

Zero Liquid Discharge Market by Process (Pre-treatment Technology, Evaporation Process, Crystallization Process, Solid Waste Handling Process and Other Processes) Application (Non-industrial and Industrial) and Geography - Global Forecast to 2030

<https://marketpublishers.com/r/ZBB0AF9F1454EN.html>

Date: July 2023

Pages: 263

Price: US\$ 4,175.00 (Single User License)

ID: ZBB0AF9F1454EN

Abstracts

The research report titled, 'Zero Liquid Discharge Market by Process (Pre-treatment Technology, Evaporation Process, Crystallization Process, Solid Waste Handling Process and Other Processes) Application (Non-industrial and Industrial) and Geography—Global Forecast to 2030', provides an in-depth analysis of the zero liquid discharge market in five major geographies and emphasizes on the current market trends, sizes, and shares, recent developments, and forecasts till 2030. The global zero liquid discharge market is expected to reach \$11.7 billion by 2030, at a CAGR of 8.8% during the forecast period from 2023 to 2030.

Zero liquid discharge (ZLD) is a water treatment technique used to purify and recycle liquid waste from industrial plants. These are instead replaced with clean water, which is reused in the process, and the minimum amount of solid residues, which often include valuable byproducts that can be sold or reused. ZLD is suitable for a wide range of industries, including power production, chemical and fuel refining, mining, distillation, food production, and waste treatment, and a variety of equipment is available to treat different waste streams and processes. However, this diversity is also one of the drawbacks of ZLD, as every system needs to be designed on its own merits, considering factors such as the contamination or chemicals present in the water, flow rate, how pure the returned water needs and others.

ZLD systems comprise a pre-treatment phase, an evaporation phase to remove most of the water, and a further concentration or crystallization phase to produce the final solid

residue. Pre-treatment often focuses on removing organic elements and any chemicals which could damage evaporation or other equipment later in the process. Most common water treatments, such as pH adjustment, flocculation, membrane processing, degasification, oxidation, separation, and aerobic & anaerobic digestion, have all been used as pre-treatments for ZLD systems.

The growth of the zero liquid discharge market is driven by the need to meet wastewater treatment regulations, a lack of available water and wastewater disposal options and the scarcity of freshwater sources. However, high installation, maintenance, and operating costs and intensive energy consumption restrain the growth of this market.

Furthermore, the recovery of valuable resources and growing demand for energy-efficient and advanced water treatment solutions are expected to create market growth opportunities. However, upgrading and repairing aging water infrastructure is a major challenge for the zero liquid discharge market.

The global zero liquid discharge market is segmented by process, application, and geography. The study also evaluates industry competitors and analyses the country and regional-level markets.

Based on process, the global zero liquid discharge market is segmented into pre-treatment technology, evaporation process, crystallization process, solid waste handling process, and other processes. The pre-treatment technology segment is expected to register the highest CAGR during the forecast period. The growth of this segment is attributed to the stringent environmental regulations and wastewater discharge limits imposed by authorities that incentivize industries to implement sustainable practices like ZLD. Furthermore, growing concerns over water scarcity and the need for freshwater conservation push industries to reduce their water footprint and maximize water recovery through ZLD systems. In addition, the potential cost savings achieved by recovering valuable resources from wastewater and reducing freshwater intake make ZLD an attractive solution for industries.

Based on application, the global zero liquid discharge market is segmented into non-industrial and industrial. The non-industrial segment is expected to register a higher CAGR during the forecast period. The adoption of ZLD technologies by municipalities and hospitals drives the segment's growth, leading to increased investments and advancements in ZLD technologies. Moreover, the need for regulatory compliance, hazardous waste management, infection control, water conservation, and resource

management are key factors driving the adoption of ZLD systems across non-industrial sectors worldwide.

Based on geography, the zero liquid discharge market is segmented into North America, Europe, Asia-Pacific, Latin America, and the Middle East & Africa. The market in Asia-Pacific is slated to register the highest CAGR during the forecast period. The growth of this regional market is driven by the growing demand for advanced treatment solutions, advancements in membrane technology, environmental deterioration, declining availability of clean water, and increased research & development expenditures.

The key players operating in the global zero liquid discharge market are AQUARION AG (Switzerland), Veolia Environnement SA (France), Aquatech International LLC (U.S.), GEA Group Aktiengesellschaft (Germany), DuPont de Nemours, Inc. (U.S.), Evoqua Water Technologies LLC (U.S.), H2O GmbH (Germany), IDE Technologies (Israel), SafBon Water Service (China), Saltworks Technologies Inc. (Canada), WOG Technologies (India), Thermax Limited (India), Petro Sep Corporation (Canada), Samco Technologies, Inc. (U.S.), and Condorchem Envitech (Spain).

Key Questions Answered in the Report:

Which are the high-growth market segments in terms of process, application, and geography?

What is the historical market size for the zero liquid discharge market across the globe?

What are the market forecasts and estimates for the period 2023–2030?

What are the major drivers, restraints, opportunities, and challenges in the global zero liquid discharge market?

Who are the major players in the market, and what are their market shares?

How is the competitive landscape for the global zero liquid discharge market?

What are the recent developments in the global zero liquid discharge market?

What are the different strategies adopted by the major players in the market?

What are the key geographic trends, and which are the high-growth countries?

Who are the local emerging players in the global zero liquid discharge market, and how do they compete with other players?

Scope of the Report:

Zero Liquid Discharge Market Assessment—by Process

Pre-treatment Technology

Membrane-based Technology

Reverse Osmosis

Ultrafiltration

Electrodialysis

Membrane Bioreactor

Forward Osmosis

Other Membrane-based Technologies

Biological Treatment Technology

Chemical Treatment Technology

Other Pre-treatment Technologies

Evaporation Process

Crystallization Process

Solid Waste Handling Process

Other Processes

Zero Liquid Discharge Market Assessment—by Application

Non-industrial

Municipal

Hospital

Industrial

Power Generation

Food & Beverage

Oil & Gas

Mining & Minerals

Chemicals

Agrochemicals

Electronics & Semiconductors

Textiles

Environment

Other End-use Industries

Zero Liquid Discharge Market Assessment—by Geography

Asia-Pacific

China

India

Japan

Australia

South Korea

Taiwan

New Zealand

Rest of Asia-Pacific

North America

U.S.

Canada

Europe

France

Germany

U.K.

Italy

Spain

Denmark

Sweden

Rest of Europe

Latin America

Brazil

Mexico

Rest of Latin America

Middle East & Africa

Saudi Arabia

UAE

Rest of the Middle East & Africa

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