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Res. Agr. Eng.

M. Rousek

Results of the development of

suitable for forest machines

Res. Agr. Eng., 49 (2003): 12-21

The paper is a response to the problem of the environment pollution by oil product spills from mechanisms of forest and agricultural machines. The problem can be dealt with through the replacement of mineral oils by biodegradable oils. Information concerning the measurement of parameters of these oils was published by the author. It has been demonstrated that the parameters are broadly suitable with the exception of thermooxidation stability. The paper is, therefore, aimed at improving the thermooxidation stability of biodegradable oils of HETG type. Oil raffinates based on rape oil, methyl esters are delivered in various quality, mostly with a service life of 600 to 2,000

service hours at a temperature of max. 70 °C. Methods of testing are based on monitoring the change in acid value, viscosity, water content and peroxide number during the service life test. It has been proved that peroxide number characterizes very well thermooxidation stability which is nearly unsatisfactory in raffinates. A method for improving the thermooxidation stability has been proposed using high superheating of oils at the beginning of use and their subsequent treatment. Thus, deep-frying oils (HETG) characterized by a short-term thermal stress appear to be suitable. Through filtration and other treatment three types of samples were developed and tested. The advantage of the procedure consists in the fact that esterification does not occur. Results of the tests are evaluated and compared with properties of traditional raffinates. It is possible to conclude that thermooxidizing stability of the oils has been substantially improved, other parameters in additivated samples are comparable with raffinates.

Keywords:

biodegradable oil; leakage; environment pollution; hydraulic circuit; gearbox; thermooxidation stability

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