COMPREHENSIVE WASTEWATER TREATMENT AND WATER RECOVERY SYSTEM ENABLES SUSTAINABLE MANUFACTURING EXPANSION AT CONSUMER GOODS FACILITY

CASE STUDY | Personal Care Products, Turkey

| The client's needs

The client invested in a new manufacturing facility in Turkey to increase production capacity for home and personal care products, including a diverse portfolio of well-known consumer brands. The facility required a comprehensive wastewater treatment solution capable of handling the complex wastewater streams generated by consumer goods manufacturing operations.

The client's environmental objectives included achieving Leadership in Energy and Environmental Design (LEED) certification and zero waste-to-landfill status. This required a treatment system that would not only meet Turkish environmental discharge standards but also enable significant water recovery and reuse on-site.

The facility needed to process approximately 750 m³/day of wastewater whilst recovering 330 m³/day of high-quality water for reuse. This substantially reduces freshwater consumption and supports the company's sustainability goals.

The project required a complete Engineering, Procurement, and Construction (EPC) delivery model. The client sought a single point of contact to manage all aspects of design, installation, and commissioning, including civil works.

| The solution

Veolia designed and delivered a comprehensive wastewater treatment plant using advanced, proven technologies to meet the client's operational and environmental objectives. The project was awarded in 2015 and completed within 18 months, including all civil works.

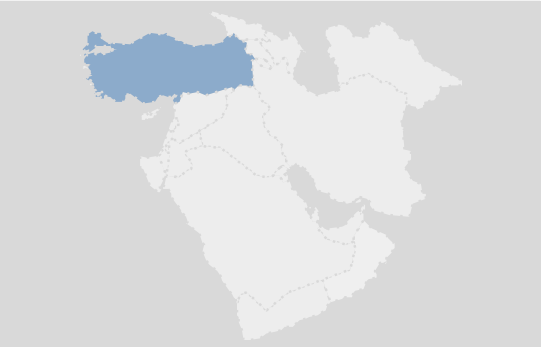
The treatment plant comprises multiple integrated stages:

Preliminary treatment:

- **Idrascreen***: Advanced screening technology for removal of coarse solids and debris from incoming wastewater
- **Oil & grease separator**: Band-type separator with oil trap section and underwater weirs to remove high concentrations of oil and grease
- **Equalization tanks**: Two tanks (750 m³ primary + 250 m³ emergency) with aeration to equalise variable wastewater flows and prevent settling of solids

Primary treatment:

- **Idraflot*** (DAF): Removes total suspended solids (TSS) and remaining oil & grease through dissolved air flotation.



Turkey

The client is a multinational consumer goods manufacturer with a significant presence in emerging markets. The company operates a modern manufacturing facility in Turkey, reflecting a strategic investment in sustainable production capacity for home and personal care products. As a global leader in the consumer goods sector, the company is committed to environmental sustainability, resource efficiency, and operational excellence. The facility was designed to achieve LEED certification and zero waste-to-landfill status, reflecting the company's ambitious environmental targets.

Key Benefits

330 m³/day of reusable water recovered on-site

Advanced treatment technologies ensuring superior effluent quality

Single point of contact EPC delivery model reducing project complexity

Secondary treatment:

- **Moving Bed Biofilm Reactor (MBBR)**: Efficient biological treatment of organic contaminants, reducing BOD_5 from 7,000-9,000 mg/L to 200 mg/L and sCOD from 9,000 mg/L to 300 mg/L
- **Idraflot**: Removes suspended biomass and excess sludge from the MBBR using dissolved air flotation

Tertiary treatment and water recovery:

- **Reverse Osmosis (RO) system**: Producing 330 m³/day of high-quality reusable water suitable for on-site applications
- **Product water quality**: COD reduced to 19 mg/L, BOD to 4.29 mg/L, total suspended solids to 104 mg/L

The integrated system processes the incoming wastewater through multiple treatment stages, achieving outlet water quality meeting Turkish environmental discharge standards whilst simultaneously recovering high-quality water for on-site reuse. The EPC delivery model provides a single point of contact for all project aspects, eliminating coordination complexity and reducing project risks. The 18-month completion timeline, including civil works, demonstrates efficient project execution and commissioning.

| Results

The comprehensive wastewater treatment plant has successfully delivered exceptional operational and environmental performance, enabling the facility to achieve its sustainability objectives whilst maintaining reliable, cost-effective operations.

The advanced treatment technologies (Idrascreen, MBBR, and Idraflot) deliver consistent, superior effluent quality across varying influent conditions. The system reliably processes 750 m³/day of complex wastewater, achieving significant contaminant removal. The preliminary treatment stage reduces the total COD from approximately 20,000 mg/L in the raw wastewater to approximately 9,000 mg/L, removing suspended solids, oils, and grease before the wastewater enters the biological treatment process. The MBBR stage achieves further significant contaminant removal: BOD_5 reduction of 97.1% (from 7,000 mg/L to 200 mg/L) and sCOD reduction of 96.7% (from 9,000 mg/L to 300 mg/L). The post-flotation system removes suspended biomass and excess sludge from the MBBR.

The reverse osmosis system recovers 330 m³/day of high-quality reusable water, representing a 44% recovery rate from the total influent flow of 750 m³/day. This substantial water recovery directly reduces freshwater procurement costs and wastewater disposal expenses, delivering significant operational cost savings. The recovered water is suitable for on-site reuse in non-critical applications, further optimising resource efficiency.

The outlet water quality meets Turkish environmental discharge standards, ensuring full regulatory compliance. The on-site water recovery and reuse programme substantially reduces the facility's freshwater consumption and environmental footprint, supporting the company's commitment to LEED certification and zero waste-to-landfill objectives. The circular economy approach to water management demonstrates the facility's commitment to resource efficiency and sustainable operations.

The EPC delivery model successfully managed all aspects of design, procurement, construction, and commissioning within an 18-month timeline, including civil works. The single point of contact approach eliminated coordination complexity and reduced project risks, delivering the facility on schedule and within budget.



Veolia
Water Tech
www.kruger.dk

*Trademark of Veolia; may be registered in one or more countries.EXTERNAL USE: Update : 2024 | Contact: technohub@veolia.com | Created by: Veolia Water Technologies TechnoHub