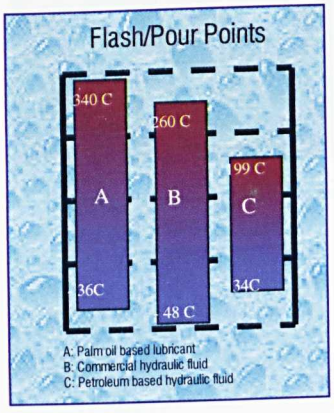
Rysoil™ – High Performance Synthetic lubricants from Palm Oil

The awareness and concern over the impact of petroleum-based lubricants on the environment have created an opportunity to produce environmentally acceptable lubricants from vegetable oils. Palm oil represents readily biodegradable ester-type lubricants derived from renewable resources. However, to function as a lubricant, the inherent characteristics of palm oil such as inadequate oxidation stability, poor low temperature properties, and hydrolytic stability must be overcome. To eliminate these negative properties, the innovation applies structural modifications to the palm oil to convert to a new synthetic ester using a special type of polyol. Palm oil-based synthetic ester or *Rysoil* is a new class of bio-based synthetic esters that exhibit exceptional oxidative stability and cold-temperature properties, low volatility, high viscosity and a high flash point. The *Rysoil* products provide cost effective alternative base stocks for biodegradable lubricant applications. Plus, they can be custom-formulated to meet specific OEM requirements.

Rysoil™, *Synthetic Lubricant*



This innovation uniquely combines efficiency and high productivity. The technology used in the innovation reduces the operation time from 10 hours to only 1 hour, hence it is 10 times faster and guarantees high product yield of at least 95% of palm-based polyol triesters. Relatively mild condition of 120°C and low pressure, 10 mbar, reduces the overall operating costs due to shorter production time and high yield. The use of only 1% of catalyst in the synthesis as compared to 40% w/w required using biocatalyst reduces the operating cost further. The *Rysoil* products are also cheaper than similar products derived from either rapeseed or sunflower since it uses palm oil methyl esters as starting materials. Palm oil is the cheapest vegetable oil and has the highest yield per acre than other vegetable oils. Besides protecting the environment, the product offers alternative higher value-added products for palm oil industry. Palm oil methyl esters have been successfully tested for biodiesel by MPOB. Hence, the use of palm-based lubricants will complement the use of biodiesel as fuel.

The *Rysoil* products offer excellent thermal and oxidative stability. With a flash point of above 340°C, they are considered as non-flammable and fall under the category of Class III-B combustible materials. The products also pass the requirements of the DIN 51581 and ILSAC GF-3 specifications. The evaporation

losses from these samples are very low at 2% as compared to the Noack volatility limit of 22%. Moreover, the problem with the pour point (PP) associated with the level of saturation in palm oil is resolved, as the PP is successfully lowered to -36°C in the palm based synthetic esters. The technology is patent-pending with Malaysian Patent Registration Number: PI 20030943.

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