

Few lessons on sustainable water management in industrial units



Dharmendra Pratap Singh, COO of Universal MEP Projects & Engineering Services Limited, discusses the environmental impact of emerging contaminants, the company's water recycling project, wastewater treatment contributions, the latest advancements, and challenges faced by water treatment plants in ensuring water quality.

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What are the environmental impacts of emerging contaminants in water sources, and how can they be effectively managed through treatment processes?

India is home to various highly water-intensive industries, such as tanneries, paper and pulp, textiles, dairy, breweries, soft drink production, and steel mills. The volume of wastewater discharged by these industries in India is substantial. Emerging contaminants are generally present in low concentrations and can create problems for the aquatic system in the long run. Generally, these are contributed by the Pesticides/ Pharma/ Personal Care/ Dyes and Pigment manufacturing industries to a large extent. The toxic impacts of these contaminants are concerning, prompting treatment methods involving a combination of chemical precipitation and filtration techniques determined by effluent volume and contaminant concentration levels.

Our manufacturing facility follows processes that do not generate contaminants throughout the manufacturing operation.

Please provide an overview of the water recycling project at your facility.

Universal MEP Projects & Engineering Services Limited (UMPESL), a 100 percent wholly-owned subsidiary of Voltas Ltd, is engaged in mechanical, electrical and plumbing (MEP)/ heating, ventilation and air-conditioning (HVAC) and water projects, mining and construction equipment (M&CE) business and textile machinery business.

Through our water business, we have led the nation in creating sustainable water management processes to protect our dwindling resources while following government norms and regulations. Our manufacturing facility, water and wastewater system is contemporary, focusing on sustainable resource management. We aim to conserve water by treating and recycling wastewater generated within our facility. By utilising advanced filtration and purification technologies, we purify

wastewater to a quality that allows usage for non-potable purposes, thereby reducing our dependence on freshwater sources and minimising our environmental impact. Our factory handles zero liquid discharge wastewater treatment facilities, enabling complete recycling of treated water.

Can you please talk about water and wastewater management in your manufacturing facility?

Water is a crucial natural resource. The government of India is taking various initiatives to boost the infrastructure to ensure that tap water reaches every house across the country. UMPESL emphasises water management by implementing practices and strategies to preserve, protect and optimise the utilisation of water resources.

The Water Management Business Division (WMBD) at UMPSEL has full expertise in managing raw water and wastewater treatment facilities. Prioritising sustainability and water conservation goals, we adopt eco-friendly technologies. We employ the Conventional Filtration process for extensive plant capacities in raw water treatment, while for smaller plant capacities, we opt for Pressure Filtration. In wastewater treatment, our approach is tailored to customer needs and tender



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specifications, incorporating SBR/MBBR Technologies and UF-RO Filtration techniques.

We successfully executed two STP projects in Patna (as part of the Namami Gange initiative) with SBR Technology under BUIDCO. It is currently in its third year of operation and maintenance. Furthermore, Government initiatives in the water sector like Jal Jeevan Mission, 'Swachh Bharat', and 'AMRUT' create opportunities for UMPEL. Additionally, our Waghodia factory in Gujarat has a zero-liquid discharge plant that recycles wastewater and reuses this treated water during manufacturing.

What challenges are water treatment plants encountering in ensuring the quality and safety of water for industrial use?

Ensuring the quality and safety of water for industrial use brings forth various challenges for water treatment plants. One notable obstacle involves the substantial energy consumption inherent in the treatment processes, leading to increased operational costs and environmental considerations. Simultaneously, the calibre of the workforce emerges as a pivotal factor influencing plant operations, as a proficient and knowledgeable staff is indispensable for sustaining optimal treatment processes.

Managing sludge presents an enduring challenge, necessitating careful consideration for its disposal or reuse to mitigate environmental impact. Striking a balance between efficient sludge management and overall plant performance remains an ongoing concern. Another crucial aspect is the optimisation of the plant's footprint to curtail land and capital costs. Limited space constraints can hinder the implementation of advanced treatment technologies, prompting the need to maximise efficiency within a confined area.

Maintaining sustained performance and consistently delivering high-quality and ample quantities of treated water is a paramount objective. Adherence to regulatory standards, proactive equipment maintenance, and continuous monitoring are essential components

in meeting the demands of industrial water users, ensuring reliable and uninterrupted water treatment plant operations.

What are the means for effluent treatment plants?

The wastewater generated in any manufacturing facility is collected in one place, and all the water is completely treated in the Effluent treatment plant. Voltas adopt initial screening to remove all foreign material and direct it through the DAF system for oil removal and biological processes to reduce BOD and COD. The treated water is filtered through DMF (Dual media filters) and Ultrafiltration technology for complete recycling to the plant. This paves the way for minimal discharge from the plant and a reduction in freshwater conservation. We contribute to carbon footprint and sustainable solutions for the future. In our large-scale EPC Projects, UMPEL continues to innovate and contribute to nation-building through our expertise in water and wastewater treatment solutions across various industrial and municipal segments, covering both government and private sectors. We use all the latest Technologies like MBBR (Moving Bed Biofilm Reactor), SBR (Sequencing Batch Reactor), ZLD (Zero Liquid Discharge), UF (Ultrafiltration), and RO (Reverse Osmosis) in our projects depending on the quality of the treated water desired.

What are the latest advancements in effective wastewater treatment and recycling technology?

With less than 50 percent of wastewater being treated in India, there is an urgent need to explore new and emerging technologies to ensure water efficiency. Geographic Information Systems (GIS) and Supervisory Control and Data Acquisition (SCADA) are widely accepted in the water industry. IoT platform uses Artificial Intelligence (AI) based algorithms for the detection of various anomalies such as pump/ motor failure, filtration efficiency, chemical consumption, etc.

Why should manufacturing facilities consider sewage-to-water recycling for their water resource utilisation?

In an era marked by water scarcity and growing competition for freshwater resources, sewage water recycling emerges as a sustainable solution. This approach alleviates pressure on limited water sources, advocating for environmental responsibility and cost-effectiveness. Sewage water recycling reduces the need to purchase and transport freshwater, enhances resource efficiency and aligns with corporate social responsibility objectives.

Furthermore, it establishes a dependable water supply unaffected by external factors such as seasonal variations or droughts, promoting process stability. The environmental advantages are substantial, with sewage water recycling reducing the impact on local water bodies, alleviating the strain on wastewater treatment plants, and minimising pollution to support ecosystem health. In addition, the financial benefits are noteworthy, encompassing reduced discharge costs, potential revenue generation from selling excess treated water, and a lowered carbon footprint due to reduced water transport and treatment.

Beyond the immediate practical gains, adopting sewage-to-water recycling reflects a commitment to sustainable practices and positions manufacturing facilities to meet evolving regulatory standards. This approach ensures a more resilient water supply and contributes to a greener and more responsible industrial landscape. ❁