CASE STUDY

Industry: Chemical

Magnesium Sulfate Recovery from Cellulose Acetate Wastewater

Resource Recovery Using PolyCera® Titan 500 Nanofiltration Membrane

Application Overview

Recovering valuable compounds from industrial wastewater is a growing priority for resource conservation and cost efficiency. In 2021, a chemical production facility implemented **PolyCera® Titan 500 nanofiltration (NF) membranes** to recover **magnesium sulfate** from **cellulose acetate production wastewater.**

The system was designed for **continuous operation** at a capacity of **43 m³/h**, with the goal of improving recovery rates and minimizing environmental impact.

Process Design

The PolyCera Titan 500 NF membrane was selected for its ability to handle industrial wastewater with high solute loads and fouling potential. The treatment process includes:

PolyCera® Titan 500 NF system in continuous operation for magnesium sulfate recovery from cellulose acetate wastewater.

Feedwater Source: Cellulose acetate production wastewater containing magnesium sulfate and organic impurities with molecular weights >500 Da.

PolyCera® Titan 500 NF Membrane Filtration:

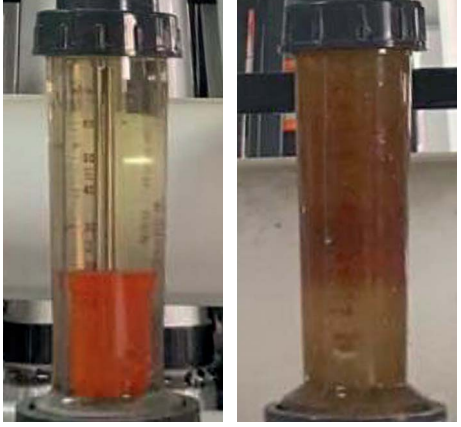
- Retains organic and high-molecular-weight impurities.
- Allows selective passage of magnesium sulfate.

Continuous Recovery Loop: System runs in a stable, continuous mode achieving high permeate flow and product concentration.

Cleaning Protocols:

- Periodic flushing removes surface fouling.
- Chemical cleaning restores near 100% membrane flux.

Downstream Compatibility: Filtrate feeds directly into a secondary sulfate removal NF system without operational issues.



Left: ultrafiltration concentrated water; right: nanofiltration concentrate

Results

The PolyCera Titan nanofiltration system delivered the following outcomes:

High Recovery Rate: Achieved **>90% initial system recovery**, with **total recovery up to 99%** after integration with downstream biological treatment.

Selective Separation: Effectively removed contaminants >500 Da, while allowing magnesium sulfate to pass through for direct reuse.

Stable Operation: Chemical cleaning restored membrane performance fully, supporting continuous production with minimal downtime.

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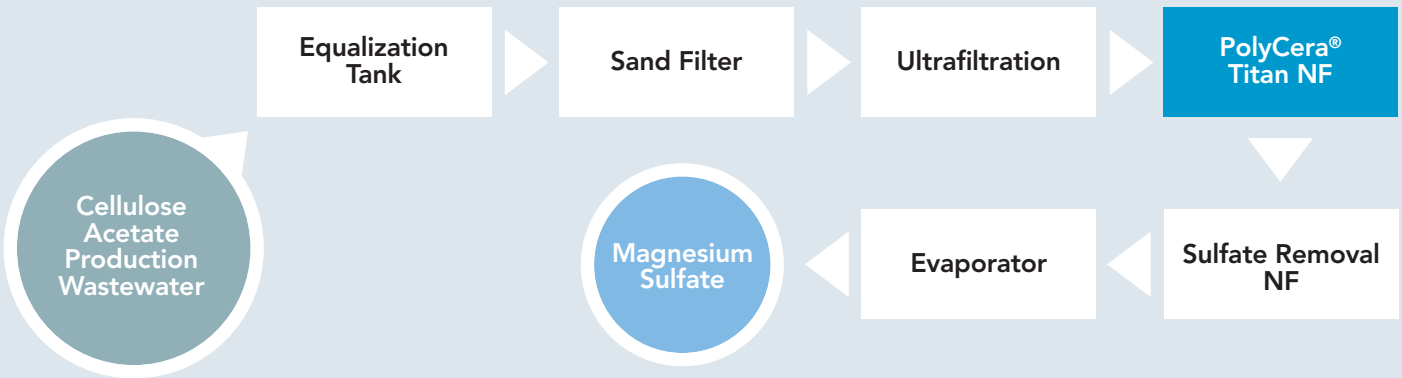
Downstream Performance: Ensured trouble-free operation of the follow-on nanofiltration system for sulfate removal.

Conclusion

The use of **PolyCera® Titan 500 nanofiltration membranes** for magnesium sulfate recovery from cellulose acetate production wastewater enabled **efficient, selective separation and high recovery performance**. The system supported continuous production, minimized waste, and delivered reliable operation across multiple process stages.

This case highlights the value of PolyCera membranes in **industrial resource recovery**, offering a durable and scalable solution for facilities targeting circular water use and cost savings.

Process Flow



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