

## WASTEWATER TREATMENT STAGES

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**Abstract.** *This article provides an overview of the steps involved in wastewater treatment.*

**Keywords:** *waste water, water treatment, mechanical treatment, biological treatment, physical-chemical treatment, disinfection.*

Protecting the environment from pollution and rational use of natural resources is one of the main problems of the current era. In addition, protection of the environment from anthropogenic influences is currently being paid a lot of attention worldwide. The rapid development of the industry, including the chemical industry, the increase in the extraction of raw materials, and the increase in the use of transport cause a lot of waste to be dumped into the environment.

Pollution of the environment (water, air, soil) leads to disruption of the normal life activity of the biosphere, climate change, extinction of plant and animal species, deterioration of public health.

Discharge of insufficiently treated or untreated wastewater into water bodies leads to water resource pollution. Microorganisms that cause various diseases appear in water bodies due to the rapid decay of organic substances in wastewater. And the basin is a good environment for these microorganisms to live, which reduces the amount of oxygen in the water and has a bad effect on various animals and people.

Therefore, it is necessary to comply with sanitary requirements before discharging any wastewater into water bodies. In order to comply with sanitary requirements, it is necessary to collect any wastewater and treat it outside the city, reusing it whenever possible.

In order to reduce and prevent environmental pollution, relevant laws are being developed in our country and in foreign countries, various technological, sanitary-technical, technical, organizational and other measures are being implemented. The development of industry, the transfer of agriculture to an industrial basis, the growth of cities, and the increase of people lead to an increase in water consumption. Today, industrial enterprises generate wastewater with different composition. Naturally, the creation and implementation of modern cleaning facilities and technologies for cleaning them is one of the important issues of today. At the same time, one of the main problems is reducing the consumption of clean water due to the creation of a closed water chain system in industrial enterprises. For this, specialists working in this field must have sufficient knowledge, skills and qualifications. In particular, it is important to pay serious attention to the stages of wastewater treatment.

Water treatment is a set of technological processes designed to bring the quality of water from water supply sources (rivers, lakes, reservoirs, reservoirs, etc.) to the specified standard. It also includes the treatment of wastewater from industrial enterprises and domestic enterprises.

Water purification works are carried out with the help of engineering structures in the water supply and sewage system, in enterprises, and by biological and chemical methods.

Natural water sources on the surface of the earth (rivers, lakes, etc.) are calmed, clarified and neutralized before sending their water to the water supply network. During purification and

clarification, the suspended and colloidal (small) particles in the water sink to the bottom of the water, the water is treated with aluminum sulfate and iron chloride in special containers, and the water is passed through a gravel, sand layer, and sometimes a porous ceramic filter. Liquid or gaseous chlorine, hypochlorites - NaClO,  $\text{Ca}(\text{ClO})_2$  and chlorine double oxide  $\text{ClO}_2$ , chlorinated lime are added to clear water for disinfection (killing various micro-organisms and viruses). ultraviolet rays are also used. Mercury-quartz or argon-mercury lamps are used for this. If the water is hard (the total amount of calcium and magnesium salts in its content is higher than normal), it is softened.

Groundwater is often de-ironed (enriched with air oxygen) by aeration. Lime, sodium aluminate  $\text{NaAlO}_2$ , sometimes calcined dolomite are used for water desilication (reducing the amount of metasilicic acid  $\text{H}_2\text{SiO}_3$  and its salts). Water is desalinated or deionized to remove other dissolved salts from the water. Water is degassed to remove hydrogen sulfide, methane, radon, carbon dioxide and other dissolved gases. To reduce excess fluoride in the water, the water is filtered through activated aluminum oxide. If the water is found to contain radioactive substances, it will be deactivated. In addition, if there is an unpleasant smell in the water, it is treated with activated carbon, ozone, potassium permanganate or chlorine double oxide.

Waste water (dirty water from industrial enterprises, domestic enterprises and residences) and stormwater treatment is an important part of nature protection. Mud, colloids, and dissolved substances contained in wastewater are deposited in clarifiers, harmful substances are neutralized by biological methods, and water coming out of enterprises is cleaned in treatment facilities. There are also physicochemical, thermal and other methods of water purification.

At the same time, it should be said that there are certain stages of wastewater treatment, and paying serious attention to them is one of the important tasks of the industry and industry experts. Domestic and industrial wastewater undergoes multi-stage treatment immediately before reuse and discharge into water bodies. This process is divided into phases, each of which aims to eliminate a specific type, variety and volume of pollution of different origins.

The main stages of waste treatment:

- \* mechanical;
- \* biological;
- \* physical and chemical;
- \* disinfection.

It was considered permissible to take a closer look at the structural processes of the above-mentioned stages as follows.

#### ***Mechanical cleaning step:***

The technical process of wastewater treatment begins with the mechanical stage, where insoluble impurities are stored. A special complex consisting of several devices cleans the water flow from sludge (pollutants of organic and inorganic origin), preparing it for biological treatment.

Of course, you need convenient and necessary equipment for mechanical cleaning. These equipment are: grids and sieves; mechanical support MG; RMU with mechanically joined bars; grinders; screw conveyors and screw presses; sand traps; primary sedimentation tanks; scraper and chain mechanisms; mesh microfilters and drum nets with UV lamps.

#### ***Biological treatment stage:***

The method of biological treatment is used to remove dissolved organic residues, biogenic substances and additives in the water mass. With the help of special microorganisms that create

activated sludge, wastewater undergoes deep cleaning. First of all, organic particles of nitrogen and phosphorus are destroyed and the purified liquid is mineralized. In this case, suspended organic matter settles to the bottom, after which sediment and floating pollutants are removed from the tank.

The equipment and devices used in the biological treatment stage are: aerotanks (aerobic treatment by bacteria); secondary sedimentation tanks (sludge pumps, sludge scrapers); biofilters; decomposers (anaerobic fermentation).

***Physico-chemical cleaning stage:***

Physical and chemical methods of wastewater treatment include a complex system of measures aimed at cleaning wastewater from dissolved compounds and suspended solids. Depending on the physical and chemical composition of pollutants, the following cleaning technologies are used:

- flotation (oil traps);
- centrifugation;
- sludge and sludge dewatering (filter presses, screw dehydrators);
- ion exchange;
- electrochemical cleaning;
- hyperfiltration; reverse osmosis.

In addition to the above methods, additional precipitation of phosphorus with Fe and Al salts, electroflotation and special treatment with water vapor (to extract volatile substances) are often carried out in water treatment facilities.

***Disinfection:***

In the final stage of treatment, wastewater is disinfected and prepared for discharge to a reservoir or surface. Water disinfection methods in this process: ultraviolet radiation; chlorination; disinfection with sodium hypochlorite; are ozonations.

For the last stage, microfilters with bactericidal lamps, ultraviolet units are used, which are highly efficient and do not require significant operating costs.

At the end of the thoughts, it should be said as a conclusion that the water, which has been made suitable for consumption and use after the above-mentioned specific stages, is harmful for human life and body. For this reason, it is permissible not to make mistakes in the stages of wastewater treatment. Also, it is necessary to be sure that the level of knowledge of the specialists involved in these processes is high.

**REFERENCES**

1. Alimova M. I., Egamberdiev N. B., THE ROLE OF SCIENCE FROM CHILDHOOD AS A CASE STUDY THE REPUBLIC OF UZBEKISTAN. SCIENCE AND INNOVATION INTERNATIONAL SCIENTIFIC JOURNAL VOLUME 2 ISSUE 1 JANUARY 2023. 26-34p.
2. Alimova Madinaxon Iskanqar qizi, Egamberdiev N.B, UZBEK WOMEN IN DEVELOPMENT OF SCIENCE. SCIENCE AND INNOVATION INTERNATIONAL SCIENTIFIC JOURNAL VOLUME 2 ISSUE 1 JANUARY 2023. 17-25-p.
3. Dilshoda Jalilova Ural qizi. BO‘LAJAK BOSHLANG‘ICH SINFI O‘QITUVCHILARIDA AXBOROT KOMPETENTLIGINI RIVOJLANTIRISH MASALASINING AHAMIYATI. RAQAMLI TEXNOLOGIYALAR DAVRIDA TILLARNI INTENSIV O‘QITISHNING

- PSIXOLOGIK- PEDAGOGIK JIHATLARI RESPUBLIKA ILMIY-AMALIY ANJUMANI. 2023-yil 2-iyun (<https://doi.org/10.5281/zenodo.7993607>)
4. Dilshoda Jalilova Ural qizi, Shahzoda Jamilova. BO‘LAJAK BOSHLANG‘ICH SINFI O‘QITUVCHILARINI INNOVATSION FAOLIYATGA TAYYORLASHNING E‘TIBORLI JIHATLARI. YANGILANAYOTGAN O‘ZBEKISTON TARAQQIYOTIDA IQTISODIY FANLARNI O‘QITISHNING DOLZARB MASALALARI mavzusidagi respublika ilmiy-amaliy konferensiyasi. 2023-yil 16-iyun. [https://scholar.google.com/scholar?hl=en&as\\_sdt=0%2C5&q=%222181-3337](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=%222181-3337)
  5. Jalilova D.U. Psychological And Technological Features of Increasing the Efficiency of Educational Activity of Talented Students in Presidential Schools. Journal of Pedagogical Inventions and Practices ISSN NO: 2770-2367 ( <https://zienjournals.com> ).
  6. Madinakhon Alimova Iskandar qizi. WASTEWATER POLLUTION AND ITS EFFECTS ON HUMAN HEALTH. «ҚИШЛОҚ ВА СУВ ХЎЖАЛИГИНИНГ ЗАМОНАВИЙ МУАММОЛАРИ» *мавзусидаги анъанавий XXII – ёш олимлар*, [www.tiiame.uz](http://www.tiiame.uz) магистрантлар ва иқтидорли талабаларнинг илмий-амалий анжумани. Тошкент - 2023 йил [www.tiiame.uz](http://www.tiiame.uz)
  7. Madinakhon Alimova Iskandar qizi, Egamberdiev N.B. BIOCHEMICAL BASIS OF THE BIOLOGICAL TREATMENT METHOD IN WASTE CLEANING OF WATERS. SCIENCE AND INNOVATION INTERNATIONAL SCIENTIFIC JOURNAL VOLUME 2 ISSUE 5 MAY 2023 UIF-2022: 8.2 | ISSN: 2181-3337 | SCIENTISTS.UZ
  8. Madinakhon Alimova Iskandar qizi, Egamberdiev N.B. THE IMPORTANCE OF SCIENCE AND EDUCATION IN DEVELOPING DESIGN ABILITY IN PRESCHOOL AND PRIMARY SCHOOL CHILDREN. SCIENCE AND INNOVATION INTERNATIONAL SCIENTIFIC JOURNAL VOLUME 2 ISSUE 4 APRIL 2023. 566-569p.
  9. Madinakhon Alimova Iskandar qizi, Egamberdiev N.B. WOMEN IN THE DEVELOPMENT OF SCIENCE AND EDUCATION IN UZBEKISTAN: OPPORTUNITIES AND PROSPECTS. SCIENCE AND INNOVATION INTERNATIONAL SCIENTIFIC JOURNAL VOLUME 2 ISSUE 4 APRIL 2023. 451-452-453p.