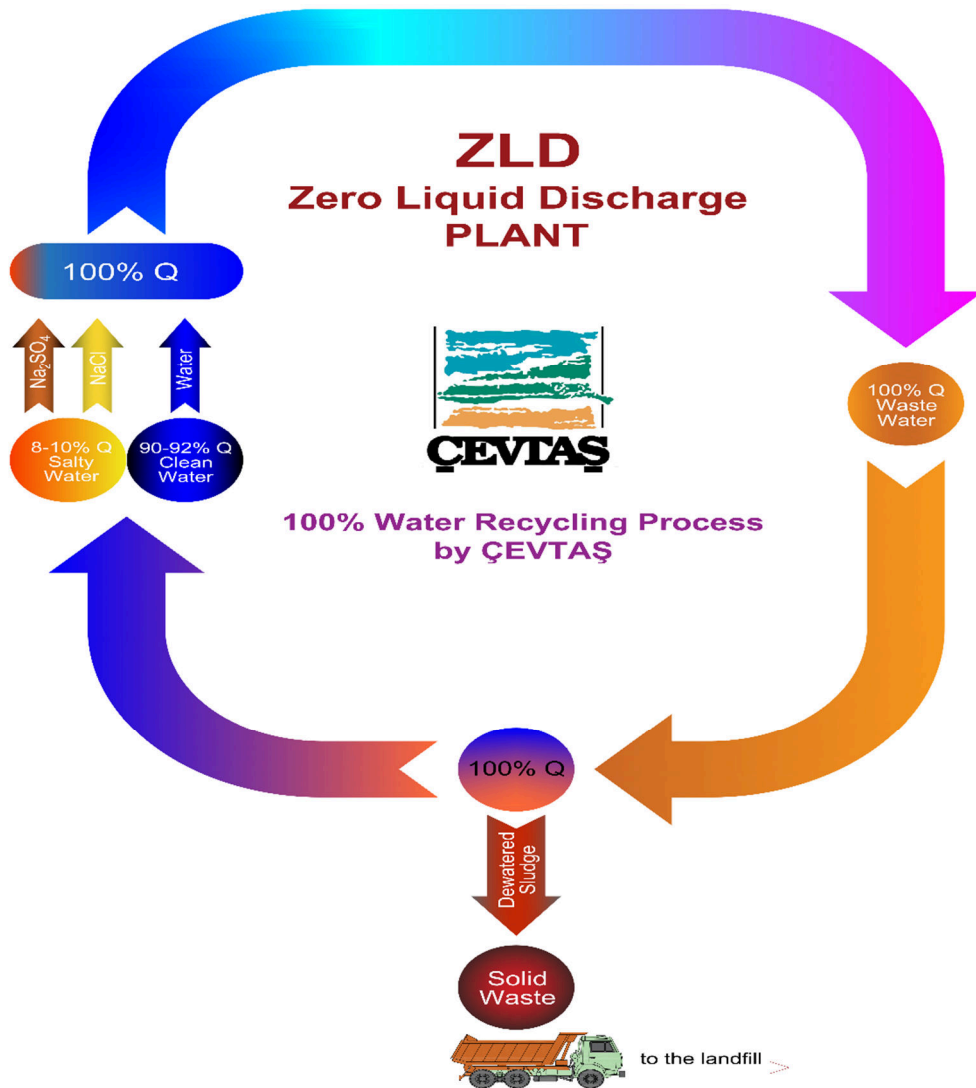




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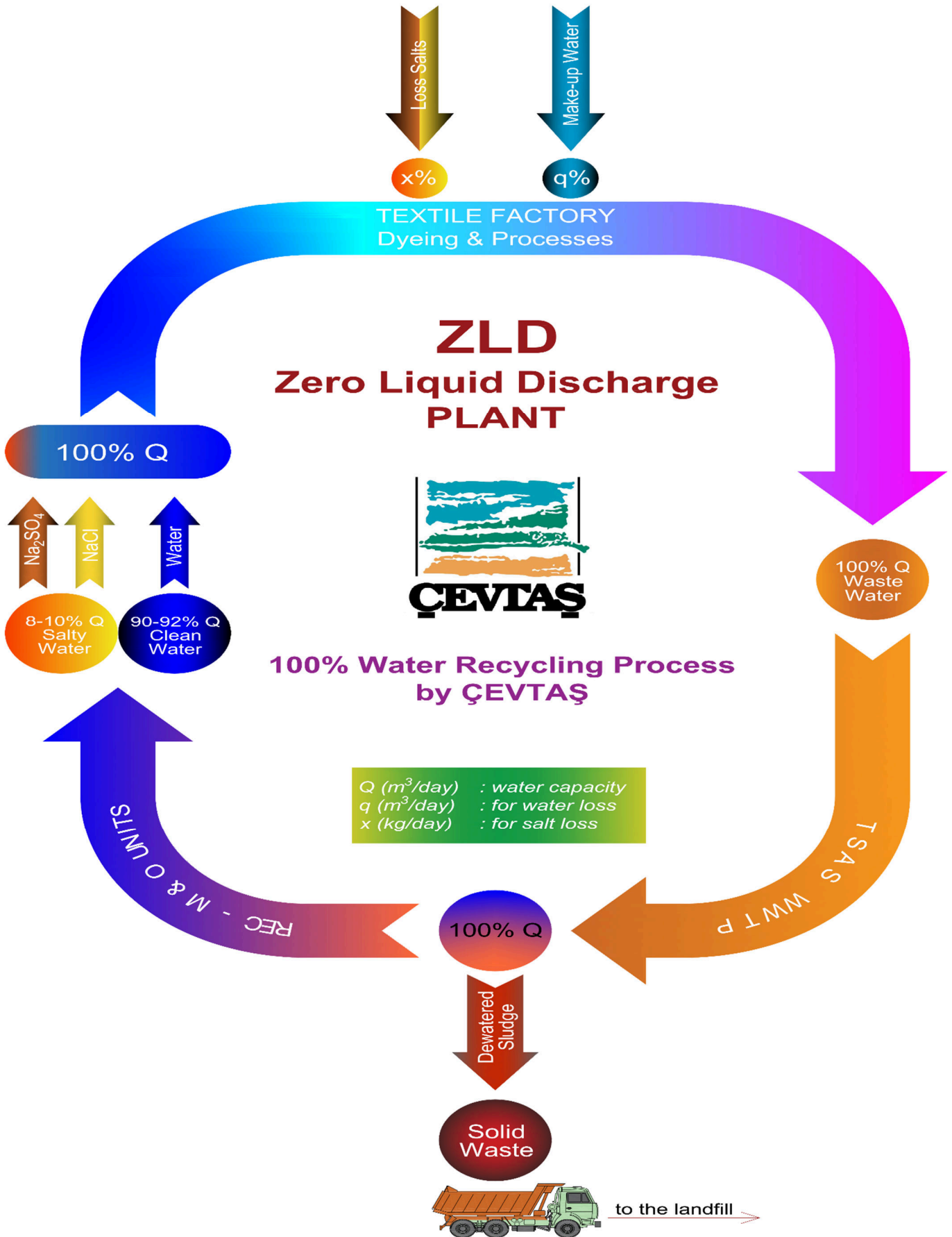


ZLD-WATER REUSE

ZERO LIQUID DISCHARGE PLANT

100% WATER RECYCLING PROCESS

1- What is the “ZLD Plant” 100% Water Recycle Chart?



2- Who is ÇEVTAŞ Çevre Teknolojisi A.Ş.?

ÇEVTAŞ is a Turkish company that has been working as a specialist contractor in the fields of urban and industrial water and wastewater issues for 40 years, both in Turkey and internationally. The company operates on a turnkey basis with a focus on **HIGH TECHNOLOGY and SERVICE**. **ENDEMIC-Process Engineering** is the engineering and manufacturing company of the ÇEVTAŞ Group.

3- What is “ZLD-Zero Liquid Discharge”?

ZLD-zero wastewater discharge; It means recycling the water used by different industries, *especially textile factories*, to the factory as clean process water and salty water without producing wastewater, **with 100% reuse**, and disposal of industrial wastes in the form of dewatered sludge, **only as solid waste**. Except for extraordinary operating conditions, there is no wastewater discharge to the sewer. There will be no need for raw water, except for dewatered sludge and evaporation-like lost water.

4- How does the “ZLD” process work?

Raw and soft water resources used in dyeing and other operating processes in Textile Factories are transferred to the wastewater balancing tank by passing through the physical treatment stage as wastewater.

It is subjected to pH neutralization from the balancing tank. Acid and CO₂ are not required for pH neutralization; As an alternative, we recommend the solution of the wastewater NEUTRALIZATION unit with Flue Gas. At the same time, flue gas emissions are controlled with this method and it emerges as a double-acting innovative method. Neutrajel®-FlueGas Wastewater Neutralization method, which is ÇEVTAŞ know-how, is used here.

The next stage; The most important stage of the ZLD plant is the biological treatment section. Biological Treatment Plant should show high performance against variable flow rates, variable and overloads. For this reason, instead of conventional wastewater treatment methods, two-stage **TSAS, TSAS-membrane and/or mbr series** biological treatment processes of ÇEVTAŞ know-how are used. This two-stage biological treatment process shows a high operating performance, meets the nutrient and nutrient demands with its own internal solutions, and shows a superior operating performance without the demand for nutrient except under extreme conditions.

The wastewater in the biological treatment stage is taken to the bio-treated water tank. The next one from here is bio-treated water, which was taken to the **ReC-M&O UNITS** stage, again with ÇEVTAŞ know-how; At this stage, it is processed in different Membrane, Ozone, Ca/Mg and Organic removal units. Final products recovered as 100%; It is to be sent to the factory as **clean water and salt water**. *The reclaimed final products, the saline water, are separated into saline water containing NaCl and Na₂SO₄ and are returned to the operation.*

In the ZLD plant, **100% volumetric recycle** is provided with high-tech solutions and the remaining chemical and organic sludge is dewatered by decanter and **disposed of as solid waste**.

There is no need for raw water, except for dehydrated sludge and evaporation-like lost water. The ratio of lost salt remaining in the solid waste is approx. It is projected to be 30%. These losses will be borne by the enterprise.

As advanced solutions; In the textile industry, salts can also be recovered as salt at a concentration of 30-40% or 85-92%. In this case, it is possible to obtain solid salt and to recover 100% of clean water with different evaporation & crystallization techniques.

There may be no demand for brine in industries other than the jug sector. In this case, these alternative techniques can be applied or an average of 10% Q(m³/day) with a high conductivity of colourless can be discharged to the sewer. In this case, the same amount of raw water is included in the cycle.

On the other hand; In other sectors that do not need salt recovery, such as the textile industry and similar industries, it is possible to economically recover the wastewater at an average of 90%.

5- Is it possible to upgrade and modernize the capacities of the existing Wastewater Treatment Plants and convert them into ZLD plants?

Yes, it is possible. In Waste water plants working with different processes, capacity can be increased and improved with modern, innovative approaches and methods according to the existing facility features. These plants can be adapted to the ZLD solution, which will operate safely and efficiently in different operating conditions.

6- Are there support for State Investment Incentive and Energy Exemption?

Yes, there are government supports such as investment incentives and energy exemptions for ZLD and wastewater recovery facilities in our country.

- ZLD and Wastewater Recovery Plants are within the scope of investment incentives.
- There is VAT exemption.
- The energy consumed by these facilities is covered by the Energy Exemption as much as the recovery rate. For example, since the recovery rate in ZLD will be 100%, this exception is also calculated as 100%.
- In addition, the green industry fund of the Ministry of Industry and Technology, supported by the World Bank, was made available to ZLD investors.
See: <https://tubitak.gov.tr/tr/icerik-dunya-bankasi-yesil-sanayi-projesi>
- There are similar supports applied in different ways in other EU and OECD countries.

7- In what ranges are the 'ZLD-plant' CAPEX and OPEX values per unit 'm3' of wastewater?

Textile Factories have to be evaluated under the technical and budgetary conditions stated above and within the scope of exceptions for different operating processes.

It varies according to the wastewater treatment plants that will be newly established or modernized by revision according to the wastewater parameters for each different textile enterprise.

However, we must clearly state that; with energy exemptions, there is an extremely economical OPEX-operation cost per unit flow.

Information on this subject is presented together with our CAPEX, OPEX and PRE-FEASIBILITY studies before the contract.

8- How should the roadmap be in the 'ZLD-plant' project work?

It will be appreciated that; these high-tech ZLD project works are under confidential information, know-how and patent protection. Initial studies for each project also require serious knowledge, effort and time.

For this reason, first of all, the client should evaluate the past performance of our factory company for 40 years. If these evaluations are positive and he decides to work with our company as a solution partner in such a project; In this “**high tech**” project, we foresee that an excellent and high-performance cooperation environment can be provided in an open, transparent and trustworthy environment with the following **roadmap**.

- Preliminary Protocol and mutual 'NDA'-Confidentiality Agreement are signed.
- In the new factories to be established; factory operation processes are defined, wastewater sources and total daily capacity are determined, raw water sources and criteria and similar factory wastewater parameters, if any, are reported. This study is done under the consultancy of ÇEVTAŞ.
- In factories that do not have a Wastewater Treatment Plant; operational processes are defined, wastewater sources and total daily capacity are determined, raw water sources and criteria and factory wastewater parameters are reported. This study is done under the consultancy of ÇEVTAŞ.
- In factories with Wastewater Treatment Plants; operational processes are defined, wastewater sources and the new total demanded daily capacity are determined, raw water sources and criteria and factory wastewater parameters are reported. Process report and projects related to the existing facility, equipment lists, etc. notifications are made. This study is done under the consultancy of ÇEVTAŞ.
- Notification is made about factory raw water and soft water etc. dimensions of tanks, wastewater heat recovery system, wastewater temperature, designed or existing salt preparation units and systems for all the above cases.
- Notification is made about flue gas flow rates and parameters for wastewater neutralization solutions.
- In the light of the information listed above, ÇEVTAŞ presents the CAPEX, OPEX and PRE-FEASIBILITY study, which also includes the preliminary technical information.
- A CONTRACT is signed with the annex of the E&M equipment list.
- Architectural and Civil works are preferred to be done by the Factory according to ÇEVTAŞ process projects.
- ÇEVTAŞ obligation begins with the advance payment date, the parties fulfil their obligations in accordance with the WORK PROGRAM during the contract period.
- Commissioning and operation works are carried out by selected factory personnel under the consultancy of ÇEVTAŞ.
- The ZLD plant is delivered with tests and operational training.