WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979, Volume 4, Issue 4, April., 2023

IMPROVING THE ABILITY OF MOTOR OILS TO THE EFFECTS OF HIGH TEMPERATURES

Alimova Zebo Hamidullayevna
Candidate of Technical Sciences, Professor,
Tashkent State Transport University, Uzbekistan

Ibrahimov Karimjon Ismailovich
Candidate of Technical Sciences,
Professor Tashkent State Transport University, Uzbekistan

Annotation
In the high temperature zone, the oil burns completely or carbonaceous particles remain, which cannot remain on the surface devoid of a binding medium. The greatest danger of varnish deposition is for piston rings. By filling the gaps formed by the piston rings and the grooves drilled in the pistons, it reduces the mobility of the rings. To reduce or prevent the formation of carbon deposits, special surfactants called detergent-dispersing additives are introduced into engine oils. The effect of such additives is based on their ability to loosen, wash off deposits from the surface of parts and transfer insoluble substances into suspension and keep these particles in this state without enlargement.

Keywords: engine oils, additives, oxidation, sedimentation, varnish deposits, carbonaceous particles.

In the high temperature zone of the engine, hydrocarbons and other components of oils are oxidized and form poorly evaporating, highly viscous, practically insoluble in oil oxy-acids, asphaltenes and acid resins, which are deposited on the parts in the form of a thin shiny layer called a varnish deposit. At the beginning of the oxidation process, compounds (resins, acids) are formed in a fat-soluble state. Then they turn into insoluble substances. Resins, on the other hand, form a laxative precipitate on the piston and piston ring, sharply reducing their excitability. Acids are considered oxidizing agents and are the main factor in the destruction of cylinder walls, piston rings and rust.
Lacquer deposits are carbon-rich substances formed as deposits in the grooves under the piston rings, on the skirts and inner walls of the pistons.
The greatest danger of varnish deposition is for piston rings. By filling the gaps formed by the piston rings and the grooves drilled in the pistons, it reduces the mobility of the

rings. It is here that high-carbon compounds are formed, which are deposited in the grooves in the form of films. The deposition of varnish causes the piston rings to burn and the parts on which these deposits were formed to overheat. Combustion of piston rings, which causes a breakthrough of gases into the crankcase and a decrease in compression in the cylinders, and as a result – a drop in engine power.

The accumulation of carbonaceous deposits on the cylinder walls, pistons, rings, valves, etc., occurs not only due to oxidation products, but also as a result of purely thermal transformations of polycyclic hydrocarbons. At the same time, engine oil consumption increases significantly, wear increases, even bullying on cylinder mirrors and piston rings breakage with piston jamming are possible.

The presence of precipitation in the engine is a great danger. They can clog oil ducts, oil pipelines and filters. If the oil pump receiver and oil lines are clogged with sediments, then the normal oil supply will be disrupted. As a result, melting of bearing liners, bully of crankshaft necks and even engine failure may occur. If the oil filter is clogged with sediments, then uncleaned contaminated oil enters the rubbing parts, as a result of which the wear of parts increases sharply, there is a danger of burning piston rings, etc.

If there is precipitation in the engine, the quality of freshly poured oil deteriorates sharply. In addition, sediments can condense and harden over time so that it is difficult to clean parts from them even by mechanical means.

A very significant factor affecting the appearance of precipitation is the mode of operation of the engine. Working on light modes is the most dangerous. Since this creates the most favorable conditions for sedimentation.The operation of the vehicle in low-speed modes, with insignificant loads, frequent and prolonged stops, prolonged engine idling leads to lower operating temperatures in the engine, more severe contamination of the crankcase oil by products of incomplete combustion of fuel, oil liquefaction by fuel.

When idling for a long time, in order to reduce precipitation, it is recommended to maintain the coolant temperature at about 70 ° C.

Sediments in the engine are sticky oily substances from gray-brown to black, deposited during operation in the engine, crankcase, valve box, oil system and filters. Basically, it is an emulsion of water in oil contaminated with various impurities. The ingress of water into the crankcase oil is the main cause of precipitation. The composition of precipitation is variable and largely depends on the conditions under which it is formed.

Oils with special additives are less prone to precipitation than pure oils, since additives make it possible to better retain insoluble impurities and better resist

oxidation.

One of the measures to combat varnish formation is the introduction of antioxidant and detergent additives into the oils, which inhibit the deposition of the resulting resinous-asphaltene substances and reduce the formation of varnish deposits and carbon deposits on hot surfaces of engine parts. To reduce or prevent the formation of carbon deposits, special surfactants called detergent-dispersing additives are introduced into engine oils. The alkali contained in detergents neutralizes the acids formed during the combustion of fuel.

Currently, work is underway to create motor oils with ash-free dispersing additives. An example of such additives are succinimide products, which differ in the number of amino groups, length and branching of aliphatic chains. Succinimides not only do not form abrasive particles, but also exceed many ash additives in terms of the dispersing effect.

Alkynphenolic compounds are more common as antioxidant compounds, the most effective of which are ionic, amine-type compounds and containing sulfur, nitrogen, and phosphorus compounds. Alkylsalicylate washing compound holds solid particles in the oil in the form of a tiny suspension and prevents them from sticking to metals. Also, when such compositions are added, the deposition of varnish and sediment on the surface of engine parts and oil pipelines decreases.

Antioxidant compounds delay the beginning of the oil oxidation process, extend the working cycle, destroy the hydroxides formed during oxidation, and, as a result, interrupt the chain reaction by acting on the oxidation products of hydrocarbons, forming new substances, these substances have antioxidant properties, stop the oxidation process.

The sulfide compound or phenol derivative prevents the oxidation of the oil film on hot metal surfaces. SB-3 compounds with detergent properties are effective. The effect of such additives is based on their ability to loosen, wash off deposits from the surface of parts and transfer insoluble substances into suspension and keep these particles in this state without enlargement.

Thus, thermal effects on the oil lead to the formation of oxidation products, such as organic acids and resins in a dissolved state. They cause an increase in the viscosity and acid number of oils, thereby increasing its corrosion activity. To improve the ability of motor oils to high temperatures, special surfactants are introduced. The alkali contained in detergents neutralizes the acids formed during the combustion of fuel.

Literature

1. Dzherikhov V.B. Automotive operational materials: textbook. St.Petersburg: SPGASU, 2009
2. Alimova Z. K., Makhamadjanov, M.I., &Magdiev, K. I. (2021). Research Of Anti-Corrosion Properties Of Engine Oils When The Engine Is Running. The American Journal of Agriculture and Biomedical Engineering, 3(11), 28-33.
3. Alimova, Z., Makhamadjanov, M. I., & Magdiev, K. (2022). The effect of changes in the viscosity parameters of engine oils on the operation of engine parts. Eurasian Journal of Academic Research, 2(10), 151-154.
4. Khamidullaevna, A. Z. (2022). Studies of anticorrosive properties motor oils and ways to improve. European International Journal of Multidisciplinary Research and Management Studies, 2(06), 6-12.
5. Alimova Zebo Kh, Abdurazzoqov Abduaziz A, & Yuldasheva Gulnora B. (2022). Improving the Anticorrosive Properties of Motor Oils by Adding Additives. Texas Journal of Engineering and Technology, 8, 16–19.
6. Alimova Zebo Xamidullayevna, & Niyazova Gulhayo Parpiyevna. (2022). Research of the mechanism of action of the protective properties of inhibited compositions. The American Journal of Engineering and Technology, 4(02), 19–22.
7. Alimova Zebo Khamidullaevna. (2022). Investigation of changes in the quality of motor oils when operating engines. Innovative Technologica: Methodical Research Journal, 3(06), 119–122.
8. Khamidullaevna, A. Z., & Miraziz, I. (2022). Regularities of the mechanism of varnish formation on the surface of parts of internal combustion engines. Innovative Technologica: Methodical Research Journal, 3(6), 1-5.
9. Alimova, Z. (2018). The influence of the process off oxidation of engine oils on engine performance and improving antioxidant properties. Acta of Turin Polytechnic University in Tashkent, 8(1), 17.
10. Xamidullayevna, A. Z., & Parpiyevna, N. G. (2022). Research of the mechanism of action of the protective properties of inhibited compositions. The American Journal of Engineering and Technology, 4(02), 19-22.
11. Alimova, Z., Abdukhalilov, H., Kholmirzayev, B., & Samatayev, T. (2020). Ways to improve the performance of hydraulic oils for agricultural machinery. Industrial Technology and Engineering, 3(36), 17-22.
12. Khamidullaevna, A. Z., & Faxriddin, S. (2022). The aging process of motor oils during operation. European International Journal of Multidisciplinary Research and Management Studies, 2(06), 166-169.

13. Khamidullaevna, A. Z. (2022). Causes of changes in the viscosity parameters of motor oils during operation. Web of Scientist: International Scientific Research Journal, 3(10), 156-160.
14. Alimova Zebo Hamidullayevna, & Ibrahimov Karimjon Ismailovich. (2023). Causes of changes in the properties of motor oils in the high temperature zone of the engine. American Journal of Applied Science and Technology, 3(01), 1–5. https://doi.org/10.37547/ajast/ Volume03Issue01-01