Case study

Zero liquid discharge system

Satellite manufacturer achieves zero liquid discharge with Xylem

How a new satellite production facility turned wastewater reuse into a mission-critical advantage

When a leading Texas-based satellite manufacturer set out to build a new 700,000 sq. ft. production facility, it faced a challenge rarely encountered at this scale: the site had no municipal sewer infrastructure. Unlike traditional manufacturing operations that can discharge wastewater through city systems, this plant had no option but to find another solution—or risk delaying the start of production.

Challenge

For a facility designed to produce next-generation communication satellites, uninterrupted production was critical, with any downtime risking millions in lost revenue.

The plant's powder-coating process required large volumes of rinse water for its pretreatment operations. With no drains to discharge wastewater, the manufacturer would have needed to haul wastewater off-site at a cost of approximately $500 per 1000-gallons—a financially unsustainable approach given its water usage of 140 gallons per minute, or 70 million gallons annually.

To avoid mounting disposal costs, the manufacturer needed a zero liquid discharge (ZLD) system capable of recycling rinse water from its powder-coating pretreatment process while ensuring consistent uptime for mission-critical satellite production.

Xylem's solution

The manufacturer turned to Xylem to design and implement a custom-built water recycling and ZLD system that could meet the facility's operational, financial, and sustainability goals.

Xylem provided a wastewater reuse system that incorporated multiple stages of treatment—reaction tanks, clarification, media filtration, activated carbon, reverse osmosis (RO), and electrodeionization (EDI)—to continuously refine rinse water from the production process waste. This allows the facility to reuse virtually 95%+ of its water, with only a small concentrate stream requiring evaporation or off-site removal.

Customer
Texas-based satellite manufacturer

Challenge
Cost-effective wastewater management for a remote production facility

Solution
Custom water recycling and ZLD system that incorporates multiple stages of treatment—reaction tanks, clarification, reverse osmosis (RO), electrodeionization (EDI), and Water One® WX Services

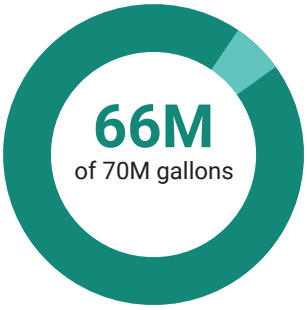
Xylem provides an advanced monitoring, control, and communications panel that is connected to the WWIX system. Tank performance is monitored 24/7 via a cellular connection and Xylem's Link2Site® remote monitoring technology, which sends alerts for leaks, tank effluent quality, flow restrictions, and tank exchanges.

Given the highly automated nature of the factory, a digital-first approach was critical. At uniquely challenging points of use throughout the powder coating part of the process, a closed loop recycle system reclaims the water for reuse, using the Water One® WX, wastewater ion exchange (WWIX) system. Xylem's polishing system adds a 24/7, remotely monitored WWIX layer that tracks rinsewater treatment system health in real time, flags anomalies (like rising filter pressure), and optimizes predictive maintenance to prevent downtime and lower costs. By servicing components only as needed, the line now runs with ~40% fewer operators (10+ to 6), aligning with the plant's broader automation strategy.

Unlike piecemeal alternatives, Xylem was able to manufacture and deliver all equipment in-house—from treatment technologies to monitoring platforms—ensuring seamless integration and long-term reliability. The customer also benefits from single-source maintenance, warranty, and support, thereby reducing complexity and risk.

Results

The impact of Xylem's digitally monitored wastewater treatment system has been immediate and measurable. The results have been transformative for the aerospace manufacturer:



- **Water Reuse at scale:** Out of 70 million gallons of water consumed annually, more than 66 million gallons are recovered and reused, significantly reducing the facility's reliance on freshwater sources.
- **Cost avoidance:** By eliminating the need to haul wastewater at $500 per 1000-gallons, the manufacturer avoids tens of millions of dollars in annual disposal costs.
- **Operational continuity:** With predictive analytics and proactive monitoring, the system minimizes downtime risk — protecting satellite production operations from costly interruptions.
- **Sustainability gains:** Metals, TDS, and salinity are contained within the ZLD system, with no discharge back into the environment. This supports the manufacturer's broader environmental goals while demonstrating leadership in sustainable aerospace manufacturing.

Digital monitoring has significantly enhanced water recovery and process efficiency by providing predictive insights that detect issues like filter obstructions and premature tank exhaustion. These insights enable upstream process improvements, such as optimizing powder-coating applications to reduce residual solids, which in turn lowers chemical usage, minimizes waste, and boosts production efficiency. This proactive approach empowers operations teams to prevent disruptions and maintain continuous production, demonstrating that smart water management is not just about compliance—it's a key driver of industrial performance, cost savings, and sustainable growth.

SVC-SAT-ZLD-CS-1225

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Let's Solve Water