

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

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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

Contents

1. MARKET DEFINITION

- 1.1. Market Ecosystem
- 1.2. Currency and Limitations
- 1.3. Key Stakeholders

2. RESEARCH METHODOLOGY

- 2.1. Research Approach
- 2.2. Process of Data Collection and Validation
 - 2.2.1. Secondary Research
 - 2.2.2. Primary Research/Interviews with Key Opinion Leaders of the Industry
- 2.3. Market Sizing and Forecast
 - 2.3.1. Market Size Estimation Approach
 - 2.3.2. Growth Forecast Approach
- 2.4. Assumptions for the Study

3. EXECUTIVE SUMMARY

- 3.1. Overview
- 3.2. Market Analysis, by Process
- 3.3. Market Analysis, by Application
- 3.4. Market Analysis, by End User
- 3.5. Market Analysis, by End-use Industry
- 3.6. Market Analysis, by Geography
- 3.7. Competitive Analysis

4. MARKET INSIGHTS

- 4.1. Overview
- 4.2. Market Dynamics (Impact Analysis of Market Drivers, Restraints, Opportunities, and Challenges)
 - 4.2.1. Impact Analysis of Market Drivers, Restraints, Opportunities, and Challenges
- 4.3. Case studies
 - 4.3.1. Client: Harquahala Generating Project (U.S.)
 - 4.3.2. Client: Boxcapiel (Spain)
- 4.4. Porter's Five Forces Analysis

- 4.4.1. Bargaining Power of Buyers
- 4.4.2. Bargaining Power of Suppliers
- 4.4.3. Threat of Substitutes
- 4.4.4. Threat of New Entrants
- 4.4.5. Competitive Rivalry
- 4.5. Value Chain Analysis

5. ZERO LIQUID DISCHARGE MARKET ASSESSMENT, BY PROCESS

- 5.1. Overview
- 5.2. Pre-treatment Technology
 - 5.2.1. Membrane-based Technology
 - 5.2.1.1. Reverse Osmosis
 - 5.2.1.2. Ultrafiltration
 - 5.2.1.3. Electrodialysis
 - 5.2.1.4. Membrane Bioreactors
 - 5.2.1.5. Forward Osmosis
 - 5.2.1.6. Other Membrane-based Technologies
 - 5.2.2. Biological Treatment Technology
 - 5.2.3. Chemical Treatment Technology
 - 5.2.4. Other Pre-treatment Technologies
- 5.3. Evaporation Process
- 5.4. Crystallization Process
- 5.5. Solid Waste Handling Process
- 5.6. Other Processes

6. ZERO LIQUID DISCHARGE MARKET ASSESSMENT—BY APPLICATION

- 6.1. Overview
- 6.2. Non-industrial
 - 6.2.1. Municipalities
 - 6.2.2. Hospitals
- 6.3. Industrial
 - 6.3.1. Power Generation
 - 6.3.2. Food & Beverages
 - 6.3.3. Oil & Gas
 - 6.3.4. Mining & Minerals
 - 6.3.5. Chemicals
 - 6.3.6. Agrochemicals

- 6.3.7. Electronics & Semiconductors
- 6.3.8. Textiles
- 6.3.9. Environment
- 6.3.10. Other End-use Industries

7. ZERO LIQUID DISCHARGE MARKET ASSESSMENT—BY GEOGRAPHY

- 7.1. Overview
- 7.2. Asia-Pacific
 - 7.2.1. China
 - 7.2.2. Japan
 - 7.2.3. India
 - 7.2.4. South Korea
 - 7.2.5. Australia
 - 7.2.6. New Zealand
 - 7.2.7. Taiwan
 - 7.2.8. Rest of Asia-Pacific
- 7.3. North America
 - 7.3.1. U.S.
 - 7.3.2. Canada
- 7.4. Europe
 - 7.4.1. Germany
 - 7.4.2. Spain
 - 7.4.3. France
 - 7.4.4. U.K.
 - 7.4.5. Italy
 - 7.4.6. Sweden
 - 7.4.7. Denmark
 - 7.4.8. Rest of Europe
- 7.5. Latin America
 - 7.5.1. Brazil
 - 7.5.2. Mexico
 - 7.5.3. Rest of Latin America
- 7.6. Middle East & Africa
 - 7.6.1. Saudi Arabia
 - 7.6.2. UAE
 - 7.6.3. Rest of the Middle East & Africa

8. COMPETITIVE LANDSCAPE

- 8.1. Introduction
- 8.2. Key Growth Strategies
- 8.3. Competitive Dashboard
 - 8.3.1. Industry Leaders
 - 8.3.2. Market Differentiators
 - 8.3.3. Vanguard
 - 8.3.4. Emerging Companies
- 8.4. Vendor Market Positioning
- 8.5. Market Ranking by Key Players (2022)
 - 8.5.1. Product Portfolio

9. COMPANY PROFILES (COMPANY OVERVIEW, FINANCIAL OVERVIEW, PRODUCT PORTFOLIO, STRATEGIC DEVELOPMENT, AND SWOT ANALYSIS OF TOP THREE COMPANIES)

- 9.1. GEA Group Aktiengesellschaft
- 9.2. AQUARION AG
- 9.3. Evoqua Water Technologies LLC
- 9.4. Aquatech International LLC
- 9.5. H2O GmbH
- 9.6. IDE Technologies
- 9.7. SafBon Water Service (Holding) Inc., Shanghai (SWSHS)
- 9.8. Saltworks Technologies Inc.
- 9.9. Veolia Environnement SA
- 9.10. DuPont de Nemours, Inc.
- 9.11. WOG Technologies
- 9.12. Thermax Limited
- 9.13. Petro Sep Corporation
- 9.14. Samco Technologies, Inc.
- 9.15. Condorchem Envitech

10. APPENDIX

- 10.1. Related Report
- 10.2. Available customization

List Of Tables

LIST OF TABLES

Table 1 Currency Conversion Rate (2018–2022)

Table 2 Global Zero Liquid Discharge Market, by Process, 2021–2030 (USD Million)

Table 3 Global Pre-treatment Technology Market, by Type, 2021–2030 (USD Million)

Table 4 Global Pre-treatment Technology Market, by Country/Region, 2021–2030 (USD Million)

Table 5 Global Membrane-based Technology Market, by Type, 2021–2030 (USD Million)

Table 6 Global Membrane-based Technology Market, by Country/Region, 2021–2030 (USD Million)

Table 7 Global Membrane-based Technology Market for Reverse Osmosis, by Country/Region, 2021–2030 (USD Million)

Table 8 Global Membrane-based Technology Market for Ultrafiltration, by Country/Region, 2021–2030 (USD Million)

Table 9 Global Membrane-based Technology Market for Electrodialysis, by Country/Region, 2021–2030 (USD Million)

Table 10 Global Membrane-based Technology Market for Membrane Bioreactors, by Country/Region, 2021–2030 (USD Million)

Table 11 Global Membrane-based Technology Market for Forward Osmosis, by Country/Region, 2021–2030 (USD Million)

Table 12 Global Membrane-based Technology Market for Other Membrane-based Technologies, by Country/Region, 2021–2030 (USD Million)

Table 13 Global Biological Treatment Technology Market, by Country/Region, 2021–2030 (USD Million)

Table 14 Global Chemical Treatment Technology Market, by Country/Region, 2021–2030 (USD Million)

Table 15 Global Other Pre-treatment Technologies Market, by Country/Region, 2021–2030 (USD Million)

Table 16 Global Zero Liquid Discharge Market for Evaporation Process, by Country/Region, 2021–2030 (USD Million)

Table 17 Global Zero Liquid Discharge Market for Crystallization Process, by Country/Region, 2021–2030 (USD Million)

Table 18 Global Zero Liquid Discharge Market for Solid Waste Handling Process, by Country/Region, 2021–2030 (USD Million)

Table 19 Global Zero Liquid Discharge Market for Other Processes, by Country/Region, 2021–2030 (USD Million)

Table 20 Global Zero Liquid Discharge Market, by Application, 2021–2030 (USD Million)

Table 21 Global Non-industrial Zero Liquid Discharge Market, by End User, 2021–2030 (USD Million)

Table 22 Global Non-industrial Zero Liquid Discharge Market, by Country/Region, 2021–2030 (USD Million)

Table 23 Global Non-industrial Zero Liquid Discharge Market for Municipalities, by Country/Region, 2021–2030 (USD Million)

Table 24 Global Non-industrial Zero Liquid Discharge Market for Hospitals, by Country/Region, 2021–2030 (USD Million)

Table 25 Global Industrial Zero Liquid Discharge Market, by End-use Industry, 2021–2030 (USD Million)

Table 26 Global Industrial Zero Liquid Discharge Market, by Country/Region, 2021–2030 (USD Million)

Table 27 Global Industrial Zero Liquid Discharge Market for Power Generation, by Country/Region, 2021–2030 (USD Million)

Table 28 Global Industrial Zero Liquid Discharge Market for Food & Beverages, by Country/Region, 2021–2030 (USD Million)

Table 29 Global Industrial Zero Liquid Discharge Market for Oil & Gas, by Country/Region, 2021–2030 (USD Million)

Table 30 Global Industrial Zero Liquid Discharge Market for Mining & Minerals, by Country/Region, 2021–2030 (USD Million)

Table 31 Global Industrial Zero Liquid Discharge Market for Chemicals, by Country/Region, 2021–2030 (USD Million)

Table 32 Global Industrial Zero Liquid Discharge Market for Agrochemicals, by Country/Region, 2021–2030 (USD Million)

Table 33 Global Industrial Zero Liquid Discharge Market for Food & Beverages, by Country/Region, 2021–2030 (USD Million)

Table 34 Global Industrial Zero Liquid Discharge Market for Textiles, by Country/Region, 2021–2030 (USD Million)

Table 35 Global Industrial Zero Liquid Discharge Market for Environment, by Country/Region, 2021–2030 (USD Million)

Table 36 Global Industrial Zero Liquid Discharge Market for Other Industries, by Country/Region, 2021–2030 (USD Million)

Table 37 Global Zero Liquid Discharge Market, by Country/Region, 2021-2030 (USD Million)

Table 38 Asia-Pacific: Zero Liquid Discharge Market, by Country/Region, 2023-2030 (USD Million)

Table 39 Asia-Pacific: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 40 Asia-Pacific: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 41 Asia-Pacific: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 42 Asia-Pacific: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 43 Asia-Pacific: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 44 Asia-Pacific: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 45 China: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 46 China: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 47 China: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 48 China: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 49 China: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 50 China: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 51 Japan: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 52 Japan: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 53 Japan: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 54 Japan: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 55 Japan: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 56 Japan: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 57 India: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 58 India: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 59 India: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 60 India: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 61 India: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 62 India: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 63 South Korea: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 64 South Korea: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 65 South Korea: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 66 South Korea: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 67 South Korea: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 68 South Korea: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 69 Australia: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 70 Australia: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 71 Australia: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 72 Australia: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 73 Australia: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 74 Australia: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 75 New Zealand: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 76 New Zealand: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 77 New Zealand: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 78 New Zealand: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 79 New Zealand: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 80 New Zealand: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 81 Taiwan: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 82 Taiwan: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 83 Taiwan: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 84 Taiwan: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Million)

Table 85 Taiwan: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 86 Taiwan: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 87 Rest of Asia-Pacific: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 88 Rest of Asia-Pacific: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 89 Rest of Asia-Pacific: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 90 Rest of Asia-Pacific: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 91 Rest of Asia-Pacific: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 92 Rest of Asia-Pacific: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 93 North America: Zero Liquid Discharge Market, by Country, 2023-2030 (USD Million)

Table 94 North America: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 95 North America: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 96 North America: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 97 North America: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 98 North America: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 99 North America: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 100 U.S.: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 101 U.S.: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 102 U.S.: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 103 U.S.: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 104 U.S.: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 105 U.S.: Industrial Zero Liquid Discharge Market, by End-use Industry,

2023-2030 (USD Million)

Table 106 Canada: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 107 Canada: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 108 Canada: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 109 Canada: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 110 Canada: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 111 Canada: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 112 Europe: Zero Liquid Discharge Market, by Country/Region, 2023-2030 (USD Million)

Table 113 Europe: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 114 Europe: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 115 Europe: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 116 Europe: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 117 Europe: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 118 Europe: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 119 Germany: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 120 Germany: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 121 Germany: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 122 Germany: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 123 Germany: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 124 Germany: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 125 Spain: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 126 Spain: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Million)

Table 127 Spain: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 128 Spain: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 129 Spain: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 130 Spain: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 131 France: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 132 France: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 133 France: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 134 France: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 135 France: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 136 France: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 137 U.K.: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 138 U.K.: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 139 U.K.: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 140 U.K.: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 141 U.K.: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 142 U.K.: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 143 Italy: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 144 Italy: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 145 Italy: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 146 Italy: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 147 Italy: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 148 Italy: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 149 Sweden: Zero Liquid Discharge Market, by Process, 2023-2030 (USD

Million)

Table 150 Sweden: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 151 Sweden: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 152 Sweden: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 153 Sweden: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 154 Sweden: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 155 Denmark: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 156 Denmark: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 157 Denmark: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 158 Denmark: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 159 Denmark: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 160 Denmark: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 161 Rest of Europe: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 162 Rest of Europe: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 163 Rest of Europe: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 164 Rest of Europe: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 165 Rest of Europe: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 166 Rest of Europe: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 167 Latin America: Zero Liquid Discharge Market, by Country/Region, 2023-2030 (USD Million)

Table 168 Latin America: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 169 Latin America: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 170 Latin America: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 171 Latin America: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 172 Latin America: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 173 Latin America: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 174 Brazil: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 175 Brazil: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 176 Brazil: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 177 Brazil: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 178 Brazil: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 179 Brazil: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 180 Mexico: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 181 Mexico: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 182 Mexico: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 183 Mexico: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 184 Mexico: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 185 Mexico: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 186 Rest of Latin America: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 187 Rest of Latin America: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 188 Rest of Latin America: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 189 Rest of Latin America: Zero Liquid Discharge Market, by Application,

2023-2030 (USD Million)

Table 190 Rest of Latin America: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 191 Rest of Latin America: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 192 Middle East & Africa: Zero Liquid Discharge Market, by Country/Region, 2023-2030 (USD Million)

Table 193 Middle East & Africa: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 194 Middle East & Africa: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 195 Middle East & Africa: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 196 Middle East & Africa: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 197 Middle East & Africa: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 198 Middle East & Africa: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 199 Saudi Arabia: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 200 Saudi Arabia: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 201 Saudi Arabia: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 202 Saudi Arabia: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 203 Saudi Arabia: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 204 Saudi Arabia: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 205 UAE: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 206 UAE: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 207 UAE: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 208 UAE: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 209 UAE: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 210 UAE: Industrial Zero Liquid Discharge Market, by End-use Industry,

2023-2030 (USD Million)

Table 211 Rest of the Middle East & Africa: Zero Liquid Discharge Market, by Process, 2023-2030 (USD Million)

Table 212 Rest of the Middle East & Africa: Pre-treatment Technologies Market, by Type, 2023-2030 (USD Million)

Table 213 Rest of the Middle East & Africa: Membrane-based Technologies Market, by Type, 2023-2030 (USD Million)

Table 214 Rest of the Middle East & Africa: Zero Liquid Discharge Market, by Application, 2023-2030 (USD Million)

Table 215 Rest of the Middle East & Africa: Non-industrial Zero Liquid Discharge Market, by End User, 2023-2030 (USD Million)

Table 216 Rest of the Middle East & Africa: Industrial Zero Liquid Discharge Market, by End-use Industry, 2023-2030 (USD Million)

Table 217 Recent Developments by Major Market Players (2020–2023)

List Of Figures

LIST OF FIGURES

Figure 1 Currency and Limitations

Figure 2 Research Process

Figure 3 Primary Research Techniques

Figure 4 Key Executives Interviewed

Figure 5 Breakdown of Primary Interviews (Supply Side & Demand Side)

Figure 6 Market Sizing and Growth Forecast Approach

Figure 7 Key Insights

Figure 8 Zero Liquid Discharge Market Size, by Process, 2023 VS. 2030 (USD Million)

Figure 9 Zero Liquid Discharge Market Size, by Application, 2023 VS. 2030 (USD Million)

Figure 10 Non-Industrial ZLD Market, by End User, 2023 VS. 2030 (USD Million)

Figure 11 Industrial ZLD Market, by End-use Industry, 2023 VS. 2030 (USD Million)

Figure 12 Geographic Snapshot: Global Zero Liquid Discharge Market

Figure 13 Porter's Five Forces Analysis

Figure 14 Value Chain: Zero Liquid Discharge Market

Figure 15 Global Zero Liquid Discharge Market, by Process, 2023 VS. 2030 (USD Million)

Figure 16 Global Zero Liquid Discharge Market, by Application, 2023 VS. 2030 (USD Million)

Figure 17 Global Non-Industrial Zero Liquid Discharge Market, by End User, 2023 VS. 2030 (USD Million)

Figure 18 Global Industrial Zero Liquid Discharge Market, by End-use Industry, 2023 VS. 2030 (USD Million)

Figure 19 Global Zero Liquid Discharge Market, by Geography, 2023 VS. 2030 (USD Million)

Figure 20 Asia-Pacific: Zero Liquid Discharge Market Snapshot

Figure 21 North America: Zero Liquid Discharge Market Snapshot

Figure 22 Europe: Zero Liquid Discharge Market Snapshot

Figure 23 Latin America: Zero Liquid Discharge Market Snapshot

Figure 24 Middle East & Africa: Zero Liquid Discharge Market Snapshot

Figure 25 Growth Strategies Adopted by The Key Players (2020–2023)

Figure 26 Competitive Dashboard: Zero Liquid Discharge Market

Figure 27 Vendor Market Positioning Analysis (2020–2023)

Figure 28 AQUARION AG: SWOT Analysis

Figure 29 Veolia Environnement SA: SWOT Analysis

Figure 30 Aquatech International LLC: SWOT Analysis

Figure 31 GEA Group Aktiengesellschaft: SWOT Analysis

Figure 32 DuPont de Nemours, Inc.: SWOT Analysis

Figure 33 GEA Group Aktiengesellschaft: Financial Overview (2022)

Figure 34 DuPont de Nemours, Inc.: Financial Overview (2022)

Figure 35 Thermax Limited: Financial Overview (2021)

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