
Theoretical Principles and Problems of Wastewater Treatment Technology

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Abstract: In order to reduce and prevent environmental pollution, effectively manage and protect water resources, relevant laws are being developed in our country and in foreign countries, various technological, sanitary technical, organizational and other measures are being implemented.

Keywords: Industrial enterprises, sewage, constructions, cleaning technology, environmental protection, security technology.

Wastewater from households and industrial enterprises is treated in facilities and discharged back into water bodies. At the same time, it pollutes water bodies to a certain extent. In recent years, our government has taken a number of practical measures aimed at improving the sanitary conditions of water bodies. The decision of the President of the Republic of Uzbekistan "On the program of comprehensive development and modernization of drinking water supply and sewage systems in 2017-2021" was adopted on April 20, 2017. The development of the technology of wastewater treatment in modern facilities today, the treatment of urban wastewater in modern facilities is the most urgent topic.

Hydromechanical processes are used to separate suspended particles from the composition of wastewater, and chemical processes are used to separate physico-chemical, organic and inorganic solutions for colloidal dispersed systems. The choice of these processes depends on the particle size, physical and chemical properties, their concentration in water, and wastewater consumption.

Therefore, the following methods are used in wastewater treatment: 1. Mechanical methods (swimming, settling, sedimentation, filtering, centrifugation); 2. Physico-chemical methods (adsorption, coagulation, flocculation, flotation, ion exchange, extraction); 3. Chemical (reagent) methods (neutralization, oxidation, reduction); 4. Biochemical methods (under aerobic, anaerobic conditions); 5. Thermal methods (involving high temperature). These methods, in turn, are divided into different cleaning processes, first of all, a mechanical method is used.

Mechanical methods of wastewater treatment. Mechanical wastewater treatment is used to remove undissolved mineral and organic compounds from the treated water. The application of mechanical treatment usually consists of the preparation of industrial waste water to achieve a high level of treatment using one of the physico-chemical, chemical and biological, as well as thermal methods. Such treatment provides up to 90/95% removal of suspended solids in wastewater and 20/25% reduction of organic pollution (total BOD) [8; 9; 10; 11].

Methodology of scientific research work. In today's water treatment facilities, the mechanical treatment consists of the processes of filtration, sand trap, settling and filtration using grids of different sizes. The volume sizes of such facilities and their types mainly depend on the amount, composition and properties of wastewater, as well as on the processes

of further treatment of water. By filtering the wastewater more thoroughly, that is, the water is filtered from the layer of various granular materials (quartz sand, granite gravel, slag from cast-iron quiche works, etc.) through 15 cm or mesh drum filters or microfilters, high-capacity pressure filters are used. The choice of the method of cleaning wastewater from suspended particles is carried out taking into account the kinetics of the process. The sizes (large and small) of suspended particles in industrial wastewater can be within very wide limits of 10-9 mm (the diameter of the particles is estimated to be from 10-4 to 5 mm). For particles up to 10 μm in size, the final settling velocity is below 10-12 cm/s. If the particles are 50 μm and larger), they are easily separated by settling (voluntary settling - under the influence of gravitational forces) or floating, for example, through microfilters. It should be noted that if the concentration of impurities in the water is high, dilution is used, and if the concentration of impurities is low, the next method of purification is used.

Results. Liquid phase oxidation bthe cleaning method is based on the oxidation of organic matter dissolved in water with oxygen at a temperature of 100-350 C and a pressure of 20-28 MPa. At high pressure, the solubility of oxygen in water increases and accelerates the oxidation process of organic substances. In the liquid-phase oxidation of organic substances in wastewater, wastewater is mixed with air and pumped to a heat exchanger, where the mixture is heated due to the heat emitted from the treated water. Then it goes into the furnace for heating, and then into the reactor - here the oxidation process takes place, which is observed at a high temperature. Water and oxidation products (steam, gas, sol) are fed from the reactor to the separator, where the gas is separated from the liquid.

Sources of surface and underground water pollution with heavy metals are electroplating workshops, mining, ferrous and non-ferrous metallurgy, machine-building industries. Heavy metals are also found in fertilizers and pesticides and can end up in water bodies with runoff from agricultural fields. One of the main sources of environmental pollution with heavy metals is thermal energy enterprises. Mercury, cadmium, cobalt and other metals are released into the atmosphere as a result of fossil fuel (coal) burning. Pollutants released into the atmosphere "settle" in the environment, resulting in contamination of soil and water bodies. One of the sources of pollution of soil and water bodies is wastewater from industrial enterprises.

In a common sewage system, various types of sewage are discharged through a network and treated in a treatment plant. In this system, the total length of networks is 30 / 40% shorter than in a fully split system, but the need to lay large-diameter pipes, the construction of large treatment facilities and pumping stations requires more money. From a sanitary point of view, this system is the most convenient.

Summary. Various water bodies in Central Asia are polluted with various chemicals, including phenol, petroleum, petroleum products, heavy metals, for example, phenols and petroleum products adversely affect the chemical and biological qualities of water. It worsens the ecological characteristics of water. For example, if phenols in the amount of 0.001 mg/l create a bad smell in water, oil products create a thin film on the surface of water in addition to an unpleasant smell, disrupt the gas regime of water, cause oxygen deficiency, disrupt biochemical processes and destroy the ability of water to self-clean. On the other hand, hydrobionts characteristic of clean waters disappear, and instead of them, particulate organisms adapted to dirty waters appear. As a result, the biocenoses of water bodies and their composition change. Permitted concentrations of phenols and petroleum products in water bodies are 0.001 and 0.05 mg/dm³. Exceeding these indicators will have a negative effect on the water and the organic conditions found in it.

Nowadays, compact and generalized devices are produced and put into practice in many foreign countries. In these modern facilities, re-equipment of the treatment device is widely implemented, and as a result, the efficiency of the facility is increased several times.

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