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WASTEWATER AND SANITARY CONDITIONS FOR DRAINING

Аннотация*: в этой статье рассматриваются вопросы очистки сточных вод и санитарные условия для слива. В воде, которая использовалась для различных нужд и получала дополнительные примеси, что изменило их первоначальный химический состав и физические свойства.*

Ключевые слова*: сточные воды, состав воды, свойства воды, очистка сточных вод.*

Abstract*: in this article, the issues of wastewater treatment and sanitary conditions for draining. Sewage is the water that was used for various needs and received additional impurities, which changed their original chemical composition and physical properties.*

Keywords*: wastewater, composition of water, properties of water, wastewater treatment.*

Sewage is the water that was used for various needs and received additional impurities (impurities), which changed their original chemical composition and physical properties. Depending on the origin, type and qualitative characteristics of impurities, the wastewater is divided into three main categories: domestic (household-fecal); Industrial (industrial); Atmospheric or rain. The composition and properties of water and water bodies should be monitored in a range located on streams 1km above the nearest points of water use (water intake for domestic and drinking water supply, places for bathing, organized recreation, settlements and the like), and on inaccessible water bodies and Reservoirs – on 1km in both parties from a point of water use. It is forbidden to discharge into water body's wastewater containing infectious agents. Sewage,

hazardous in the epidemic context, can be discharged into water bodies only after appropriate cleaning and disinfection [1].

It is forbidden to discharge pulp into the water bodies, to the surface of the ice cover of the catchment area, concentrated bottoms from waste water, including those containing radionuclide's, other technological and household waste. Discharge of sewage into water bodies within the boundaries of settlements is prohibited. The place of waste water discharge should be located downstream of the border of the settlement and all places of water use of the population, taking into account the possibility of reverse flow in winds.

Discharge of sewage into water bodies within the boundaries of the settlement through existing releases is allowed only in exceptional cases, with the appropriate feasibility study and in agreement with the state sanitary inspection. In this case, the regulatory requirements established for the composition and properties of water in water bodies should be attributed to the wastewater itself [2].

The conditions for the diversion of sewage into water bodies are determined taking into account:

1. Object on the site from the place of production of wastewater to the settlement (control) sections of the nearest points of economic, drinking, cultural and household water use of the population.

2. The background quality of the water of the water body is higher than the place of the considered wastewater outlet, according to analyzes no more than two years ago; In the presence of other existing and (or) projected – wastewater releases between the considered and the nearest point of water use, the level of water pollution of the water body is applied as a background, taking into account the contribution of the said wastewater releases.

3. Water quality standards for water bodies (MPC- Maximum Permissible Concentration) [4].

Types of sewage treatment:

The construction of sewage treatment plants is provided in full with complete mechanical and biological treatment of wastewater. Mechanical treatment facilities clarify

sewage by removing large slurries, sand, grease and other insoluble substances from it, by passing through gratings and settling at low inflow rates. The structure of mechanical cleaning includes: lattice, sand trap with a circular movement of sewage and primary settling tanks [5].

Composition of biological treatment facilities:

Substances with the help of activated sludge and air blown through the sewage liquid.

Secondary sedimentation tanks, which serve for the retention of silt after the aero tanks. The following stages are distinguished in biological purification.

In the first stage, immediately after mixing of wastewater with activated sludge, adsorption of pollutants and their coagulation (aggregation of organic carrier particles) occur on its surface, adsorption is provided by both chemisorptions' and bio sorption with the help of a polysaccharide gel of active silt and due to the huge Surface of silt, one gram of which occupies 100m2. Thus, in the first stage of purification, the pollutants in the waste water are removed due to the mechanical withdrawal of their active sludge from the water and the beginning of the bio oxidation process of the most readily decomposable organics. At the first stage, at 0,5–2, 0 hours, the content of organic pollutants, characterized by the BOD5 index, is reduced by 50–60% [7].

At the second stage, the bio sorption of pollutants continues and their active oxidation with exoenzymes (enzymes released by activated silt into the environment). Due to the reduced concentration of pollutants, sludge activity begins to recover. The duration of this stage is from 2,0 to 4,0 hours.

In the third stage of purification oxidation of pollutants by endoenzymes (inside the cell), oxidation of complex oxidizable compounds, conversion of nitrogen of ammonium salts to nitrites and nitrates, regeneration of activated sludge. It is at this stage (the stage of intracellular nutrition of activated sludge) that a polysaccharide gel produced by bacterial cells is formed. The duration of the third stage is from 4 to 6 hours for domestic wastewater treatment and can extend up to 15 hours for wastewater of complex industrial composition.

To determine the quality of river water and the degree of wastewater treatment by determining the monitored indicators, the following organoleptic substances were selected: transparency, odour, colour; From hydro chemical – suspended matter, pH (hydrogen), ammonium nitrogen, nitrates, nitrites, phosphates, sulphates, chlorides, biochemical oxygen consumption, dissolved oxygen content, permanganate oxidation, heavy metals [7].

The chromaticity was determined in a water sample after centrifugation photo metrically on a 100-degree chromium-cobalt colour scale and expressed in degrees of chromaticity. The degree of transparency was determined from the height of the column of liquid in cm, through which a special font is clearly visible. The smell was determined qualitatively and described as fecal, putrefactive, kerosene, phenolic, etc. The intensity of the odour was assessed in points on a 5-point scale. The concentration of hydrogen ions (pH) was established by potentiometer method using a pH meter. The method is based on measuring the potential difference that occurs at the boundaries between the outer surface of the glass membrane of the electrode and the test solution, on the one hand, and the inner surface of the membrane and the standard solution, on the other. The internal standard solution of a glass electrode has a constant concentration of hydrogen ions, so the potential on the inner surface of the membrane does not change. The measured potential difference is determined by the potential arising at the boundary of the outer surface of the electrode and the solution under study [4].

The concentration of ammonium ions was determined by photometry using the reaction with Nessler reagent. The principle of the method is based on the fact that ammonium with the Nessler reagent forms the mercuric iodide, which stains the solution in a yellow-brown color. The intensity of the color is proportional to the content of ammonium in water.

The mass concentration of nitrate ions was determined by the photometric method with salicylic acid. The photometric method is based on the interaction of nitrate ions with salicylic acid to form a complex compound of yellow colors.

Characteristics of wastewater entering for treatment when assessing wastewater discharged into water bodies, much attention is paid to organoleptic and

physicochemical indicators. One such indicator is the clarity of wastewater, which is measured by the height of the water column, in which a font of a certain size and type can be read through it. Domestic wastewater entering the treatment should have clarity of at least 10 cm. The clarity of waste water is due to the presence of undeserved and colloidal impurities in it [3].

One of the significant factors affecting the rate of removal of pollutants during mechanical settling, the intensity of metabolism in organisms of activated sludge, the consumption of dissolved oxygen, and consequently the efficiency of the process of biochemical oxidation, is the temperature of the treated sewage. A significant effect of temperature on the cleaning process is observed in the absence of hot water supply. The optimum values for a satisfactory biological purification process are in the range 16–23°C. The effect of primary sedimentation depends on the temperature of the waste water. With increasing temperature, the content of suspended solids increases from 5 to 10%. The work of secondary settling tanks deteriorates in winter by 20–30% due to a decrease in the temperature of the water entering the treatment [7].

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