PALM-BASED GREASE

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Lubricating grease is not a new product; evidence from archaeological findings in the West Asia suggests that the art of making grease was known about 4000 years ago. As far back as 1400 B.C., both mutton and beef fats were used in the attempt to reduce axle friction in chariots. Analyses of residues from ancient axle hubs indicated that fat and lime were sometimes mixed together to make a more complex lubricant. However, the technology for the current generation of lubricating grease is about 60 years old. It is based on Earle's patents on lithium greases in 1942-43, and today well over 60% of lubricating greases produced in Europe are based on this technology.

Lithium grease is a multipurpose grease able to withstand temperature up to 180°C, has good water resistance and good mechanical stability. It is used to lubricate plain bearings, rolling bearings, gear-wheels and gear-boxes.

The primary function of lubricating grease is to reduce friction. Besides that, grease also acts as a seal preventing water, dirt or even gases to enter into the system. It also protects the machine parts from corrosion.

According to its classical definition, lubricating grease is a solid to semi-solid product of a thickening agent in a liquid lubricant; other ingredients imparting special properties may be included. In the simplest sense, a grease consists of at least two components, the base fluid and the thickener system. A typical multipurpose grease would contain about 85% base fluid, 10% thickener and 5% additives. The base fluid is usually either mineral oil or synthetic fluid. The thickener system can be either soap- or non-soap-based. Examples of soap-based thickener are calcium soap, lithium soap, aluminium soap, *etc.* and non-soap-based thickener are clay, polyurea, silica, *etc.* The soap is usually made from tallow or other fatty materials.

The global demand for grease is about 1 175 000 t in 1995 with 34% coming from Asia. Prospects for future growth of this market look promising since the per capita consumption of lubricants in Asia is still 3.3 kg yr^{-1} against the world average of double this amount. It is also anticipated that there will be a gradual move from calcium grease to better performance lithium grease and towards more environmentally acceptable formulations in the future.

Palm-based grease.

This project involves the preparation of lithium grease using palm-based material. The properties of the prepared grease are shown in *Table 1*. The quality was found to be comparable to a commercial sample.

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TABLE 1. PROPERTIES OF PALM-BASED GREASE COMPARED TO A COMMERCIAL SAMPLE

Sample	Grease 1	Grease 2	Commercial
Thickener	15% lithium	20% lithium	Lithium
Drop point, °C	161	172	174
Lubricity at 40 kg, scar diam., mm	0.6	0.6	0.3
Weld point, kg	140	140	180
Cone penetration, mm/10; worked	361	347	275

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