10_2017

IN SIGHT

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Thermooxidation stability and corrosiveness of modern domestic aviation fuels

Keywords: aviation materiel failure, fuels for jet engines, thermo oxidation stability, corrosiveness, quality index, compliance assessment.

Abstract. The directive of Federal Aviation Administration (USA) no 2012-NE-21AD and European Aviation Safety Agency AD no 2012-0123-011123 dated 9 July 2012 "Operating limitations of HMU for CFM56-5, CFM56-5B" unreasonably impose restrictions on service hours of fuel auto system units up to 10 hours while operation on TS-1 fuel. Foreign auto manufactures consider that advanced Russian jet fuel has insufficient thermo oxidation stability and high corrosiveness. Taking into consideration this statement , 20 samples of TS-1 and RT fuels were tested as to thermooxidation stability and corrosiveness levels. These samples were produced in different Russian refineries using different technologies. The jet fuels test results of the 25th State Research Institute Of Himmotology, Ministry of Defense Of the Russian Federation were used as initial data at military materiel admission.
There were made some conclusions on the basis of the presented information:
- russian jet fuels are prime quality products with good thermo oxidation stability and corrosiveness coefficients;
- foreign auto producer statement about low level of thermo oxidation stability and high level of corrosiveness is false;
-the attention should be paid to antiwear properties of TS-1 straight-run fuel, which has low amount of hetero-organic compounds and no antiwear aditives. It's reasonable to introduce control on antiwear property level of each TS-1 and RT commercial batch, so "lubricity as per GOST R 53715 "parameter should be included in GOST 10227. We believe that control of advanced domestic jet fuel antiwear properties will help to increase operational reliability of aviation materiel.
There was made a conclusion that fuel bronze unit wear debris (copper content in fuel was above normal in 1000 times) could cause jet fuel quality loss in defined engine fuel system. This conclusion was made on the basis of Russian jet fuel quality data and GosNII GA conclusion report on fuel test in case of engine (CFM56-5 ans CFM56-5B of Airbus A-319/320/321) flame out accidents during flight due to main pressure valve jamming of operating HMU. This conclusion corresponds to the same one of Moscow Aviation University specialists. They believe that engineering design and manufacturing problems have caused fuel auto unit fault in all the cases.

FAE «The 25th State Research Institute of Chemmotology of the Ministry of Defence», Moscow

PETROLEUM PRODUCTS: technology, innovation, market

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Multifunctional additive for high-quality gasoline

Keywords: multifunctional additive, succinimide, detergent, corrosion inhibitor, liquid solvent, engine tests.

Abstract. A new multifunctional additive based on industrial detergent succinimide additive S-1500, a new synthetic anti-corrosion additives, functional additives and proposed solvent component. Developed additive provides high cleaning efficiency of the intake valves during engine tests various methods and demonstrates improved anticorrosion properties of gasoline.

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© Obtaining butylnitrates and their application as cetane improvers

Keywords: butyl alcohols, nitroesters, diesel fuel, cetane number.

Abstract. This article describes the process of preparation nitroesters of butyl alcohols (butyl nitrates) and their use as cetane-increasing additives. It has been determined that butylnitrates are effective cetane-enhancing additives, while normal-structure n-butyl nitrate is more effective than isobutyl nitrate when identical amounts of additive are added (0.1, 0.2 and 0.5% by weight). While examining the nitration product of a mixture of butyl alcohols (the ratio of n-butanol to isobutanol is 65:35), was found synergetic effect of n-butyl nitrate and isobutyl nitrate on the increase in the cetane number in comparison with the effect of each in isolation.

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The development of high-quality lubricate oils from Baku petroleum

Keywords: base oil, Baku oil, viscous additive, additive package, thermo-oxidative properties of oil, engine oil 15W-40.

Abstract. The article presents the results of studies on the selection of the basic base from Baku Balakhani oily petroleum, the selection of high-index components and viscous additives to increase the viscosity index of the base and the selection of the additive package to the base oil (type 15W-40). It is shown that the obtained oil with a viscous additive and an additive package RA-2600 (LLC LLK "NAFTAN") meets the requirements of the standard for oil type 15W-40 (SD / CB).

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ANALYTIC METHODS FOR OIL and PETROLEUM PRODUCTS

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Method of evaluating the stability of fluids for hydraulic systems

Keywords: hydraulic fluids, ultrasonic transducer , to develop a method, test results.

Abstract. It is shown that stability of hydraulic fluids when exposed to pressure and temperature can be carried out on a model setup with an ultrasonic transducer. The method of evaluation of stability of hydraulic fluids after acoustic stimulation, studies have confirmed the possibility of estimating the stability of hydraulic fluids by using the developed method.

FAE «The 25th State Research Institute of Chemmotology of the Ministry of Defence», Moscow

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New domestic automatic distillation analyzer - contribution to import substitution

Keywords: automatic analyzer, petroleum, petroleum products, distillation, repeatability, reproducibility, precision, trueness, accuracy

Abstract. Distillation of petroleum and petroleum products is referred to most often defined properties in laboratories that are working in all stages of petroleum production and refining as well as production, use, transportation and storage of petroleum products. This property is mandatory not only in certification and confirmation of compliance, but also it is critical for acceptance and control tests. First of all it is related to the fact that evaporation properties are the main criteria of safety and applicability of fuels. Therefore, domestic base improvement of testing equipment is very important for simplification and automation of tests. It is particularly important that domestic analyzers are not only highly competitive with foreign counterparts in terms of metrological characteristics, but also exceed them for a number of factors.

The paper contains test results of the new Russian automatic analyzer DIST-A1 using commercial petroleum products, petroleum and certified reference materials as well as metrological characteristics of the analyzer that were received from tests in comparison with the requirements of effective normative documents by the test method for distillation.
Trend analysis of the requirements to repeatability and reproducibility of the test method for distillation of petroleum products at atmospheric pressure was carried out by the example of effective standards at the present time. Appearance causes of some ambiguities in interpretation of the standard's (GOST's) clauses were analyzed and ways for their resolving were proposed.
It is substantiated that the analyzer DIST-A1 complies with requirements of GOST R 57036, GOST ISO 3405, GOST R EN ISO 3405, ASTM D86, GOST 2177 (method A and B) in terms of repeatability and reproducibility factors. Accuracy ratings of test results were obtained using the State Standard Reference Sample of distillation. Automation level of the analyzer provides an opportunity to use it for routine analyses as easy handling apparatus available for both beginning user and advanced user who can create own programs for control of distillation optimized for the specific grade of petroleum product.

CONFERENCES. SEMINARS. EXHIBITIONS

Surrounded but not broken / Post-release conference "Fuel additives 2017" (05.09.2017)