineral Analysis

CATIONS	mg/L	meq/L
Total Hardness (as CaCO ₃)		
Calcium (Ca)		
Magnesium (Mg)		
Sodium (Na)		
Potassium (K)		
Total Cations		
Total Dissolved Solids (TDS)		

ANIONS	mg/L	meq/L
Total Hardness (as CaCO ₃)		
Hydroxide (OH)		
Carbonate (CO ₃)		
Bicarbonate (HCO ₃)		
Sulfate (SO ₄)		
Chloride (Cl)		
Nitrate (NO ₃)		
Fluoride (F)		
Total Anions		
Conductivity (µS/cm)		

Inorganic Analysis

Aluminum (Al)	
Arsenic (As) Inorganic	
Arsenic (As) Organic	
Barium (Ba)	
Cadmium (Cd)	
Chromium (total Cr)	
Copper (Cu)	

Iron (Fe)	
Lead (Pb)	
Manganese (Mn)	
Mercury (Hg)	
Selenium (Se)	
Silver (Ag)	
Zinc (Zn)	

Additional Analysis

Total Organic Carbon (TOC)	mg/L	
Trihalomethane (THM)	mg/L	
Ammonia (NH ₃)	mg/L	
Silica (Si)	mg/L	
Radium (Ra) 226	pCi/L	
Radium (Ra) 228	pCi/L	
Radon (Rn)	pCi/L	

Odor Threshold (TON) @ 60°C	Units
Apparent Color (unfiltered)	Units
pH	
Turbidity	NTU
Uranium (U) 235	pCi/L
Uranium (U) 238	pCi/L

Distributed by:

Address:

Tel:

Fax:

Email:

Manufactured by:

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A Water Company

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