The American Journal of Engineering and Technology
(ISSN – 2689-0984)
Published: December 18, 2021 | **Pages:** 1-5
Doi: https://doi.org/10.37547/tajet/Volume03Issue12-01

IMPACT FACTOR
2021: 5. 705
OCLC - 1121105677

Journal Website: https://theamericanjournals.com/index.php/tajet

Improve The Physico - Chemical Properties Of Hydraulic Oils Way Of Introduction Of Additives

Alimova Zebo Khamidullaevna
Ph.D., Professor, Tashkent State Transport University, Uzbekistan

Sobirova Dilorom Kobulovna
Ph.D., Associate Professor, Tashkent State Transport University, Uzbekistan

Yuldasheva Gulnora Buranovna
Ph.D., Associate Professor, Tashkent State Transport University, Uzbekistan

ABSTRACT

In the article considered from the best path physico-chemical properties hydraulic oils. The results of laboratory analyze at studies the hydraulic oils with molybdenum sulfide based additives and recommendations for their use.

KEYWORDS

Hydraulic Oil, Additives, Quality Indicators, Viscosity, Chemical Composition, Lubricants, Operational Properties.

INTRODUCTION

The reliability of the operation of machines and mechanisms and their durability is inextricably linked with the use of high-quality lubricants, including hydraulic oils.

In recent years, hydraulic actuators have also significantly improved. Modern models of hydraulic drives are characterized by low weight, increased operating pressures and temperatures, reduced gaps between the working elements.

The design of hydraulic drives is constantly being upgraded. Along with the modernization of hydraulic actuators, the requirements for hydraulic oils are becoming tougher: they must have a wide range of operating temperatures, maintain their working capacity for as long as possible and comply with strict environmental standards.

Improvement of hydraulic drives entails a change in the composition and quality of

The American Journal of Engineering and Technology
(ISSN – 2689-0984)
Published: December 18, 2021 | **Pages:** 1-5
Doi: https://doi.org/10.37547/tajet/Volume03Issue12-01

IMPACT FACTOR
2021: 5. 705
OCLC - 1121105677

hydraulic oils. During operation of the pump in the hydraulic system, the oil is heated and intensively mixed with air. This leads to oil oxidation, an increase in oil viscosity, and an accumulation of oxidation products in it. The oxidation of oil leads to a change in its viscosity, and the products formed during this process form precipitates and varnish on the surfaces of parts of the hydraulic system. All this leads to an increase in energy costs for the drive of the hydraulic system.

The quality of hydraulic oils significantly affects the reliability of not only specialized cars but also modern construction and road equipment. It is therefore very important but a reasonable selection and rational use of the hydraulic oils and additives to them.

THE MAIN FINDINGS AND RESULTS

According to studies, 70% of hydraulic system failures occur due to the condition of the oil. Of these, 40% are directly related to the performance of the oil, 60% are related to the purity of the oil. Hydraulic oils with additives in the form of dialkyl dithiophosphates of metals, ash-free (amine) salts or dithiophosphoric acid esters can provide a reduction in the wear of hydraulic system elements.

This article proposes methods for improving the operational properties of hydraulic oils used for agricultural machinery. Hydraulic oils with additives in the form of metal dialkyldithiophosphates, ashless (amine) salts or dithiophosphoric esters can provide reduced wear of hydraulic elements.

We conducted a study of samples of industrial oils, and samples by adding of additives zinc dithiophosphate TCD-40 (40-means: 10% zinc, 20% sulfur, 10% phosphorus).

Hydrocarbon radicals of such additives contain from three to eight ten carbon atoms. The characteristic properties of phosphorus-containing additives is their ability to reduce surface wear at moderate loads, and to ensure high smoothness of the friction surfaces. The presence of a phosphorus atom in the composition of zinc dialkylthiophosphate increases the antiwear properties of lubricants. The antioxidant properties of zinc dialkylthiophosphate are determined by the presence of thionic sulfur atoms in their molecule.

The mechanism of action of zinc dialkylthiophosphate is associated with their thermal decomposition and the formation of a polymer pellicle on the friction surface and interrupt the oxidation chain processes. They are able to convert active radicals into inactive compounds.

At high temperatures in the zinc-sulfur-air system, the main reactions are between the solid phase and the environment. In the course of further decomposition, O-S-S alkyl trithiophosphate is formed, the interaction of which with decomposition products leads to the formation of disulfide. The effectiveness of extreme pressure is due to the formation of zinc disulfide.

As the object of study were selected: basic oil I-20(40%) + I-40(60%);I-20(20%) + I-40 (80%)with different contents (0.3, 0.5, 0.8%) additives TCD-40, which strongly affects the anti-wear and extreme pressure properties of oils. In table.1 changes in viscosity and flash point of oils depending on the percentage concentration of additives are given.

The American Journal of Engineering and Technology
(ISSN – 2689-0984)
Published: December 18, 2021 | **Pages:** 1-5
Doi: https://doi.org/10.37547/tajet/Volume03Issue12-01

IMPACT FACTOR
2021: 5. 705
OCLC - 1121105677

Influence of the concentration of TCD- 40 on the viscosity and flash point of hydraulic oils
Table1.

Quality of indicators	I-20 (40%) + I-40 (60%)			I-20 (20%) + I-40 (80%)		
	TCD - 40					
	3%	5%	8%	3%	5%	8%
Viscosity, mm^2/s at t = 40°C	28.1	32	35	41.4	46	50
Temperature of flash, ° C	190	200	202	215	224	226

From the results of the analysis was selected 0.5% content of additives TCD- 40which shows the optimum viscosity and flash point. Next were determined the physical and chemical properties of oils with 5% additive TCD- 40.

For the experiments, hydraulic oil was analyzed by physical and chemical parameters for compliance with the requirements and standards(Table2.3).

Table 2
Change in physico-chemical characteristics of the tested oil depending on the concentration of TDC-40

№	Name of the indicator	Results of experience	Norm in accordance with GOST
		I-20 (40%) + I-40 (60%) + 0,5% TCD- 40	
1	Viscosity, mm^2/s at t = 40°C	32	28,8 – 35,2
2	Density at 20°C, g/cm^3	0,858	No more than 0.905
3	Flash point, °C	202	200
4	Pour point, °C	-33	- 30 to -42
5	Water content, not more than	-	traces
6	Furcontent impurities,%	0,008	No more than 0,015
7	Alkaline number	0.03	0.03

The American Journal of Engineering and Technology
(ISSN – 2689-0984)
Published: December 18, 2021 | **Pages:** 1-5
Doi: https://doi.org/10.37547/tajet/Volume03Issue12-01

IMPACT FACTOR
2021: 5. 705
OCLC - 1121105677

Table 3

№	Name of the indicator	Results of experience	Norm in accordance with GOST
		I-20 (20%) + I-40 (80%) + 0,5 % TCD-40	
1	Viscosity, mm^2/s at t = 40°C	46	41,4 – 50,6
2	Density at 20°C, g/cm^3	0,898	no more than 0,905
3	Flash point, °C	228	224
4	Pour point, °C	-33	- 30to -42
5	Water content, not more than	-	traces
6	Furcontent impurities,%	0,008	no more than 0,015
7	Alkaline number	0.03	0.03

The results of laboratory studies showed some improvement in the operational properties of hydraulic oils. In the future, these oils can be admitted to the next stage - to operational tests on special equipment.

REFERENCES

1. Smirnov A. V. Automotive maintenance materials.Textbook allowance / NovSU them.Yaroslav the Wise. - Veliky Novgorod, 2004.- 176 p.
2. Jerichov, B. B. Automobile maintenance materials: textbook. allowance. state architect build un-t - SPb., 2009.- 256 s.
3. Kirichenko N.B. Automobile maintenance materials: Textbook. – M.: Publishing Center "Academy" 2012.- 208 pp.
4. Maharramov A.M., Akhmedova R.A., Akhmedova N.F. Petrochemicals and oil refining. Textbook for higher education. Baku: BakiUniversiteti Publishing House, 2009, 660 p.
5. Danilov V.F. and others. Oils, lubricants and special fluids. Study guide-Elabuga: publishing house of the K (P) FU branch. 2013. - 216 p.
6. Alimova Z.Kh. Ways to improve the properties of lubricants used in vehicles - T.: "VNESHINVESTROM", - 2019.
7. Glushchenko, A.D., Slivinsky, Tulchinskaya, N.N., & Alimova, Z.KH. (1987). The body of a dump vehicle for the transport of lightweight cargo.
8. Alimova, Z., Kholikova, N., & Karimova, K. (2021). Influence of the antioxidant properties of lubricants on the wear of agricultural machinery parts. Web of Conferences IOP Conf. Ser.: Earth Environ. Sci. 868 012037
9. Glushchenko, A.D., Slivinsky, E.V., Blazhko, A.N., Pilipenko, A.D., Bondarenko, A.P., & Alimova, Z.Kh. (1988). Vehicle mudguard.
10. Glushchenko, A.D., Fedotov, A.P., Mordvintsev, G.M., Tashboltaev, M.T., Alimova, Z.KH., & Martianov, O. M. (1990). Vehicle.
11. Alimova, Z. Kh. (1999). Dynamics of interaction of cotton wedges with

elements of pneumatic transport systems of cotton pickers.

12. Alimova, Z., Akhmatjanov, R., Kholikova, N., & Karimova, K. (2021). Ways to improve the anticorrosive properties of motor oils used in vehicles. In E3S Web of Conferences (Vol. 264, p. 05004). EDP Sciences.
13. Alimova, Z., Ismoilov, S., & Akhmadjanov, R. (2020). Improving the Performance of Transmission Oils.
14. Alimova, Z. (2018). The influence of the process off oxidation of engine oils on engine performance and improving antioxidant soust. Acta of Turin Polytechnic University in Tashkent, 8(2), 50-53.