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PRODUCTION AND TESTING OF AN EXPERIMENTAL BATCH OF GEAR LUBRICANT ALSL-UZ IN THE CONDITIONS OF THE REPUBLIC OF UZBEKISTAN

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ABSTRACT

Requirements for the viscosity of the gear lubricating oil. A prototype of ALsl-Uz (AL-Axial lubrication,sl- semi-liquid, Uz- Uzbekistan) type gear lubricant was developed and manufactured from local raw materials. Laboratory tests of a prototype gear lubricant were carried out at the Fergana Oil Refinery. The samples obtained were tested on the T-40 Tractor in the conditions of the farm "Agrosanoat Hosil Servis". The Institute of General and Inorganic Chemistry of the Academy of Sciences of the Republic of Uzbekistan has carried out work on the development and manufacture of a composition of a gear lubricant of the ALsl-Uztype from local raw materials. The service life of lubricants is quite long, which is why the owner often has to change the material, which could not even develop half of its own resource. Therefore, thickened (all-season) products have gained great popularity on the domestic market.

KEYWORDS: *Reducer Grease, Gear Starter, Viscosity, Transmission, Asphalt, Extract.*

INTRODUCTION

There are several classifications of gear lubricating oils by viscosity. Most of them use numerical designations that indicate that the oil belongs to a larger or smaller range of viscosity values [1,9].

The classification allows you not only to find out the viscosity index of the gear lubricating oil, but also to quickly select the right type of lubricant for a specific application. For industrial gear lubricating oils, the ISO viscosity classification is widely used, where each digit indicates the range of kinematic viscosity at 40°C. The SAE standard [2,10,11] is used to characterize engine and transmission oils.

The Institute of General and Inorganic Chemistry of the Academy of Sciences of the Republic of Uzbekistan has carried out work on the development and manufacture of a composition of a gear lubricant of the ALsl-Uztype from local raw materials. In the T-40 Tractor, the gear designs have an exclusively cylindrical shape, which allows preventing a high probability of bullying during operation. In cargo and passenger transport, which has a traditional gearbox design, it is possible to use gear lubricating oil without any alternatives [4,5].

RESEARCH METHODS

Laboratory studies of a prototype of a gear lubricant were carried out in the TSL shop No. 10 at the FNPZ.

Together with the Institute of General and Inorganic Chemistry of the Academy of Sciences of the Republic of Uzbekistan and the Ferghana Oil Refinery, work was carried out in shop No. 17 to produce a prototype of a gear lubricant in accordance with the technical specifications for ALsl-UzTSh 39.3-225: 2012 and to test their physico-chemical parameters and anti-wear characteristics.

The obtained samples were tested on a T-40 Tractor in the conditions of the farm "Agrosanoat Hosil Service". To get acquainted with how the viscosity of the gear lubricating oil is indexed according to the standards, you can use Table No. 1.

TABLE NO. 1.

Requirements for the viscosity of gear lubricating oil						
Properties of gear lubricant	**Viscosity class**					
	75W	**80W**	**85W**	**90**	**140**	**250**
Kinematic viscosity at 100 S, sq. mm/s						
min	4,2	7,3	10,8	12,5	23,5	40,5
max	-	-	-	24	41	-

Max. temperature (°C) at a viscosity of 150,000 SDRs	-38	-23	-11	-	-	-
Loss of mobility temperature (°C), not higher	-43	-33	-21	-	-	-

If the Latin letter W is present in the designation, this indicates the possibility of using it in winter. The absence of this designation in all other products makes it clear that the buyer is facing oil for the summer period. In practice, the use of seasonal gear lubricating oils is not always financially profitable. The service life of lubricants is quite long, which is why the owner often has to change the material, which could not even develop half of its own resource. Therefore, thickened (all-season) products have gained great popularity on the domestic market. The chemical composition is a symbiosis of winter and summer oils, each of the labels of which is indicated in the corresponding index [6,7,8].

RESULTS AND DISCUSSIONS

Gear lubricant of the ALsl-Uztype meets the requirements and standards of the technical specifications for ALsl-UzTSh 39.3-225: 2012, specified in Table No. 2, according to physical and chemical parameters.

TABLE NO. 2

Name of indicators	**The norm for the brand**		**Test method**
	L	**Z**	
Appearance	Homogeneous oily liquid from dark brown to black color		
Ashcontent,%, nomore	3,0	3,0	By GOST 1461-75
Mass fraction of sulfur,%, within	1,3-1,7	1,3-1,7	By GOST 1437-73
Corrosion effect on metal	withstands		By GOST9.080-77
Mass fraction of water,%, no more	0,5	0,5	By GOST2477-65 (from SLZ 2362-60)
Mass fraction of mechanical impurities,%, no more	0,1	0,1	By GOST 6479-83
Mass fraction of free alkali in terms of NaOH,%, no more	0,3	0,3	By GOST6707-76
Conditional viscosity at plus 1000C, conditional degrees	7-12	3-7	By GOST6558-52

If the letter L is present in the designation, it indicates the possibility of application in the summer period also Z, it indicates the possibility of application in the winter period.

1 2

1-Gear starter; 2-Transmission box

Fig. 1. Image of T-40 Tractor spare parts

Gear lubricant of the ALsl-Uz type was tested on the gear starter and transmission box of the T-40 Tractor (Fig. 1.).

Prototypes of gear lubricant in an amount of 20 kg for operational tests on the T-40 Tractor according to the following composition are shown in Table No. 3.

TABLE NO. 3.

Name of components	**Period of use**		
	Summer	**Spring-autumn**	**Winter**
	Sample №1	**Sample №2**	**Sample №3**
	The content of components in the lubricant samples, wt.%		
Deparaf. Residualoil	73,8	65,1	55
Asphalt	14,7	14,1	11
Extract of the III fraction	8,5	12,4	24
Gossypolresin	1,5	2,6	3,6
K 61 (from the III fraction)	1,2	3,3	5
Additive CD-7	0,3	0,3	1,4

CONCLUSIONS

1. At the Institute of General and Inorganic Chemistry of the Academy of Sciences of the Republic of Uzbekistan, work was carried out on the development of the formulation and manufacture of the composition of a gear lubricant of the ALsl-Uz type from local raw materials.

2. Fergana refinery plant in laboratory №10 laboratory investigations of the prototype gear lube in accordance with the regulations, and the obtained samples were tested on the Tractor T-40.

3. The resulting lubricant gear type ALslTies for physical and chemical indicators meet the requirements and standards specifications for ALsl-UzTSh 39.3-225: 2012.

4. Lubricant gear type ALsl-Uz tested on the gear of the starter and the transmission of the Tractor T-40.

5. As a result of the tests, the prototypes of gear lube, developed Academy of Sciences of the Republic of Uzbekistan Institute of General and Inorganic Chemistry has mobility and the determination of the diameter of the wear on the toothed parts Tractor T-40, showed better results than negroli. This indicates that it can be used on the T-40 Tractor in the Farm "AgrosanoatHosil Service".

REFERENCES

1. Navidad R. D., Vdovichenko P. N., Krasnokutskaya M. E., Kobylinska I. F., Thermal analysis greases and their components methods of investigation of the composition and properties of lubricants, Tsniiteneftekhim. M. 1988. –S. 71-82.
2. Ubaydullaev M. J., Khamidov B. N., Ubaydullaev .B.X. Development of effective technologies of obtaining lubricating materials using waste oils.//Uzbek chemical journal, 2009, No. 6, pp. 49-53.
3. Saidahmedov S. M. Development and industrial development of technologies for the production of oil from local oils. Autoref. doct. Technical Sciences, Tashkent, 2005, 62 p.
4. Toshtemirov B. V., Khamidov B. N., Ubaydullaev B. H., Smanov B. A., Ganieva S. H. Development of a new composition of a lubricant using anticorrosive additives. Uzbek Journal of Oil and Gas. No. 1, 2012, pp. 35-38.
5. Saidakhmedov Sh. M., Khamidov B. N., Ubaydullaev B. Kh., Dzhianbayev S. V. The main directions of production of lubricants using local raw materials. Uzbek Journal of Oil and Gas. Special issue, 2015, pp. 166-173.
6. Chernozhukov N. I., Krein S. E., Losikov B. V. Chemistry of mineral oils. 2nd ed., trans. and add. - M.: Gostoptehizdat, 1959. - 416 p.
7. Kazakova L. P., Krein S. E. Physico-chemical bases of the production of petroleum oils. - M.: Chemistry, 1978. -319 p.
8. Chernozhukov N. I., Krein S. E. The oxidability of mineral oils. 3rd ed., trans. and add. - M.: Gostoptehizdat, 1955. - 372 p.
9. Kiseleva I. A., Nesterov A.V. and others. New gear lubricants / / Oil and business, 1995, No. 3. pp. 22-24
10. Kiseleva I. A. Development of semi-liquid lubricants for railway transport. Diss. candidate of Technical Sciences. Moscow: I. M. Gubkin GANGES, 1996. - 110 p.
11. Larin A.M. Investigation and regulation of the composition and properties of petroleum oils using thermal diffusion. Diss. candidate of Technical Sciences. - M.: Gubkin Russian State University of Oil and Gas, 2000. 111 p.