

**PETROLEUM PRODUCTS:
TECHNOLOGY, INNOVATION, MARKET**

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*Vysotskaya M.A., Shiryaev A.O., Kuznetsov D.A., Barkovskiy D.V.***The aging of the polymer and its contribution
to the processes of PBV destruction****4-12***Keywords:* polymer-bitumen binder, aging, polymers, destruction.

Abstract. The ways used to modify bitumen are different. The purpose of the modification is to create high-tech astringents that ensure the production of structural materials and products from them with a specified set of operational and technical properties. Of particular interest in recent years are bitumen modified with various polymers - polymer-bitumens binders (PBV). The most common way of supplying a bituminous binder on the territory of the Russian Federation is motor transport. Specification of production and logistics of organic binders is such that the time interval from loading the PBV manufacturer before its arrival to the consumer is up to several days. This determines the increased interest in the destructive processes that occur at this time in the PBV. The presented work is a continuation of the before studies performed and evaluated the contributions of the polymer modifier to the destructive processes arising in the PBV. Obviously, the aging mechanism of polymer-bitumen binders is more complex than that of bitumens, processes of aging are subjected to both the system itself as a whole, and separately each component that makes up it. During the work, experimental batches of polymer modified bitumen were prepared. After that, they underwent the aging process using the RTFOT technique. This method simulates the effects observed in the manufacture of asphalt-concrete mixture and allows fixing changes in the properties of binders. The method consists in the action of high temperature and air on the moving thin film of the binder and the determination of the reaction to this effect by comparing the physicochemical parameters of the binder, obtained before and after thermal oxidative aging. The intensity of thermo-oxidative processes in modified bitumen polymers is estimated by such parameters as penetration at 25°C and 0°C, softening and brittle temperatures. At the end of the work, the results of comparative tests of polymer-bitumen binders prepared on different polymer modifiers differing in a number of features (chemical nature, heat resistance, chain structure, etc.) are presented. The dependence of changes in the properties of various modified binders, as well as their resistance to thermal degradation, was studied.

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*Tanayants O.V., Shardyko V.V., Karatun O.N., Morozov A.Yu.***Experience in obtaining diesel fuel at the Astrakhan Gas Processing Plant****13-17***Keywords:* diesel fuel, hydrotreatment, hydrotreating catalyst, additives, cetane-additive additive, antiwear additive, depressant-dispersant additive.

Abstract. This article considers the experience of diesel fuel production using the example of the Astrakhan gas processing plant. The initial production scheme provided for the primary distillation of the stable condensate of the Astrakhan gas condensate field followed by hydrotreating the wide fraction of NK-350°C (the sulfur content in the straight-run diesel fraction reaches 1.6% by weight) and terminated by the secondary distillation of the stable hydrogenate to obtain a diesel fraction of 180-350°C, which meets the requirements of GOST 305-82 at the time of plant start-up. After the entry into force of the requirements of the Technical Regulations "On Requirements for Automotive and Aviation Gasoline, Diesel and Marine Fuels, Jet Fuel and Fuel Oil" in 2008, the use of additives to improve the production of commercial diesel fuel required some of its properties: capacity and cetane number. Initially, the additives of the German company Basf were used. The search and implementation of modern hydrotreating catalysts allowed the timely transition to the production of new fuel classes meeting the requirements of the Technical Regulations. Further tightening of the requirements for motor fuels led to the need for deeper desulfurization of light distillates, which led to the launch of a second hydrotreating unit, which contributed to an improvement in the quality of the final products. The work carried out to find domestic analogues of additives led to the introduction of such products at the Astrakhan Gas Processing Plant as: the cetane-raising additive of the brand "Ecocetan", the anti-wear additive "AddiMAX CM" and the depressant-dispersing "Dipris 5706".

The complex of measures taken to find the active hydrotreating catalyst and domestic additives to diesel fuel allowed the AGPZ to switch to the production of K5 diesel fuel that fully meets both the requirements of GOST R 52368-2005 and the requirements of the Technical Regulations of the Customs Union TR TC 013/2011 "On Requirements for Automotive and aviation gasoline, diesel and marine fuel, jet fuel and fuel oil".

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Marushkin A.B., Sidorov G.M., Kashapova L.A., Yakhin B.A.

Influence of water solvency on oil desalting process in fields _____ **18-21**

Keywords: oil desalting in the fields, water dissolving ability, salt content in oil-water emulsion.

Abstract. On the example of the operation of the installation of Tatarstan considered in the following edition. The mineralized water II separated in the electrohydrators contains 0.92 g of chlorides per 100 g of water with a hardness of 0.05 g per 100 g of water. The solubility of sodium chloride, the content of which prevails in the composition of saline water, depends slightly on temperature and is 35.9 and 38.1 g per 100 g of water at 21 and 80°C, respectively. Consequently, the potential of fresh wash water is not fully utilized.

Shows the dependence of the amount of chlorides dissolved in fresh wash water on the content of chlorides in the oil fed to the ED-2 electrohydrator. The content of chlorides in saline water at the exit from ED-2 is the achievement of the initial content of chlorides in fresh wash water, which is less than 1 g per liter of water with chlorides dissolved during purification and, as a matter of fact, from 1.1 to 2.63 g per liter of water. That is, the maximum possible concentration of chlorides in fresh wash water. ED-1 and ED-2. The fact is not full use of the possibilities of fresh wash water for desalting oil.

Thus, the analysis of the efficiency of mixing can be made on sets of various data.

The most common way to utilize saline wash water is to feed it into the reservoir. It is known that with an increase in the concentration of salt solutions, their dissolving capacity with respect to the mineral components of the reservoir first passes through a maximum and then decreases. In this case, it is necessary to use sufficient saline water.

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ECOLOGY and INDUSTRIAL SAFETY

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Korosteleva Yu.A., Karamysheva N.N., Ignatov A.L.

Efficiency biodestruction soil biological product "Bio Siterra" _____ **22-26**

Keywords: oil industry, bacteria-destructors oil spills, the biological product.

Abstract. Deposits of useful hydrocarbons, as a rule, are located in natural areas with a very fragile ecosystem. The ecological balance in these places was formed very difficult and can be easily destroyed. In this regard, the number of environmental disasters associated with ground oil spills increases from year to year. One of the most effective methods of oil pollution control is soil sorption purification. The main advantages of this method include: the ability to remove to a minimum residual concentration of almost any contamination, process control and speed of exposure (maximum sorption occurs in the first four hours).

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Rybkin A.Ya., Dyachkova S.G.

Organic pollutants in soil of a working zone tank farms of the republic Sakha (Yakutia) _____ **27-33**

Keywords: organic pollutants, the soil a working zone, tank farm.

Abstract. Based on the results of the monitoring, the qualitative and quantitative composition of organic pollutants in the soil of the working areas of four tank farms of the Republic of Sakha (Yakutia) were determined by means of GLC, CMS and gravimetrically. Organic pollutants are represented by aromatic, polyaromatic and aliphatic hydrocarbons. It was found that the organic pollutants content in the soils of all the objects under study is in the range of 27000–61000 mg/kg and varies depending on the place of selection. The total indicators of soil contamination (Zc) of the tank farms under study lie in the area of 24-60, which, according to the scale of the degree of contamination, corresponds to moderately hazardous.

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Fuel supply process modeling for overland machine diesel engines at low temperatures

34-44

Keywords: diesel fuels, low-temperature pumpability, research methods, diesel, resemblance, modeling, experiment, integral estimate.

Abstract. The article presents the current issues of development of theory of modeling for chimmotology process of the diesel fuel supply from the fuel tank to the engine nozzles at low temperatures that is conditioned by the unbiased insufficiency of diesel fuel properties influence formalization when describing the processes which directly impact on reliability of the machines and operation ability of the fuel systems in operation process. The diesel fuel supply process modeling at low temperatures was carried out by the authors on the basis of the well-known in chimmotology common factors and includes the construction of the structural and functional, physical and mathematical process models. For quantitative diesel fuel process modeling at low temperatures it was suggested to create a physical model of the fuel system that ensures the implementation of the temperature and hydrodynamic resemblance, availability of the low and high pressure fuel movement taking in view of the independent task and variation of the factor values determining the diesel fuel paraffin deposit accumulation process within the ranges conforming to the real values for the fuel system.

On the basis of the mathematic model approach of the diesel fuel supply process at low temperatures as per the results of the active experiment to investigate the response surface and fuel testing in the physical model, the authors obtained the formalized common factors of the interconnection of the fuel chemical content, application conditions, and the results of the diesel fuel paraffin deposit accumulation process as multi-factor non-linear regression models. The modeling results allow to prognose the potential fuel ability to resist the low temperature impact within the whole range of condition factor variation as a generalized indicator (integral estimate) of the low-temperature pumpability of the diesel fuels.

The authors show the ambiguity of the chemicals impact included in the content of the additives intended for the diesel fuels in various conditions of their supply to the engine nozzles. The modeling is sure to show the critical flow rate and the critical fuel supply temperature gained for the certain conditions cannot be the only sufficient indicator for characterizing the low-temperature pumpability of the diesel fuels for the whole range of the fuel system operation modes. The substantial impact of the engine operating modes on showing the tendency of the diesel fuel towards the blocking the fine filter at low temperatures is noted. It was shown that the depressor fuel additives impact not only on effectiveness of the fuel supply to the engine, but also on the way of the behavior of the fuel supply process factors influence on the blocking the fuel filter with the paraffin crystals. The application of the suggested approach when modeling the chimmotology processes allow not only the studying paraffin deposit accumulation processes of the diesel fuels in a good manner in the fuel systems at low temperatures, but also prognosing the result of application of the test brands of diesel fuels having various chemical content in the machines under actual operating conditions.

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QUALITY: DOCUMENTS and COMMENTS

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Marine fuels. Changes in the standart

44-47

Keywords: marine fuels, differences of the new ISO 8217 standard from the previously existing, Russian normative documents for marine fuels.

Abstract. International requirements and Russian normative documents for the production of marine fuels are considered. Along with the reduction of sulfur content, special attention is paid abroad to the low-temperature properties of marine fuel. The cases of clogging of filters with paraffins led to the need to determine two quality factors: cloud point and the plugging point, similar to diesel fuels. There are many company standards for marine high-viscosity fuels on the territory of the Russian Federation, in which the developer deviates from the requirements of ISO 8217 for a number of important quality factors, such as the calculated index of aromatization, stability, metal content. The Russian GOST 32511 will be revised and brought in accordance with the international standard in 2018.

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