

FOOD-GRADE PALM-BASED INDUSTRIAL LUBRICANTS

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333

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MPOB TT No. 326, 327 & 328

MPOB TT No. 326 - FOOD GRADE PALM-BASED INDUSTRIAL LUBRICANT - SPINDLE OIL
MPOB TT No. 327 - FOOD GRADE PALM-BASED INDUSTRIAL LUBRICANT - HYDRAULIC FLUID
MPOB TT No. 328 - FOOD GRADE PALM-BASED INDUSTRIAL LUBRICANT - CIRCULATING OIL

The global industrial community, including food producers, has been using mineral-based or petroleum-based lubricants for decades. Due to the fast depletion of mineral oils, there is a keen search for renewable sources to be used instead. One possible alternative is to use vegetable oils although their current application in lubricating oils is limited due to lack of know-how, and their inferior characteristics such as oxidative stability and cold-temperature fluidity. The development of synthetic lubricants has been to overcome the problems in normal petroleum-based lubricants. However, they are far too expensive to be used generally and are only used in high performance application. The question begged is: can vegetable oils be used instead?

All lubricants leak somewhat from their machinery. While this fairly innocuous in most applications, they may contaminate the food in the food-processing industry. The challenge is therefore to find a lubricant that meets its mechanical requirements and also the health standards. In recent years, due to the global establishment and implementation of Hazard Analysis and Critical Control Points (HACCP) and Good Manufacturing Practice (GMP), the food-processing and pharmaceutical industries have been looking for food-grade lubricants.

Food-grade lubricants must perform the same technical functions as any other lubricant, *i.e.* provide protection against wear, friction, corrosion and oxidation, dissipate heat and transfer power, be compatible with rubber and other sealing materials, and also, in some cases, to provide a sealing effect. Food-grade lubricants, formulated in compliance with the Code of Federal Regulations (CFR), Title 21, Section 178.3570 and other sections referenced therein of the National Sanitation Foundation (NSF)

Authorization Programme are categorized under code H1 as *lubricants intended for use in food-processing areas with incidental food contact.*

Commercial food-grade lubricants are currently mainly derived from hydrocracking of petrochemical or synthetic esters. They fetch very high prices, which consequently limit their use. On the other hand, food-grade lubricants derived from vegetable oils have fairer prices, and yet provide satisfactory lubrication properties. The development of food-grade industrial lubricants from palm oil (Figures 1 to 6) offers the food-processing industry alternative choices for selection of the right industrial lubricant to be used. The determination factor for the right lubricant depends on its viscosity. The food-grade palm-based industrial lubricants were developed for a wide range of viscosity grades [ISO viscosity grade (ISO VG) 15, 22, 32, 46, 68, 100] to cater to the different needs of different machinery.

FOOD-GRADE PALM-BASED INDUSTRIAL LUBRICANT - SPINDLE OIL



Figure 1. Food-grade industrial lubricant (ISO VG 15).

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Specifications:

ISO VG (ISO 3448)	15
Viscosity @ 40°C., cSt (D445)	15.02
Viscosity @ 100°C., cSt (D445)	4.15
Viscosity index (D2270)	197
Specific gravity @ 15°C, g ml ⁻¹	0.8999
Total acid number, mg g ⁻¹ (D664)	3.25

Applications: Spindle oil
Telemotor oil
Light hydraulic fluid

Features: High viscosity index
Excellent water separation
Good foaming inhibition
Excellent anti-wear properties
Environmentally responsible



Figure 2. Food-grade industrial lubricant (ISO VG 22).

Specifications:

ISO VG (ISO 3448)	22
Viscosity @ 40°C., cSt (D445)	24.01
Viscosity @ 100°C., cSt (D445)	5.76
Viscosity index (D2270)	198
Specific gravity @ 15°C, g ml ⁻¹	0.9077
Total acid number, mg g ⁻¹ (D664)	3.06

Applications: Spindle oil
Telemotor oil
Light hydraulic fluid

Features: High viscosity index
Excellent water separation
Good foaming inhibition
Excellent anti-wear properties
Environmentally responsible

FOOD-GRADE PALM-BASED INDUSTRIAL LUBRICANT - HYDRAULIC FLUID



Figure 3. Food-grade industrial lubricant (ISO VG 32).

Specifications:

ISO VG (ISO 3448)	32
Viscosity @ 40°C., cSt (D445)	34.35
Viscosity @ 100°C., cSt (D445)	7.37
Viscosity index (D2270)	188
Specific gravity @ 15°C, g ml ⁻¹	0.9141
Total acid number, mg g ⁻¹ (D664)	2.97

Applications: Hydraulic fluid
Air compressor oil

Features: High viscosity index
Excellent water separation
Good foaming inhibition
Excellent anti-wear properties
Excellent air release properties
Environmentally responsible



Figure 4. Food-grade industrial lubricant (ISO VG 46).

Specifications:

ISO VG (ISO 3448)	46
Viscosity @ 40°C., cSt (D445)	46.34
Viscosity @ 100°C., cSt (D445)	9.21
Viscosity index (D2270)	186
Specific gravity @ 15°C, g ml ⁻¹	0.9174
Total acid number, mg g ⁻¹ (D664)	0.96

Applications: Hydraulic fluid
Air compressor oil

Features: High viscosity index
Excellent water separation
Good foaming inhibition
Excellent anti-wear properties
Excellent air release properties
Environmentally responsible



Figure 5. Food-grade industrial lubricant (ISO VG 68).

Specifications:

ISO VG (ISO 3448)	68
Viscosity @ 40°C., cSt (D445)	63.10
Viscosity @ 100°C., cSt (D445)	12.34
Viscosity index (D2270)	198
Specific gravity @ 15°C, g ml ⁻¹	0.9180
Total acid number, mg g ⁻¹ (D664)	0.95

Applications: Hydraulic fluid
Air compressor oil

Features: High viscosity index
Good foaming inhibition
Excellent anti-wear properties
Good EP four ball character
Environmentally responsible

FOOD-GRADE PALM-BASED INDUSTRIAL LUBRICANT – CIRCULATING OIL



Figure 6. Food-grade industrial lubricant (ISO VG 100).

Specifications:

ISO VG (ISO 3448)	100
Viscosity @ 40°C., cSt (D445)	109.12
Viscosity @ 100°C., cSt (D445)	20.65
Viscosity Index (D2270)	216
Specific gravity @ 15°C, g ml ⁻¹	0.9189
Total Acid Number, mg g ⁻¹ (D664)	4.60

Applications: Circulating oil
Gear oil
Reciprocating oil

Features: High viscosity index
Good foaming inhibition
Excellent anti-wear properties
Good EP four ball character
Environmentally responsible

NOVELTY OF INVENTION

The food-grade palm-based industrial lubricants are manufactured using only ingredients considered safe by NSF for incidental contact with food. The constituents of these products meet the requirements of Regulation 21 CFR 178.3570 and the former H1 recommendations.

The novel features include:

- fortified with NSF certified HX-1 base fluids and food-grade specialty additives to resist wear, oxidation, rust and foam;
- pioneer food-grade palm-derived lubricants for use in plants that allow incidental food contact;
- highly biodegradable and renewable to reduce environmental impact; and
- free from genetically modified ingredients.

For more information kindly contact:

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