

COMPOSITIONS OF LITHIUM LUBRICANTS

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Hydroxylated fatty acids of used food oil as an emulsifier for lubricants were synthesised by epoxidation of unsaturated fatty acids followed by hydrolysis by acylglycerol grouping and oxirane rings [1–3]. Samples (1, 2) of lithium greases were developed. Sample 1 – lithium lubricants based on a commercial emulsifier, sample 2 – lithium lubricants based on hydroxylated fatty acids of used cooking oil (Table).

Table. Comparative properties of lithium lubricants based on petroleum oil

Indicator	Testing method	Values of indicators	
		Sample 1	Sample 2
Penetration at 25 °C at stirring, $\text{mm} \cdot 10^{-1}$: – 60 double cycles (P_1) – 100,000 doubles cycles (P_2) – mechanical stability, change ΔP	ISO 2137	225 249 24	235 255 20
Dropping temperature, °C	ISO 2176	198	201
Tribological characteristics on four ball machine at the temperature of (20 ± 5) °C: – critical load (P_c), N	GOST 9490	657	696
Resistance to oxidation: increase in acid number (120 °C, 10 hours), mg KOH/g	GOST 5734	0.26	0.24
Corrosive action on copper	ASTM D 4048	1a	1a

The lithium lubricant (sample 2) are characterized by high mechanical properties (a change in penetrations after moving of 100,000 double cycles of $20 \text{ mm} \cdot 10^{-1}$, temperature propertie (dropping temperature above 201 °C), tribological characteristics (critical load are 696 N) and are also resistant to oxidation, do not cause corrosion of non-ferrous metals, and are able to operate in contact with water and is not inferior to lithium grease based on an industrial analogue (sample 1).

References

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