

IMPORT SUBSTITUTION IN OIL AND GAS PROCESSING

Materials of the VII meeting of the Advisory Board by the chairman of the State Duma Committee on power supply dedicated to enterprises interaction of oil and gas complex with allied industry branches

From the minutes of Directors Board of the Refiners and Petrochemical Association...

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VNII NP works in the field of import substitution

Keywords: import substitution, additives to fuels, hydrogenation processes of oil refining, aviation gasoline, power oils, reference fuels.

Abstract. Development of JSC All-Russian Scientific-Research Institute for Petroleum Processing on creation of the modern processes and products of oil refining capable to replace import in the Russian market is considered. In particular, replacement of the western companies is begun with the market of additives to low-sulphur diesel fuels, special liquids. The new technical solutions allowing to restore production of aviation gasoline, power oils are found. A number of new processes of oil refining, and also catalysts is developed for them.

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The development of the domestic industry of oil and gas engineering

Keywords: import substitution, oil and gas engineering cluster, foreign engineering, the Russian project, equipment, foreign contractor, the state program.

Abstract. Russian customer's commitment to the Russian contractor in the form of support of general contractors in the face of domestic companies by industry customers is the best way of modern technology transfer and improvement of competences, hundreds of billions investment in the Russian economy, the load of domestic capacities and creating work places. The choice of domestic organizations as contractors in the long term will enable customers to minimize the risks of depending on foreign companies and the Russian Federation will provide a unique opportunity to strengthen and increase domestic engineering potential for further projects in Russia and abroad by investing in the modernization of fuel-and-energy company, will provide the basis for further development of domestic technologies. Development of engineering industry in the Russian Federation in oil and gas fields of world-class level will be one of the drivers of the economy when operating in foreign markets.

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Conditions and issues of production of domestic catalysts for oil refining

Keywords: catalysts, oil refining, hydrotreating, reforming, catalytic cracking, fuel, ecology, technology.

Abstract. The data for the production on the catalyst enterprises of Russia for the period 1990–2014 of cracking catalysts, hydrotreating, reforming, isomerization and petrochemicals. In recent years, the need for catalysts increased due to the construction of larger reactors, due to the need to organize the production of environmentally friendly motor fuels, process intensification and deepening of oil refining. The analysis of needs of reforming catalysts, cracking, hydrocracking and hydrotreating of petroleum fractions. It is shown that the catalysts of the brand RB are operated by 7 units, providing reception catalyst octane 96–97. Catalysts AGKD BN-400 and BC in the hydrotreating of the diesel fraction, involving about 40% of secondary raw materials provide increased service cycle to 7 years. The main technological parameters of the domestic hydrotreating catalysts using a series AGKD-400. Industrial analysis of the data shows that domestic cracking catalysts, reforming and hydrotreating not inferior to foreign analogues, and can successfully replace on their existing installations without compromising the quality of produced fuels that lead to greater competitiveness of products. With an increase in load of domestic enterprises can be expected reduce the cost of produced catalysts.

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Resuming production of avgas in Russia. Problems and prospects

Keywords: aviation gasoline, avgas 100LL, unleaded Avgas, tetraethyl lead.

Abstract. Aviation gasoline is one of the six types of petroleum products are included in the Technical regulations of the Customs Union TR CU 010/2011. At present, this fuel in the Customs Union is not made and imported from abroad. In the last years of petroleum and fuel companies has risen sharply interest in resuming its production in Russia.

The article presents the estimate of the volume of consumption of aviation gasoline in Russia, according to which it currently not exceed 15 thousand tons per year. The consumption of aviation gasoline in Russia is small, therefore the resumption of its production in one of the major domestic refineries is unlikely. More preferably produce aviation gasoline on a special factory, which will be supplied basic hydrocarbon components from large refineries. There also will be the introduction of tetraethyl lead and other additives, and certification of commercial aviation gasoline.

Avgas 100LL is the most promising for the production in Russia among the various grades of leaded aviation gasoline. Avgas 100LL takes an almost the whole world market of fuels for piston aircraft and can be used for all piston aircraft operated in Russia. One of the technical problems of production Avgas 100LL in Russia – there is no alkylate in domestic refineries with the final boiling point no higher than 170 degrees. This problem is solved by optimization of fuel composition.

However, Avgas 100LL is not approved for use in military aircraft. Therefore, to meet the needs of the Ministry of Defense of the Russian Federation can be organized the production aviation gasoline grades B-91/115 or B-92. The important difference of the grade B-92 from the grade B-91/115 – is the lack of requirements for the performance number (rich mixture), which is guaranteed by the technology of its production.

One of the main problems of production of leaded aviation gasoline grades: Avgas 100LL, B-91/115 or B-92 is the need to use anti-knock additives – tetraethyl lead. Therefore, the most promising is the development of unleaded gasoline. In Russia there was no research in this area until recently. Currently, this research is conducted in VNII NP.

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Russian lube oil science tasks in modern conditions

Abstract. The need of preventive reorientation of a maslovedeniye to domestic technologies and raw materials is the most urgent challenge in the conditions of the extending sanctions concerning the Russian economy. Critical elements of the Russian complex of lubricants are technologies and production of base oils II-IV groups, some modern additives and tool maintenance of tests for oils at their development and certification. In Nizhnekamsk at the end of this year, and in Novokuibyshevsk next year is expected introduction of units to obtain oils II and III groups of the raffinate selective treatment that can close the needs of Russian market in the coming years. These settings are being built on the basis of foreign technologies, there are used foreign catalysts of hydroconversion, hydroisomerization and hydrotreatment of oil raw. Therefore for many years large-scale production of oils II and III groups become dependent on supplies of catalysts from the countries, practicing sanction-pressure on Russia. Russian capacities are characterized by small unit PAOO, which is not working at the moment due to cessation of production of α -olefins in Nizhnekamsk as there is the lack of ethylene. There is a necessity to create PAOO production, for example, in Angarsk Petrochemical Company, as it is the most advanced in resources structure of Rosneft, close to market outlets and having many years of experience with PAOO. As potential foreign licensors reject to sell the technology of PAOO synthesis to Russia, it is necessary to build the construction of PAOO under the technology of VNII NP, which has been previously mastered and successfully practiced in "AZKiOS" JSC. Current situation in the Russian position with additives does not satisfy any manufacturers of lubricants in qualitative or in quantitative terms. In the market there are almost no Russian high extreme pressure, thickening, pour-point depressants, ready additive packages at prices that are the best foreign. Because of this, almost all the engine and transmission oils of higher groups operating properties, as well as part of lubricating oils for machinery, which is of strategic importance, are produced by domestic enterprises with foreign additives. Creating complex of obtain additives for lubricating oils will allow fundamentally change the whole ideology of production of lubricants in Russia, which is now largely dependent on the supply of packages of functional additives and thickening of additives from abroad, and to bring the company producing lubricating oils to a new competitive level. Also required to intensify development of new lubricants and thus strengthen the tribological and chemmotological components of maslovedeniye in order to bring the test and certification activities for lubricating oil on the international level. In this regard, is necessary extension of fundamental chemmotological and tribological studies of lubricants contemporary groups operating properties, improving Russian system of tests of motor, transmission, hydraulic and other oils using mainly domestic motor and tribological stands, agreed on the parameters resulting from foreign systems, improving quality control imported lubricants based on the latest test equipment.

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The influence of dissolved gases on properties of domestic and imported transformer oils in an electric field of high voltage equipment

Keywords: transformer oil, gassing, ionization, dissolved gases.

Abstract. Transformer oils (insulating oils) are manufactured in accordance with IEC 60296 and are used in high voltage power equipment with voltage up to 1150 kV. Among other characteristics of transformer oils for consumers is interesting their behavior under intense electric impact, because arc and partial discharges in high-voltage equipment lead to the rupture of bonds in molecules of oil insulation to form radicals and ions, which are converted into molecules of gas (hydrogen, methane, ethane, ethylene, acetylene). The formed gases are dissolving in the oil and are accumulated in a free space above oil. Due to impact of electric field is formed a low-temperature plasma which in turn leads to destruction of the transformer oil, which threatens the normal operation of high voltage power equipment.

In the course of this study, the behavior of transformer oils GK – produced by JSC «Angarsk Petrochemical Company» (JSC «NK «ROSNEFT»); LUKOIL VG – produced by «LLK-International»; GX-11 – produced by Swedish company «NYNAS» was compared, in according to conditions specified in IEC 60628. Tests were conducted in the atmosphere of different gases: hydrogen, nitrogen, helium, methane, acetylene and

propane, which are accumulated in high voltage transformers during operation. After the test for gassing in the electric field in different atmospheres in transformer oils were determined the content of dissolved gases.

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Lubeoil for lubrication of civil construction formwork

Keywords: formwork, adhesion, limiting wetting angle, surface tension, cleanliness of concrete surface.

Abstract. Considered requirements for the oils for formwork, which should provide good adhesion to the material of formwork and low adhesion to concrete, do not leave fat or colored spots in the concrete, provide lubrication at different ambient temperatures. Studies on the development of domestic oil substitute imported from Germany. Tests of various samples of oils by applying them to the laminate during manufacture formwork concrete construction. Assessed the quality of the concrete surface after stripping in comparison with imported sample. Confirmed positive effect oils of high purity on the appearance of the concrete. Calculated according to the formula Dupre-Young values of adhesion work of various basics regarding laminated surface formwork. The evaluation of oil film resistance under high loads. Defined low-temperature properties of the basics. Chosen base oils for formwork which includes hydrotreated oil. The content in the oil hydrogenation diesel fuel provides a lower temperature of its application as compared with imported oil. Taking into account the studies of various oxygen-containing additives and selected basics developed optimal composition of oil TMS-8B. A comparative characteristic of developed oil TMS-8B which shows that the oil TMS-8B on physico-chemical, adhesion, low temperature and tribological properties corresponds to import oil, recommended for the lubrication of formwork in the production of building structures.

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Development of hydraulic oil RN-I-G-S(d) [PH-II-F-C(π)] with improved functional properties for new precision equipment coming to PJSC «AVTOVAZ»

Keywords: hydraulic oil, precision equipment, filterability, additives composition, industrial tests.

Abstract. Currently, in Russia there is a modernization of production in various industries, grows shipments of imported industrial equipment and simultaneously with hydraulic oils and additive packages of leading foreign companies. In this connection there was a need to improve the quality of domestic hydraulic oils for PJSC «AVTOVAZ».

PJSC «MidVolgaNIINP» based on the composition of oils I-G-S (d) have developed new hydraulic oils with improved functional properties RN-I-G-S -32 (d), RN- I-G-S-46 (d), RN-I-G-S -68 (d). To improve the performance properties: filterability water demulsifying properties and hydrolytic stability of the oils in the composition I-G-S (d) have been replaced by zinc dialkyldithiophosphate, and a demulsifier. It has been established that due to synergistic interaction with the dispersant additive ZDDP reached the maximum reduction in size of the dispersed phase of the emulsion which is formed by dehydration of oil, which significantly increases the filtration rate as compared to the lubricant used. Developed a technology that allows you to get the oil 8–9 cleanliness class required to ensure the long life of the hydraulic servo-hydraulic systems. According to the results of production tests oil RN-I-G-S-32, -46, -68 (d) approved for use in precision hydraulic equipment three productions (Mechanical, Metallurgical and plastic manufacturing) equipped with servo- and proportional to the technique as well hydraulic oils «TNK Hydraulic HLP 32, 46, 68», «Volteks MG-32, -46, -68» and «Gazpromneft Hydraulic HLP 32, 46, 68», having in its composition imported additive packages. This work continues in the direction of the development of the first national multi-functional additives for hydraulic oils.

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NPP QUALITET: issues and options of import substitution in the segment of additives for lubricants

Keywords: additives, additive packages, sanctions.

Abstract. A situation with import substitution in the marketing segment of additives and additive packages for lubricants in Russia is rather acute. Development and production of additive packages is a technology- and capital-intensive process, since, as a rule, developers and producers bear all costs related with development, testing and getting permits for their application. NPP Qualitet produces all main components for formulation of its additive packages on own production facilities. The range of products includes additive packages for the most widely used lubricants.

Production of sulfonate additives is completely performed with application of domestic raw materials and based on synthesis of synthetic sulfonic acids which, by contrast with petroleum sulfonic acids, have an accurate chemical composition.

Production of the most widespread type of additives – dialkyldithiophosphates – is based on application of phosphorus pentasulphide as a raw material. There are two main types of viscosity improvers – those produced on the basis of olefin copolymers and on the basis of polymethacrylates. The process of olefin additives synthesis is inflexible and suitable for a large-scale production. NPP Qualitet produces holymethacrylate additives – allow synthesize products with a wide range of performance properties in very mild conditions, varying the ratio of fatty alcohols of different lengths, and concentrations of initiator and optional additives as well. That provides a possibility to get a wide range of PPD and viscosity improvers. Our current strategy is launching into manufacture of own phenolic antioxidant additive – the most widely used type of additives.

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Ability to solve problems with the help of domestic import polyurea greases.

Keywords: import substitution, polyurea greases, performance bearings closed type, the duration of the low-temperature properties, vibration resistance.

Abstract. The results of comparative tests of greases on the stand "sealed bearings", the possibility of using domestic polyurea greases for import of various foreign lubricants.

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Features of the improved bitumen production at PJSC Achinsk Refinery of VNK, Oil Company ROSNEFT

Keywords: road petroleum bitumen improved, tar, production technology, bitumen import substitution, physical and chemical properties of bitumens, group hydrocarbon composition of bitumens.

Abstract. The production technology for improved road petroleum bitumen has been developed, allowing production of the bitumens meeting the European standard requirements for EU countries.

The basis of the technology is utilization of heavy petroleum residues after processing of crude oils which are classified as little use, regarding their physical and chemical properties set, for production of high-quality road bitumen. The technology is developed taking into account the process features of Bitumen Unit at PJSC ANPZ, and also the actual quality of arriving crude oils mix to be processed at the plant. It is demonstrated that on condition of the improved bitumen introduction into industrial production under the developed technology, it is potentially possible to replace completely the Finnish road bitumen of Fortum Concern production for carriageway surfacing of federal level roads with improved road petroleum bitumen of the BNDU (БНД/У) brands of PJSC ANPZ (Rosneft) production.

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