

KATALOX-LIGHT®

THE CHEMISTRY BEHIND METAL REMOVAL



Active
surfaces



Controlled
pH



Precipitation



Filtration

ONE MEDIA BED. COMPLEMENTARY TREATMENT MECHANISMS.

Katalox-Light combines an active manganese-oxide coating on ZEOSORB with a porous filtration bed. Surface reactions, adsorption and physical capture work together. Understanding these mechanisms explains why water chemistry matters.

01 TURN DISSOLVED METALS INTO REMOVABLE SOLIDS

Dissolved metal ions cannot be removed by simple particle straining. At suitable pH, copper and lead can react with hydroxide ions to form poorly soluble precipitates:



These are simplified pathways. Carbonates, organic ligands and metal concentration influence which solids form and how much metal remains dissolved. (s) means a solid phase.

03 IRON: OXIDATION FOLLOWED BY PRECIPITATION

Dissolved ferrous iron, Fe^{2+} , is oxidized to ferric iron, Fe^{3+} . Ferric iron then forms poorly soluble hydroxide solids that the filter can capture:



Oxygen or a suitable oxidant supplies the oxidation step. The active coating supports catalytic reactions. This chemistry releases acidity, so adequate alkalinity helps maintain treatment pH.

05 CAPTURE THE SOLIDS. REMOVE THEM BY BACKWASH.

The granular bed retains precipitated metal compounds and suspended particles. Periodic backwashing releases accumulated solids into the backwash stream for appropriate handling. The metals are separated from the treated water, not destroyed. Adequate bed depth and filtration and backwash rates are essential.



02 pH ACTIVATES SURFACE BINDING

In water, manganese-oxide surfaces develop hydroxyl groups. Increasing pH can release protons from these groups, creating negatively charged binding sites:



The symbol $\equiv$ identifies a site attached to the solid surface. These sites can attract and bind positively charged metal ions. This is adsorption at the media surface; it complements precipitation in the water.



04 MANGANESE: OXIDATION AND SURFACE REACTIONS

Dissolved Mn^{2+} can adsorb to active surfaces and undergo oxidation to solid manganese oxides. One simplified peroxide pathway is:



Oxidant availability, pH and contact time govern performance. Manganese removal involves oxidation and surface chemistry; raising pH alone does not guarantee complete removal.



06 WHY THE RIGHT pH IS A STRENGTH

A suitable increase in pH can support both hydroxide precipitation and negatively charged surface sites. The optimum depends on the metal and the water. Excessively high pH can increase the solubility of amphoteric metals, including lead. Select the treatment pH from actual-water testing.



TREATMENT pH AND FINAL-WATER pH ARE SEPARATE TARGETS

First optimize metal removal and separate the solids. If required, adjust pH downstream to the finished-water target. Confirm dissolved and total metal concentrations after final adjustment.

ENGINEER FOR THE WATER



Check pH



Alkalinity



Metal speciation



Oxidant demand



Contact time



Flow



Backwashing

Surface area, accessible binding sites and surface charge are distinct properties. Their combination determines performance.

GERMAN WATER TECHNOLOGY - SURFACE CHEMISTRY. PRECIPITATION. SEPARATION.

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