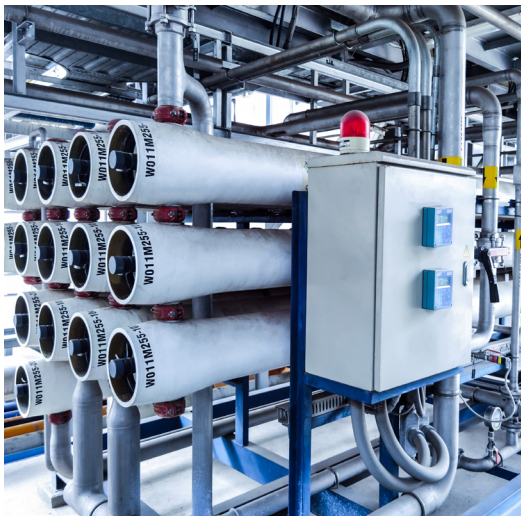
MacDermid
ENVIO SOLUTIONS

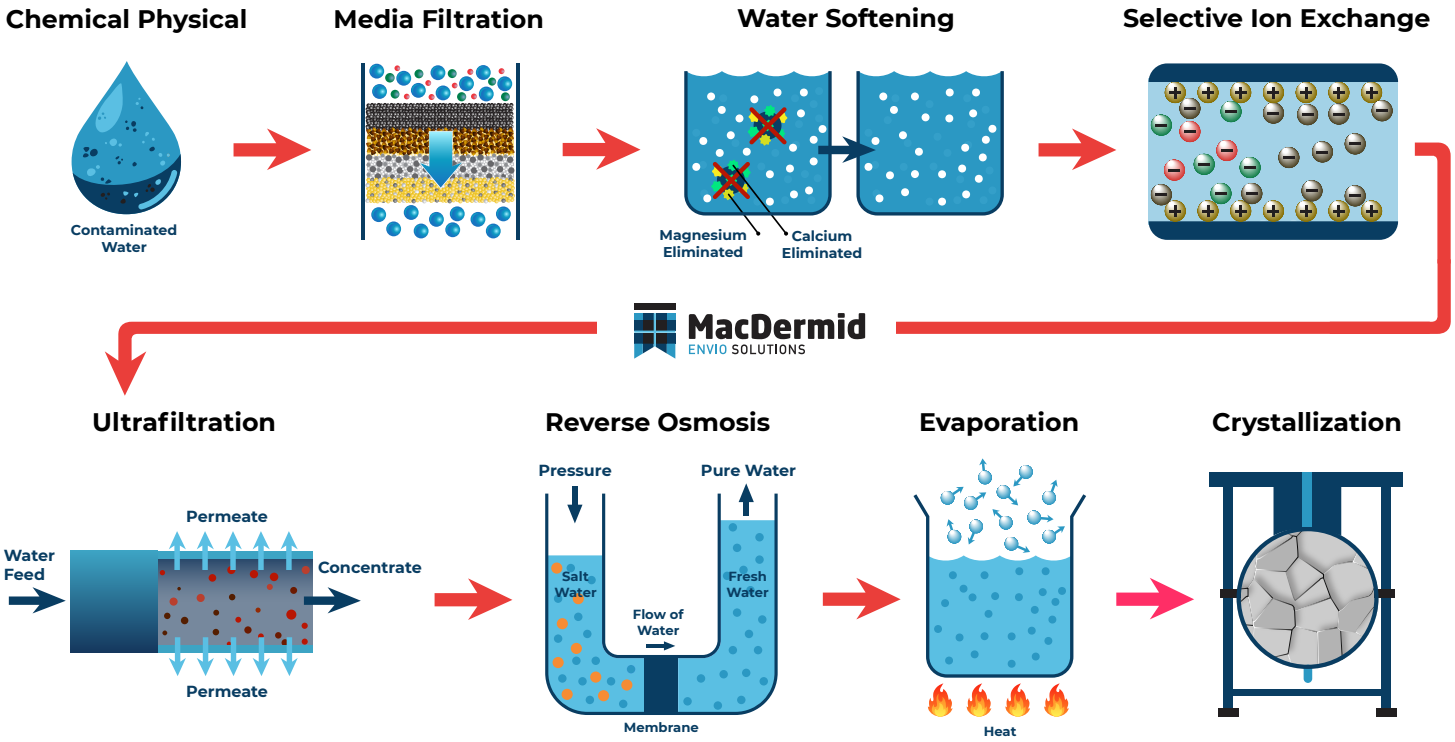
Water Recycling Technologies for Zero Liquid Discharge (ZLD)

Taking bigger steps... to leave a smaller footprint



Industrial manufacturers face growing challenges: shrinking water supplies, stricter discharge regulations, and rising sustainability demands. Zero Liquid Discharge (ZLD) provides the ultimate solution by eliminating wastewater discharge entirely. Using cutting-edge technologies like ultrafiltration, reverse osmosis, and evaporation/crystallization, ZLD recovers and purifies virtually all of your wastewater, creating a closed-loop system.

ZLD ensures compliance, reduces dependency on freshwater, and eliminates costly waste disposal. Ideal for industries with limited discharge options or advanced water treatment needs, ZLD transforms wastewater into a valuable resource-driving efficiency, sustainability, and long-term cost savings.



More on ZLD

See our web site for more details
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element solutions

An Element Solutions Inc. company

Water Recycling Technologies for Zero Liquid Discharge

Zero Liquid Discharge (ZLD) - Maximizing Water Recovery

End-of-pipe water recycling enables the recovery and reuse of nearly 100% of wastewater. A well-designed system focuses on maximizing water recovery while minimizing concentrated waste. Achieving Zero Liquid Discharge (ZLD) ensures sustainable and efficient wastewater management, reducing environmental impact and optimizing resource use.

Water Recovery Cycle

1) Media Filtration

Classic technology for suspended solids removal.
Water flows through the media bed, solids trapped between grains.

2) Softening

Removal of hardness (Ca+Mg) to avoid scaling problems downstream.

3) Selective Ion Exchange

Removal of trace heavy metals to protect equipment, especially RO membranes.

4) Ultrafiltration

Most effective protection for RO membranes (NTU<1, SDI<3)
Complete removal of TSS, colloids, surfactants, oil emulsions.

5) Reverse Osmosis

Crucial step to produce demineralized water for recycle
Spiral-wound membrane, permeable layer on a support layer.

6) Evaporation

Volume reduction of high-concentration waste (like RO reject)
High concentration efficiency: up to 95% water recovery and 40% TS.

7) Crystallization

Last stage for volume reduction of high-concentration waste
Concentration efficiency: up to 50% water recovery and 80% TS
Distillate water can be recycled.
Concentrate waste must be scraped and hauled-off.

Summary

	Zero Liquid Discharge
Water Recovery	85 – 98%
Treatment Steps	5 – 8
Reause Water Quality	Good (< 400 µS/cm)
Advantages	Secures water supply Provides consistent water quality No discharge permit required

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