

PROPERTIES OF ETHER LUBRICANT ADDITIVES OBTAINED FROM WASTE HEXANE, A SECONDARY PRODUCT OF THE POLYMERIZATION PROCESS

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Today, the chemical and oil and gas industries, which have high production, raw material and scientific and technical potential, are one of the leading basic sectors of the economy of Uzbekistan. The chemical and oil and gas industries, while making a worthy contribution to the development of the republic's economy, are also sharply increasing their export potential [1].

Comprehensive use of natural resources and industrial waste, introduction of the latest modern technologies, production of new competitive goods, deep processing and coordination of local raw materials and other issues are specifically mentioned in the development strategy of the Republic of Uzbekistan for 2022-2026. [2].

Therefore, the increasing demand for hydrocarbons in our Republic and the environmental crisis that is emerging on the ground require a thorough study of the possibilities of effective and rational use of hydrocarbon resources. Environmental requirements for hydrocarbons provide the opportunity to process secondary products of the chemical industry, oil and gas processing enterprises [3-4].

One such product is waste hexane (exhausted hexane), which is produced as a liquid by-product in the polymerization process at the Uz-Kor Gas Chemical LLC joint venture [5].

The fractional composition of the liquid secondary product was analyzed and studied in the APHK-9 structure in accordance with GOST-2177-99. According to the results of the study conducted to study the fractional composition of waste hexane, it was found that it contains more higher paraffins than other hydrocarbons. By distilling waste hexane under atmospheric pressure, fractions in the range from 170 to 290°C (C₁₀-C₁₆) were separated, and when comparing the physicochemical values of higher paraffins, their properties were similar.

The higher paraffins separated from the waste hexane were oxidized to higher fatty acids in the presence of a catalyst. The higher fatty acids were esterified with methanol to synthesize synthetic higher fatty acid methyl esters.

The physicochemical properties of the control variants obtained on the basis of methyl esters of synthetic higher fatty acids and methyl esters of various oils were also analyzed in accordance with the requirements of GOST R 53605-2009. The results obtained are presented in Table 1.

Table 1

Important physicochemical parameters of synthetic higher fatty acid methyl esters (lubricant additives)

№	Indicator name	GOST R 53605-2009		Synthetic higher fatty acid methyl ester (lubricant additives)			
		min	max	Control variants based on methyl esters of various fatty acids			FAME
				№1	№2	№3	
1	Density at 15°C, kg/m ³ GOST 3900	860	900	879	879	876	878
2	Density at 20°C, kg/m ³ GOST 3900	-	-	875	875	872	874
3	Kinematic viscosity at t40°C, mm ² /s GOST 31391	3.5	5.0	4.0	3.8	4.1	4.2
4	Refractive index n _D ³⁰ GOST 18995.2-2022	-	-	1.4488	1.4509	1.4424	1.4498
5	Flash point in an open crucible, °C GOST 4333	120	-	173	165	171	168

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