



Wastewater Treatment

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Product Category

- Wastewater Treatment
- Design, Build, Install, Operate

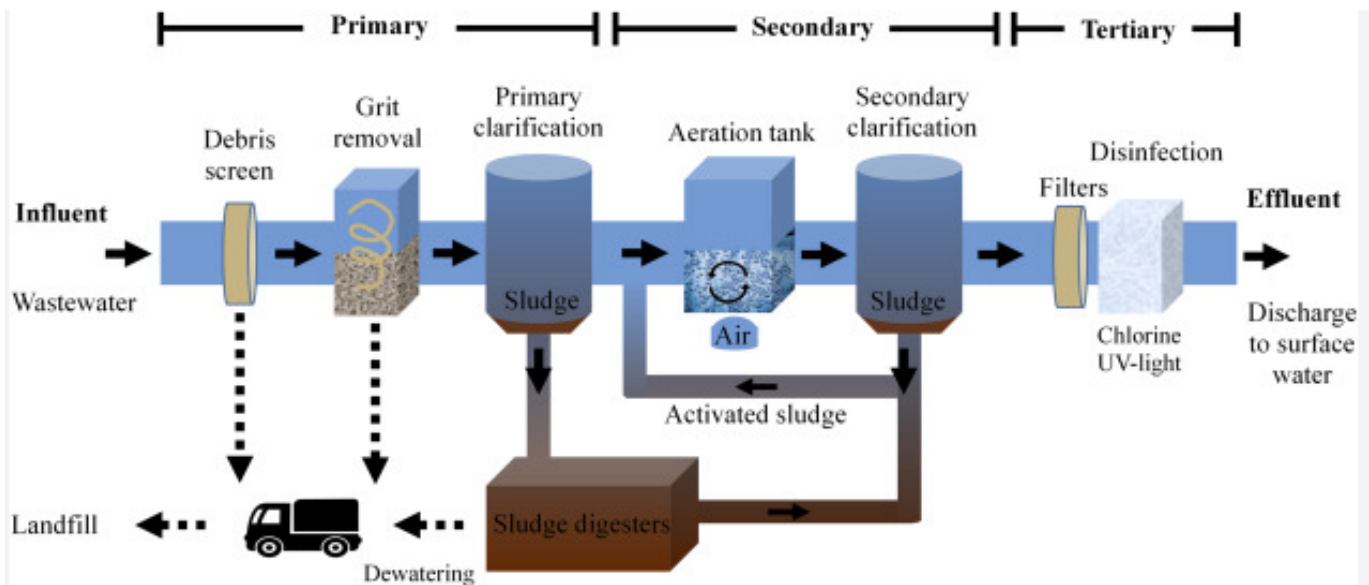
Application

- Wastewater Treatment

Key Function(s)

- Improve current wastewater treatment process
- Optimize wastewater treatment process
- Extend and digitalize wastewater treatment process

Wastewater treatment refers to the process of removing contaminants from wastewater (used water from homes, industries, or other sources) to make it safe for discharge into the environment or for reuse. The goal is to remove harmful substances, pathogens, and pollutants from the water, ensuring that it complies with environmental regulations and protects public health.



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Key Concepts of Wastewater Treatment

- 1. Wastewater Sources:** Domestic Wastewater: Water from households, which includes sewage, greywater (e.g., from sinks and showers), and toilet waste.
 - **Industrial Wastewater:** Water contaminated by industrial processes, such as chemicals, oils, heavy metals, and organic compounds.
 - **Stormwater:** Water that runs off streets and land during rain, which can carry pollutants like trash, sediments, and chemicals into the wastewater system.
- 2. Treatment Levels:** Wastewater treatment typically occurs in three main stages, often referred to as primary, secondary, and tertiary treatment.

2.1 Primary Treatment: This is the initial stage where large particles and solids (such as debris, grit, and grease) are physically removed from the wastewater through processes like screening (filtering out large solids) and sedimentation (allowing particles to settle).

Goal: Reduce the total suspended solids (TSS) and organic matter.

Methods: Screening, grit removal, and primary settling tanks.

2.2 Secondary Treatment: This stage focuses on removing dissolved organic matter and nutrients (like nitrogen and phosphorus) using **biological processes**, where microorganisms break down organic pollutants.

Goal: Reduce biochemical oxygen demand (BOD), which represents the amount of oxygen required by microorganisms to decompose organic matter.

Methods:

Activated Sludge Process: Air or oxygen is pumped into wastewater to promote the growth of microorganisms that digest organic pollutants.

Trickling Filters: Wastewater is passed over biological media covered with microorganisms that treat the water.

Membrane Bioreactors (MBR): A combination of biological treatment and membrane filtration for enhanced purification.



2.3 Tertiary Treatment: This is the final, advanced stage designed to further purify the water. It is typically used to remove remaining pollutants, pathogens, and nutrients that were not fully removed in the previous stages.

Goal: Produce high-quality effluent that can be safely discharged into the environment or reused for purposes like irrigation or industrial use.

Methods:

Filtration: Removing small particles or suspended solids.

Disinfection: Using chlorine, ozone, or ultraviolet (UV) light to kill pathogens and bacteria.

Nutrient Removal: Biological or chemical processes to remove excess nitrogen and phosphorus, which can contribute to water pollution and algal blooms.

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3. Sludge Treatment:

Wastewater treatment also generates sludge (solid by-products from primary and secondary treatment). Sludge treatment involves processes to reduce its volume, remove pathogens, and make it safe for disposal or reuse.

Methods:

Sludge Digestion: Using anaerobic or aerobic bacteria to break down organic matter in the sludge.

Dewatering: Removing excess water from the sludge to reduce its volume, using equipment like centrifuges or belt presses.

Disposal or Reuse: The treated sludge can be disposed of in landfills, incinerated, or used as compost or fertilizer.

4. Discharge or Reuse:

After treatment, the clean water (effluent) is typically discharged into natural water bodies (rivers, lakes, oceans) or can be **reused** for non-potable purposes such as irrigation, industrial cooling, or landscape irrigation. Advanced treatment may allow for potable water reuse, which involves treating wastewater to meet drinking water standards.

At Stellar Unity, being a **good service provider** for **wastewater treatment** involves more than just delivering functional systems or technologies; it requires a focus on customer satisfaction, environmental responsibility, and technical expertise.

Consult or reach out our sales representative for more details.



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