



**WATCH® GmbH**  
A Water Company

# Katalox - Light®

(Solid Katalyst)

## PART TWO

**Note:** This is an active area of WATCH® Research and many new developments are underway for a variety of Applications.



**Watch® GmbH**

Fahrlachstraße 14  
68165 Mannheim  
Germany

Web: [www.watchwater.de](http://www.watchwater.de)  
email: [info@watchwater.de](mailto:info@watchwater.de)  
Telephone: +49 (0) 621 87951-0  
Telefax: +49 (0) 621 87951-99

**February 2014**

### Introduction

The demand for clean water necessitates the development of new methods by which the Earth's most abundant source of life, the water, must be neat and clean to be usable. In particular Katalytic Water splitting is an attractive means of using and allowing for inexpensive, clean generation of



# OXYGEN FROM WATER

# Katalox-Light®



With very high content of  $\text{MnO}_2$  coating

The **Katalox-Light®** Filtration media<sup>1</sup> and as a Katalyst<sup>2</sup> to use the Oxygen content of the water for oxidation

## “HOW TO KNOW”

Using an ORP-METER<sup>3</sup>, any reading above a negative 170 millivolt (mV) indicates **Katalox-Light®** can be used effectively without the use of additional oxidants<sup>4</sup> in most of the applications. Any reading below 170 mV indicates oxidants will be required.



Compact ORP-METER

Additional oxidants *(needs chemical dosing pumps<sup>9</sup>)*

- |   |   |
|---|---|
| • Hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) <sup>5</sup> | • Potassium permanganate ( $\text{KMnO}_4$ ) <sup>7</sup> |
| • Chlorine ( $\text{Cl}_2$ ) <sup>6</sup>                   | • “Air draw” (Oxygen) <sup>8</sup>                        |



## World's Nr. 1 Filtration Media

### 1. Filtration media:

There are products, practices and processes that are used by professional water treatment companies. There is sand, anthracite and other silica sand products and none of these are ideal.

Everyday these applications go into service and everyday, technicians applying these treatment have no real idea how bad these actually works. It just works, it is sad but the magic of ZEOSORB has proven that the cleanest water to every faucet comes only from one media :

# ZEOSORB®

More on ZEOSORB Brochure

### 1. Filtration media: *(continues)*

Katalytic Precipitation, practical adsorption and mechanical straining are the only subjects that interest water treatment for future.

---

Please Read the presentation and discover that

# KATALOX - LIGHT®

Is not a Filter media but the best Katalyst used to improve water quality in every application from Surface Water<sup>10</sup>, Well-Water<sup>11</sup>, Drinking water<sup>12</sup>, Boilers<sup>13</sup>, Cooling Towers<sup>14</sup>, Heat Exchangers<sup>15</sup>, Pharmaceuticals<sup>16</sup> including Food & Beverage Industries<sup>17</sup>.

& Last but Not the Least for

Wastewater<sup>18</sup> and Water Reuse<sup>19</sup>

## Using Chemistry

### 2. What is Katalyst<sup>2</sup> ?

A Katalyst causes or accelerates a chemical reaction without itself being affected. On **Katalox-Light®** the very high content of Manganese Dioxide provides ZEOSORB Filter media with a Katalyst.  $MnO_2$  creates a very rash Katalytic effect in the chemical oxidation-reduction reactions which is necessary to remove

- Iron (Fe)
- Manganese (Mn)
- Hydrogen Sulfide
- Arsenic
- Radium-Uranium



**Katalox-Light®**

**Katalox-Light®** Katalytic reaction allows Iron and Manganese that are not oxidized to Katalitically precipitate and be adsorbed on the **Katalox-Light®** media.



## Why KL is the Best Available Technology (BAT)

### Other Medias using Manganese dioxide (MnO<sub>2</sub>)

Within the water treatment industry, there are a number of Iron and Manganese removal medias. This presentation will give a brief discussing of medias like

- BIRM<sup>20</sup>
- MTM<sup>21</sup>
- Greensand Plus<sup>22</sup>
- Mang-Ox & Pyrolox<sup>23</sup>
- Filox<sup>24</sup>

This detailed discussion will be on high weight Pyrolusite, Mang-Ox, Pyrolox, Filox, and the light weight medias available in the water treatment industries.

Only **Katalox-Light®** is

**TWO**  
**in**  
**ONE**

- Filtration
- Removal

## Oxidation Reduction Potential (ORP)

### What is ORP? Why use ORP?

Oxidation Reduction Potential is the activity or strength of oxidizers and reducers in relation to their concentrations. Oxidizers accept electrons, reducers lose electrons.

### Additional Oxidants<sup>4</sup>

Examples of Oxidizers are, Hydrogen peroxide, Chlorine and Oxydes®. Examples of reducers are Hydrogen sulfide, Iron, Arsenic just like acidity and alkalinity, the increase of one is at the expense of the others. For instance, chlorinated water will show a positive ORP value whereas Hydrogen sulfide (a reducing agent) will show a negative ORP value. ORP is measured in millivolt (mV), with no correction for temperature.



## Oxidation Reduction Potential (ORP)

### Additional Oxidants<sup>4</sup> (...continues)

ORP is used for surface water, well-water, drinking water, cooling towers disinfection, groundwater remediation, metal etching, cyanide destruction, chrome reductions. ORP is the most convenient measure of the oxidizers or reducers ability to perform a chemical task.

### Short Summary

- ❖ Oxidation is the loss of electrons (OIL)
- ❖ Reduction is the gain of electrons (RIG)

Oxidation: Originally implied reaction with oxygen to form a oxide.

Oxidizers: Substances that have the ability to Oxide other substance (cause them to lose electrons).

Reducers: Substance that have ability to reduce other substances (cause them to gain electron).



Compact ORP-METER

## Hydrogen (H<sub>2</sub>) Peroxide (O<sub>2</sub>) = H<sub>2</sub>O<sub>2</sub>

## is a Powerful Oxidant

### Important to know

The most difficult pollutant to oxidize require H<sub>2</sub>O<sub>2</sub> and it can be activated with only **Katalox-Light®**

Thanks to Hydrogen peroxide which has these properties

Hydrogen peroxide is more powerful oxidizer than chlorine or chlorine dioxide. **Katalox-Light®** with hydrogen peroxide converts into hydroxyl radicals which is the second stronger oxidant after fluorine.

- Powerful
- Safe
- Versatile
- Selective
- Widely used

### And not to forget(!)

Fluorine, Ozone, Potassium permanganate, chlorine dioxide, chlorine HOCl all leave **Disinfection Byproducts (DBPs)** while oxidizing the contaminants.



## Applications of Katalox-Light and Hydrogen Peroxide

- Potable water/mineral water production
- Municipal Water
- Food processing
- Mining/metallurgy
- Oil refining
- Fracking
- Power production
- Textiles
- Machining
- Landfills





**Katalox-Light** and **Hydrogen Peroxide** is used for more than 100 different Applications!

## Metals' Oxidation

**KL** & H<sub>2</sub>O<sub>2</sub> oxidizes iron, manganese, arsenic, hydrogen sulfide, radium, uranium and selenium to improve the water quality, filtration or precipitation from process waters and wastewaters. **Katalox-Light®** is the **Nr#1** in

## ANY WATER REUSE PROCESS

## Odor Control

**KL** & H<sub>2</sub>O<sub>2</sub> oxidizes hydrogen sulfide (H<sub>2</sub>S) at any content, mercaptans, amines and aldehydes. **KL** with H<sub>2</sub>O<sub>2</sub> may be applied, if the ODORs are a result of biological activity.

## Corrosion Control

**Katalox-Light**<sup>®</sup> with H<sub>2</sub>O<sub>2</sub> destroys residual chlorine, chloramine and reduced sulfur compounds (thio-sulfate, sulfates & sulfides) which form corrosive acids when condensed onto processing equipment and oxidized by air.

- BOD/COD removal
- Organic oxidation
- Inorganic oxidation
- Toxicity reduction/ Biodegradability Improvement
- Disinfection/Bio-control
- Legionella treatment
- Bio-control for UF and RO membranes pretreatment

And much more on Part 3

*Thanks for reading!*