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MEKXMASH AND STUDYING THE PROCESS OF SOFTENING AND SOFTENING MECHANICAL MIXTURES OF INDUSTRIAL WATER AZAMAT ZIYA TRADE

Abstract: In this article, as a result of studying the physico-chemical properties of industrial wastewater, it is necessary to develop the theoretical basis of the processing system for cleaning and mitigating mechanical impurities in industrial wastewater. Extraction, processing and industrialization of floating and dissolved organic compounds in wastewater produced by the production enterprise "MEXMASH" LLC. Based on the recommended technological scheme for the wastewater of the enterprise, the optimal technology of the treatment process is discussed.

Keywords: Wastewater, "MEKHMASh" LLC, wastewater, phosphating, degreasing, dispersed systems, cleaning, polluting component, organic compounds, oils, grease, milk of lime.

Аннотация: В данной статье в результате изучения физико-химических свойств промышленных сточных вод необходимо разработать теоретические основы технологической системы очистки и снижения содержания механических примесей в промышленных сточных водах. Добыча, переработка и индустриализация плавающих и растворенных органических соединений в сточных водах производится производственным предприятием ООО «МЕКСМАШ». На основе рекомендованной технологической схемы сточных вод предприятия обсуждается оптимальная технология процесса очистки.

Ключевые слова: Сточные воды, ООО «МЕХМАШ», сточные воды, фосфатирование, обезжиривание, дисперсные системы, очистка, загрязняющий компонент, органические соединения, масла, жиры, известковое молоко.

1. Introduction

The introduction of technology to purify industrial wastewater from production enterprises will greatly benefit the economy and the environment. Construction of water protection facilities and increasing the capacity of the water reuse system; better protection of water sources from construction or pollution in general; application of a non-polluting system of water use in enterprises; as well as the organization of an automated system of management of water management complexes; and full use of water resources in our country It is carried out by using them, protecting them from pollution from household and industrial wastes, and organizing the water purification process well. As can be seen from the above, to protect the environment and water bodies, it is necessary to thoroughly clean the wastewater before dumping it into the water bodies. In addition, production (industrial) wastewater is considered very toxic and rich in chemical (reagent) elements. For this reason, it is advisable to use a closed system in the processing of wastewater in production (industrial) enterprises [1-3].

Determination of the total hardness of water. 100 ml or less of the test water, diluted to 100 ml with distilled water, is placed in a conical flask. The total amount of calcium and magnesium ions in this volume of water should not exceed 0.5 mol. Then 5 ml of the obtained buffer solution is placed on top of this water, 5-7 drops of indicator or 0.1 g of dry sodium chloride mixed with eriochrome black-T are added, and the solution is immediately mixed with trilon B solution (0.05N) titrate until the color changes to blue-green. The blue-green color of the solution indicates that Ca^{2+} and Mg^{2+} ions are completely bound to trilon B; that is, there are no Ca^{2+} and Mg^{2+} ions in the solution. If more than 10 ml of the titrated 0.05N trilon B solution is consumed, this indicates that the total amount of calcium and magnesium ions in the obtained water is more than 0.5 mmol. In this case, it is necessary to repeat the determination by taking a smaller volume of water diluted to 100 ml with distilled water. A clear color change at the equivalence point indicates the presence of copper and zinc in the water. 1-2 ml of sodium sulfide solution is added to remove corrosive substances from the obtained sample. After that, the analysis is carried out in the order indicated above.

If, after adding the buffer solution and the indicator to the measured water, the color of the solution to be titrated slowly turns gray to gray, this indicates the presence of manganese. In this case, 5 drops of 1% $(NH_2OH)_2$*H_2SO_4 are first added to the water taken for analysis, and then the hardness of the water is determined. If a stable and clear color is not formed at the equivalence point of the titration, this indicates that the water is highly alkaline. In this case, the sample taken with a 0.1N HCl solution is neutralized and then boiled. After that, the hardness of the water is determined by adding a buffer solution and an indicator. [4,5]

2. Materials and methods

When we checked the hardness level of the artesian water coming into the production process, we saw that it was between 21 mg/l and 27 mg/l. Therefore, it can be concluded that the hardness level of the water supplied to the production is very high, but this has no effect on the production, so much attention is not paid to softening the first incoming clean artesian water. We can see that the level of hardness of the wastewater produced by the production has decreased to 10.46 mg/l. Because of this, the hardness of the water is reduced with the help of NaOH and Na_3PO_4 compounds, which are used in the galvanic process for production, that is, to clean the surface of metals.[6]

The total hardness of water is determined by the following formula:

$Q_{com}=V_1 \cdot 0.05 \cdot K \cdot 1000/V_2$

V_1- the volume of trilon B solution spent in titration, ml;

K- correction factor for the normal concentration of trilon B solution;

V_2- the volume of water taken to determine the total hardness, ml;

Relative errors in parallel analyses in determining the total hardness of water should not exceed 2%. [7-9].

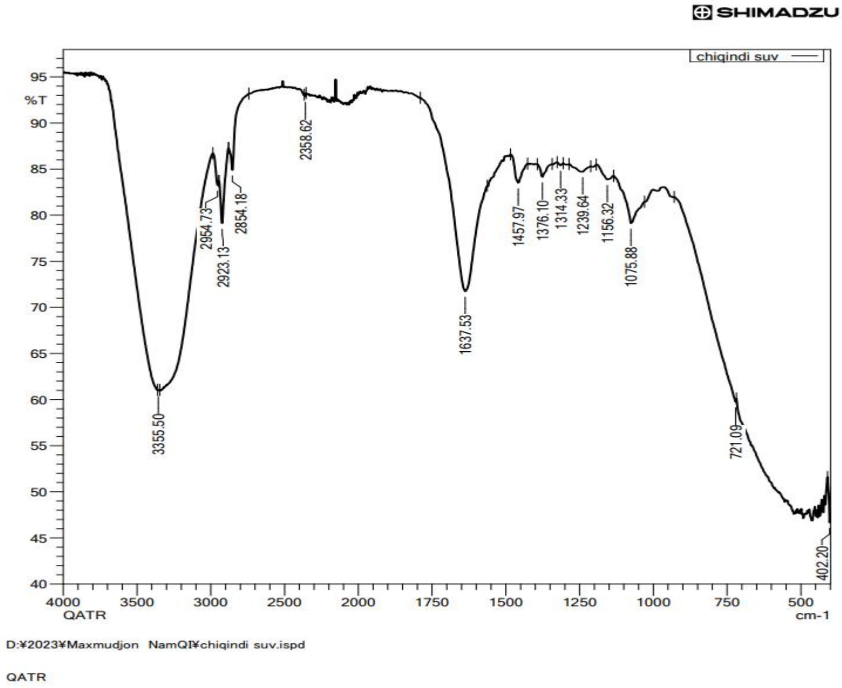

Figure 1. The composition of wastewater using the IR spectrum:

When industrial wastewater is examined using an IR spectrometer, we can see the presence of compounds in the wastewater [10]. At 3350.50, nitrates are very high in the wastewater, 2923 P_2O_5, and organic compounds and sodium are high. In addition, during the chemical treatment of the metal surface, it is evident that the concentration of nitrate and medium phosphoric acid salts and complex compounds combined with iron is very high in the solution environment. The composition of industrial wastewater and the degree of ecological and environmental impact were studied, according to which calcium and magnesium were determined by the complexometric method.[11-14] This method is based on the change in the color of the indicator due to the interaction of calcium and magnesium ions with Trilon B. Sodium is determined by the flame photometric method. Sulfates are determined gravimetrically. In this method, sulfates are precipitated with barium chloride in an acidic medium, and then the precipitate is washed and weighed. Chlorine is determined by the volumetric argonometric method. In this method, the interaction of silver ions with potassium bichromate is based on the change in the color of the precipitated silver chloride suspension. Accordingly, the initial composition of wastewater is as follows: In the technology under development, the primary raw material is a mixture of washed wastewater and recycled electrolytes. The physicochemical description of wastewater is given in Table 1.

Physico-chemical description of wastewater (m^3/gr)

Table 1

Indicators	Production wastewater
Volume m^3, hours	24,812
pH	2,7-3,5
Phosphates	720
Zinc	100
Iron (II)	133

Iron (III)	1172
Chlorides	450
Titanium oxide	9,5
Nitrates	140
Organic compounds (oils)	250-300

Table 1 shows the general composition of industrial wastewater. The pH of the water is around 2.7–3.5, i.e., it is acidic due to the acid used in the process: phosphates 720 m^3/g, zinc 100 m^3/g, iron (II) and (III) 1305 m^3/g, chlorides 450 m^3/g, titanium oxide 9.5 m^3/g, nitrates 140 m^3/g, and organic compounds (oils) 250–300 m^3/g. serves to ensure that it does not As we know, as a result of the transition of chemical compounds to each other, another substance is formed as a result of a chemical reaction, and as a result, an error in the process, i.e., the process stops.

3. Results and Discussion

It is the organization of production based on waste-free technology, which can cause damage to the environment and ecology as a result of processing industrial wastewater and can cause economic damage to the production industry. As a result of studying the process of treating wastewater generated in production, the chemical composition of wastewater was studied, and the treatment was achieved. Industrial processing is applied to the processing and production of wastewater, which can certainly reduce the supply of drinking water and harm the economy of the enterprise. It is appropriate to choose a reagent and technology depending on the production process, the generation of wastewater, and the process by which it is cleaned and reused. The wastewater treatment technology in optimal working conditions is as follows:

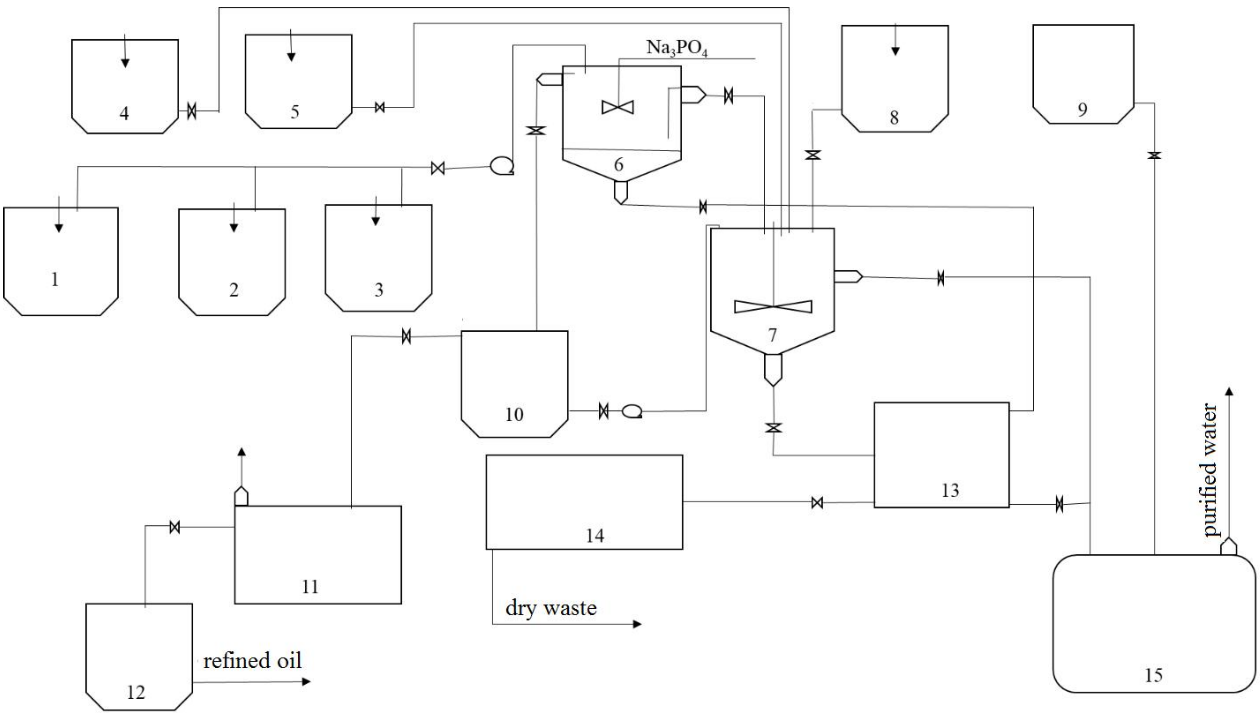

Figure 2. Technological scheme of wastewater treatment

Figure 2. Returning the purified water to the technological process after purifying the wastewater from organic compounds will prevent harmful waste to the environment and bring economic benefits to the industry. Chemically contaminated wastewater (1, 2, 3) from the production comes to the collection hopper, where some of the large particles in the wastewater are removed.

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Each collection hopper is installed based on the scale of production and then pumped to the technical water treatment and softening unit (6). In this section, wastewater is cleaned of oil, a 20% Na_3PO_4 solution is added, and calcium compounds settle to the bottom of the tank due to the hardness of the water. Due to the lower density and viscosity of the oil products, they float to the top, and the separated oil (10) comes to the dewatering section. During 40 minutes, the oil is completely freed from water, then it goes to the evaporator (11), containing 15 Oil with a moisture content of -20% is evaporated at a temperature of 110 °C, and the purified oil is poured into containers and sent to the lubrication and cooling department for reprocessing. The dewatered water coming out of the device (6) is fed to the mixer (7); (4) alkali solution from the technology; (5) hydrochloric acid; and (8) 5% alkali solution is added and mixed for 20 minutes, allowed to stand for 40 minutes; 2 of the mixer/3 parts are fed to the purified water collector (15); and the lower part is fed to the filtration section (13). Purified water as a result of filtration (15) is transferred to the clean water collector, and the residue on the filter is transferred to the sludge platform (14). 60% of the moisture content of waste goes to the sludge yard. (15) The water collected in the clean water bunker is returned to the technological process, the pH of the water (9) is adjusted with hydrochloric acid, and the dry residue is given to the technology for processing.

Supporting materials:

- Alkalizing reagent CaO (GOST 9179-77), a solution with a concentration of 5% in terms of the active part, is sent as a solution. Consumption of a 5% solution: 0.25 m^3/h. Consumption of 100% CaO: 12.5 kg/h to 75.6 t/year. Synthetic technical hydrochloric acid; hydrogen chloride not less than 31.5% by mass; GOST 857-95. It will be developed at the "NAVOIYAZOT" JSC enterprise. A solution with a volume concentration of 0.5% is transmitted visually. The consumption of the solution is determined according to the pH meter. Approximate consumption: 0.75 l/hour. A physico-mechanical description of purified water is given in Table 2.

Physico-mechanical description of treated water (m^3/gr)

Table. 2

Based on the information given in Table 2, the pH is always controlled, and its upper limit is ensured not to exceed 8.5 and not to fall below 6.5. Phosphates 2.0 g, zinc 1.0 g, iron (II), and (III)

Indicators	Production wastewater
Volume m^3, hours	24,5
pH	8,5
Phosphates	2,0
Zinc	1,0
Iron (II) and (III)	0,3
Chlorides	25
Titanium oxide	-
Nitrates	0,16
Organic compounds (oils)	0,1

vy metals, the amount remaining in the purified technical water does not harm production. It can be seen that nitrates and organic compounds are completely purified and do not cause harm in production. Chlorides are around 25 because we use HCl to correct the pH during the cleaning process, which is certainly not harmful in production.

In the technological scheme presented in Figure 2, the process of returning purified technical water to full production and technology is provided. In this technological scheme, device 6 performs the task of extracting floating oils from wastewater and reducing the hardness of the water. Separated oil and softened wastewater are sent to the recycling process. Depending on technical water requirements, water softening can be reduced to 7 mg eq/dm^3 or more.

Currently, the oil processing enterprise has been tested in five thermal processing furnaces; as a result, the technology of processing an average of 16–17 tons of oil per month has been established. It covers 80% of total production costs and brings significant benefits to the economy of the enterprise. It should be noted here that the quality indicators of processed oil are good, and no negative effects occur during the production process. Oil processing precipitates and NaOH-extracted oil extracts have been tested in a soap factory, with positive results so far.

4. Acknowledgements

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5. Conclusion

Currently, it is considered appropriate to organize production based on waste-free technology and to develop circulating water technology for cleaning and reusing wastewater, taking into account the demand for drinking water. In addition, we will prevent air pollution from damaging the soil and plants. Purification of industrial water from oil and oil products, as well as separation of organic compounds and providing it for industry, is economically beneficial for large-scale production. In addition, the organic compounds contained in wastewater are considered very dangerous for the ecology of cultivated fields, so it is very important not to clean organic compounds and throw them away as waste but to apply them to production. The test results of oil cleaned and processed as a result of cleaning and processing technology instead of oils used for cooling purposes in the thermal treatment department of the industry were studied, and a positive result was obtained.

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