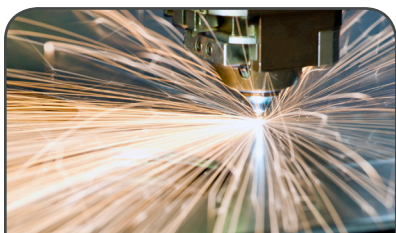


# Ultrafiltration in Heavy Metals Treatment



### Customer Benefits

- No additional chemicals, flocculants, and coagulants
- Reduced sludge and associated operating costs
- Meets stringent effluent discharge requirements
- Reduced heavy metal permeate
- Requires less space than conventional wastewater treatment

### Overview

Ultrafiltration (UF) membranes provide an efficient, compact way to treat industrial wastewater to make it pure enough for discharge or recycling. Machining processes produce large volumes of sludge containing heavy metals. Without treatment, this sludge must be hauled away and the wastewater cannot be reused.

UF technology separates and concentrates insoluble metals, reducing the heavy metals in wastewater to low enough levels to allow discharge of the wastewater.

### The Challenge

Provide a cost-effective alternative to conventional chemical/physical heavy metals wastewater treatment, a labor intensive and unreliable process.

### The Solution

The separation and concentration of heavy metals from wastewater is a proven application of UF membrane technology. Koch Membrane Systems' (KMS) industrial tubular UF systems, incorporating ULTRA-COR®, INDUCOR™, and FEG™ Plus membrane modules,

are capable of treating a variety of wastewater streams laden with heavy metals.

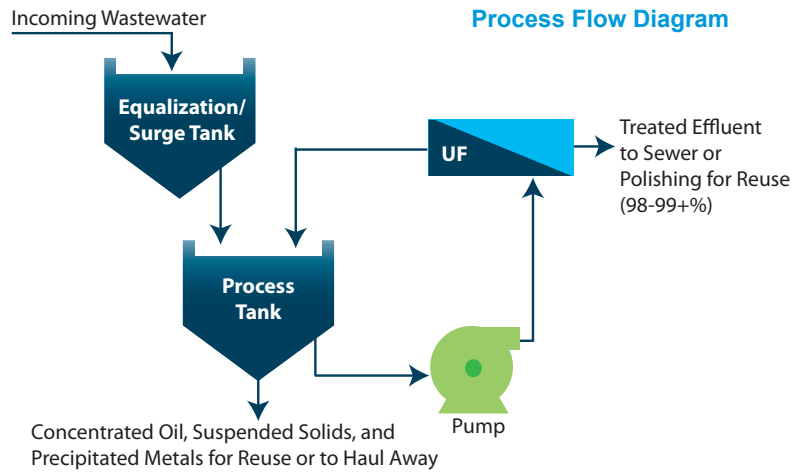
Metal solubility varies with pH. In a UF-based wastewater treatment system, the pH is first raised to precipitate metals out of the solution. The wastewater stream is then sent on to the UF system, where insoluble metals are easily retained and concentrated by the UF membranes.

One or more membrane technologies can be combined to remove these impurities, decreasing contaminants in discharge streams, or recovering clean water for recycling back into the plant.

Systems to treat streams contaminated with heavy oil and grease, such as found in the metalworking industry, typically are configured with tubular membranes.

### Maximizing Efficiency

Tubular UF membranes ensure consistent permeate quality in tough industrial environments. The use of membranes in heavy metals treatment eliminates the need for flocculants that produce a large volume of sludge, which must be removed from



**Equalization Tank**

Removal of settled solids and free oils; equalization of mixed waste streams.

**Process Tank**

Retention of accumulated solids.

**UF Membrane**

Separation of suspended solids, oils, and precipitated metals.

the site. The membrane provides a physical barrier that precipitated metals cannot penetrate, even when wastewater varies and metal concentration spikes occur. The resulting concentrations of heavy metals in permeate are acceptable for discharge by most regulatory agencies.

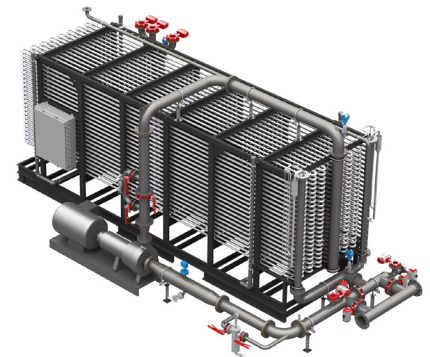
- Automotive parts industry
- Food processing
- Metal fabricating and finishing
- Printing and pigments industry
- Surfactant production
- Plating industry
- Bioreactors
- Primary metal fabricating/ processing
- Mineral and mining industry
- Fly ash

**Membrane-treatable Wastewater Components**

- Emulsified Oils
- Grease & Fats
- BOD/COD
- Biological Organics
- Dissolved Solids
- Suspended Solids
- Heavy Metals
- Latex Suspensions
- Bacteria/Viruses
- Inks and Dyes
- Pigments and Paints
- Radioactive Particulates
- Organic Chemicals

**FEG™ Product Advantages**

- Designed to treat high strength, heavy duty industrial waste-water
- Resists plugging
- Tolerates high temperatures
- FEG tubes mechanically cleaned with spongeballs
- Available with CPVC or SS shell, in 10' lengths
- Available in a neutral and negatively charged chemistry

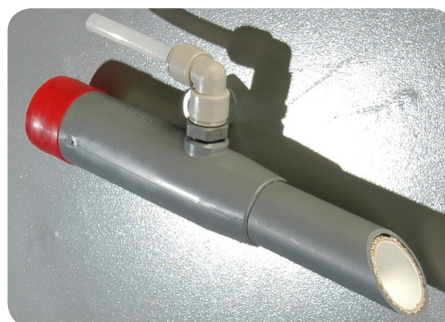


KONSOLIDATOR™ System

Used with FEG Plus or ULTRA-COR ultrafiltration membranes, KONSOLIDATOR systems are specially designed for wastewater with high solids concentration or fibrous material.

**Overview of Products**

The ABCOR® family of industrial duty membrane products are ideal for high-volume wastewater treatment and in-process membrane separation applications, including the treatment of streams from:



**Koch Membrane Systems, Inc.**

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