NEW BASESTOCK OILS OF ESTERIC TYPE WITH HIGH VISCOSITIES

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The aim of the paper is to present esteric oils with viscosity ranging from 7 to 32 mm²/s at 100°C, recommended as basestock oils for lubricants.

The studied esteric oils have the following composition and properties:

1. Tetra-2-ethylhexyl-pyromellitate (1,2,4,5-benzenetetracarboxylate) with density 0.992 g/cm³, acidity index 0.105 mgKOH/g, water content 500 ppm, content of transitional metals under 0.2 ppm, kinematic viscosity (mm²/s) 174.6/40°C and 16.1/100°C, viscosity index 92.2, flash point 250°C and pour point –25°C.

2. Complex esters of R_y(SA)_xPolyol(SA)_xR_y type, where the polyol is neopentylglycol (NPG), trimethylolpropane (TMP) and pentaerythritol (PE), SA represents the sebacic acid and R is an alkyl group proceeding from the marginal alcohol (2-ethylhexanol (2-EH) and isotridecanol (ITD)). All these oils were obtained in presence of dioctylsebacate (DOS). The combination ratio (mols) and the oils physico-chemical characteristics are given, as follows: the kinematic viscosity, mm²/s (a), viscosity index (b), flash point (c), pour point (d), density (e).

The characteristics of such complex combinations are presented below:

NPG(SA)_2(2-EH)_2·(DOS) = 1.0 : 2.0 : 2.0 (1.0) with (a) 32.8/40°C and 6.9/100°C, (b) 178, (c) 238°C, (d) –40°C, (e) 0.941 g/cm³.
NPG(SA)_2(ITD)_2·(DOS) = 1.0 : 2.0 : 2.0 (1.0) with (a) 48.2/40°C and 9.0/100°C, (b) 170, (c) 238°C, (d) –49°C, (e) 0.9286 g/cm³.
TMP(SA)_3(2-EH)_3·(DOS) = 1.0 : 3.0 : 3.0 (1.0) with (a) 41.2/40°C and 8.05/100°C, (b) 170, (c) 232°C, (d) –38°C, (e) 0.947 g/cm³.
TMP(SA)_3(ITD)_3·(DOS) = 1.0 : 3.0 : 3.0 (1.0) with (a) 89.1/40°C and 13.3/100°C, (b) 149, (c) 262°C, (d) –40°C, (e) 0.9385 g/cm³.
PE(SA)_4(2-EH)_4·(DOS) = 1.0 : 4.0 : 4.0 (1.0) with (a) 43.9/40°C and 8.4/100°C, (b) 171, (c) 225°C, (d) –35°C, (e) 0.952 g/cm³.
PE(SA)_4(ITD)_4·(DOS) = 1.0 : 4.0 : 4.0 (1.0) with (a) 237.2/40°C and 31.4/100°C, (b) 176, (c) 248°C, (d) –36°C, (e) 0.961 g/cm³.

The synthesis methods of the compounds and the purification methods of the crude oils to obtain basestock oils, are described.

The complex esters were obtained through a two steps condensation. The first step consisted in the polyol reaction with sebacic acid and the second one, in the esterification reaction with the marginal alcohol. The reaction water was removed by nitrogen stripping. The crude oils were neutralized with alkali solutions and washed with distilled water. Devolatilization was performed at 140°C at 10 mmHg.

The oils biodegradability is higher than 85%. The studied oils also present easy possibilities of additivation. Considering their high viscosities, the oils can be thus chosen so that the additives to improve the viscosity would be no longer necessary.

Some potential applications of the synthesised esteric oils are also presented.

REFERENCES