

# Metaldyne's Extremely Difficult Oily Wastewater



## Overview

Metaldyne's Twinsburg, Ohio aluminum die casting plant is a world leader in the production of aluminum valve body castings. To facilitate their process, Metaldyne developed a die casting method that uses a specially-formulated die lubricant, an oil and water emulsion that helps control the temperature of the die as well as the removal of the complex castings during the part ejection process.

However, the oil from the die lube and the glycol from the hydraulic fluid combined to create an extremely difficult wastewater treatment challenge. The plant installed a membrane bioreactor (MBR) system to consume the glycol, but the tubular membranes in the MBR couldn't handle the oil and grease and became clogged within three weeks. Ultimately, the oily wastewater resulting from Metaldyne's novel die casting process proved so difficult to treat that after more than a decade of working with 22 different wastewater treatment vendors, experts from academia, and the U.S. Department of Energy, the solution remained elusive.

## The Challenge

To find an effective, reliable, economical method for separating and concentrating die lubricant.

## Solution

Koch Separation Solutions (KSS) offered Metaldyne the perfect solution – a KONSOLIDATOR 150 Industrial Wastewater System. The pre-engineered, pre-packaged system contains 150 FEG PLUS tubular ultrafiltration (UF) membranes.

KSS tubular membranes have an open channel configuration capable of handling extremely high suspended solids loads. They are well suited to applications in heavy industrial wastes including oily wastewaters and can be cleaned mechanically using spongeballs.

"We heard that a tubular membrane was developed by Koch Separation Solutions that could handle extremely difficult oily wastewater, and indeed it proved effective," says Bill Cleary, Metaldyne's wastewater treatment manager. "Finally, we had a system capable of removing the solids up-stream of our bioreactor."

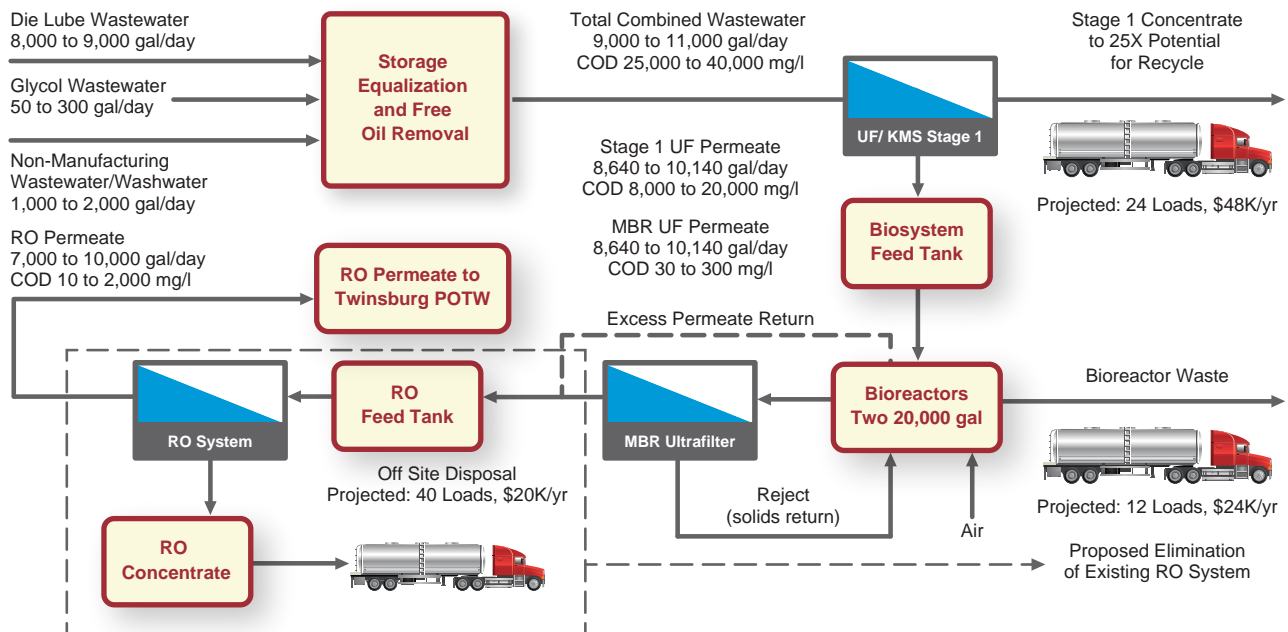
This new "Stage 1 UF system" removes solids and concentrates the waste 25 times, equivalent to a 96 percent reduction in wastewater volume. Removal of the solids enables the bioreactor process to work smoothly. Off-site disposal of bioreactor waste has been reduced tenfold. Cleary calculates that the total annual cost of off-site disposal of waste has been reduced from \$332,000 to \$104,000, a 69 percent reduction amounting to a savings of \$228,000 per year.

"We have been able to reduce our costs and maintain a reliable, manageable process," says Cleary. "We went five months without wasting in the bio system and without any ill effects. With the Stage 1 UF system, we finally have a process that works."

COD

	Prior to Installation of Stage 1 UF	After Installation of Stage 1 UF
Total Combined Wastewater stream	20,000 - 40,000 mg/l	20,000 - 40,000 mg/l
Stage 1 UF Permeate	NA	8,000-20,000 mg/l
MBR UF Permeate	1,500 - 12,000 mg/l	30 - 300 mg/l
RO Permeate	10 - 2,000 mg/l	NA

Metaldyne Twinsburg Wastewater Treatment Process Flow Diagram After KSS Stage 1 UF



The Membrane System

Prior to the installation of the Stage 1 UF system, the MBR permeate contained a wide variation in COD levels, ranging from 1,500 to 12,000 mg/l. With the Stage 1 UF system, the MBR system now produces permeate with COD of only 30 to 300 mg/l. The MBR permeate now is well below the discharge standards set for the municipal wastewater system (COD <500 mg/l) even without polishing with RO. As a result, the RO system was shut down and permeate from the MBR is discharged directly to the sewer.

Product Overview

The KONSOLIDATOR System with FEG PLUS membranes is the standard in treating wastewater and concentrating valued solids in industries including: metal fabrication and finishing, food processing, pulp and paper, and chemical processing.

FEG PLUS Benefits

- Reduced city water usage
- Water recovery
- Heat energy recovery
- Purified cleaner recycle
- Simple operation
- Reduced heating costs
- High solids tolerant
- Mechanically cleanable



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