PALM-BASED HYDRAULIC FLUID

by: YEONG, S K; OOI, T L and SALMIAH, A

279

MPOB INFORMATION SERIES • ISSN 1511-7871 • JUNE 2005 MPOB TT No. 281

Hydraulic fluids represent one of the most important groups of industrial lubricants. It comprises of 25% of the industrial lubricant sector (Anon, 1994). It is being used widely in industrial hydraulic systems, particularly machine tools, steering gears, *etc*. It is also used in land, sea and airborne transport, as well as in brake systems. The existence of greatly differentiated hydraulic systems, their operation in various environmental atmospheres and sometimes at extreme temperatures, requires a multitude of products of consistently varied properties (Kajdas, 1992). In this respect, there are different grades of hydraulic fluids made available in the market. For example, biodegradable hydraulic fluid, fire resistant hydraulic fluid, synthetic hydraulic fluid, conventional hydraulic fluid with anti-wear properties, food grade hydraulic fluid, low temperature hydraulic fluid, hydraulic fluid with high viscosity indices to satisfy the wide range of working conditions and others.

Typical hydraulic equipment consists of a circulating system, comprising a pump, series of control valves and hydraulic motors. With respect to lubrication, the pump is the most critical component in the hydraulic system. Usually sliding vanes pump, piston pumps and gear pumps are used (Kajdas, 1992). The hydraulic fluid is being pushed within a confined space transmitting power between the pump and the actuator. Basically any liquid that is incompressible can be used as a hydraulic fluid. The most common liquid used in hydraulic systems is mineral oils. Other than transmitting power, a hydraulic fluid must be able to provide adequate lubrication to protect the pump from wear.

One of the world's concerns today is about lubricant entering into our environment. Naegly (1992) reported that of the 1305 million gallons of lubricating oil used in the European Community in 1990, 174 million gallons (13%) disappeared into the environment. In the United States, 432 million gallons (32%) of 1351 million gallons of lubricating oil ended up in landfills or were dumped. These figures are only estimates. In other reports, they may vary.

Figure 1. Palm-based hydraulic fluid.

As environmental concerns grow, vegetable oils are finding their way into lubricants for industrial and transportation applications. These oils offer significant environmental benefits with respect to resource renewability and biodegradability, as well as providing satisfactory performance in a wide array of applications. But unfortunately vegetable oils do not have very good oxidative and thermal stability and low temperature properties compared to mineral oil. When converted to synthetic ester-based, fluids may offer these advantages but their cost can be high

ISSN 1511-7871
9 771511 787001

Malaysian Palm Oil Board, Ministry of Plantation Industries and Commodities, Malaysia
P. O. Box 10620, 50720 Kuala Lumpur, Malaysia. Tel: 03-89259155, 89259775, Website: http://mpob.gov.my Telefax: 03-89259446

(Gawrilow, 2004). However, when properly formulated could have acceptable low temperature properties and acceptable low oxidative and thermal stability. It is particular suitable to be used in places where leakage of equipment is inevitable or where a system is designed to function as loss lubrications. For examples, two stroke engine oils, chain saw oils, hydraulic oils, mould release oils, farming, mining and forestry equipment, open gear lubricants, greases and fuels (Gawrilow, 2004).

The palm-based hydraulic fluid (*Figure 1*) is produced from palm oil products blended with suitable additives to produce a hydraulic fluid having viscosity grade ISO 46. The properties of this hydraulic fluid are found in *Table 1*. The advantages of this oil are that it has good viscosity index (viscosity does not change very much with temperature), and it is made from renewable resources. The pour point is moderately low and suitable to be used in countries where temperatures are not so extreme such as tropical or subtropical.

TABLE 1. PROPERTIES OF THE PALM-BASED HYDRAULIC FLUID

Physical properties	HydF-46
Viscosity at 40°C, cSt	46.39
Viscosity at 100°C, cSt	8.95
Viscosity index	144
Pour point, °C	-9

REFERENCES

ANON (1994). *Fluid Power Journal, Sept. / Oct*: 3.

KAJDAS, C (1992). Industrial lubricants. *Chemistry and Technology of Lubricants* (Mortier, R M and Orszulik, S T eds.). Blackie Academics and Professional, Glasgow. p. 196.

NAEGELY, P C (1992). Environmental acceptable lubricants. *Seed Oils for the Future* (Mackenzie, S L and Taylor, D C eds.). AOCS, Champaign, IL.

GAWRILOW, I (1994). *Inform, 15 (11)*: 702.

For more information kindly contact:

Director-General
MPOB
P. O. Box 10620
50720 Kuala Lumpur, Malaysia.
Tel: 03-89259155, 89259775
Website: http://mpob.gov.my
Telefax: 03-89259446