0256I58

Geolube ECO Hydraulic

ISO 46

Fully synthetic biodegradable lubricant formulated with a very high index viscosity for hydraulic systems.
Registered according to the European ECOLABEL requirements concerning hydraulic oils with a low impact on the environment.
It guarantees high anti-wear properties and high resistance to shear, temperature and hydrolysis.

PAKELO GEOLUBE ECO HYDRAULIC ISO 46 is a **fully synthetic** lubricant specific for hydraulic systems, with a Very High Viscosity Index, formulated with selected **biodegradable base stocks**, with anti-wear and EP (Extreme Pressure) zinc free additives and with anticorrosion, antirust, antioxidant and antifoam additives.
PAKELO GEOLUBE ECO HYDRAULIC ISO 46 is based on fully saturated synthetic ester base stocks coming from vegetable oils raw materials. This refining process allows the product to gain biodegradability and renewability characteristics required by “Ecolabel” legislation guaranteeing at the same time high thermal, oxidative and hydrolytic stability.

The EU Ecolabel developed for hydraulic lubricants represents a process of harmonization of pre-existing national Ecolabels criteria affecting lubricants in some EU countries (Germany-Blau Angel, Sweden-Swedish Standard, France-NF Environment, etc) that aim at the low impact on environment.
The main set criteria aim at a reduction of the harm to water and soil during accidental exposure of the lubricant to environment and a reduction in CO2 emissions to the atmosphere.

The EU Ecolabel sets requirements for the ecological and technical characteristics of lubricants:

1. **Risk phrases**: the lubricant should not carry any R-phrases indicating environmental or human health hazards (Directive 1994/45/EEC).
2. **Aquatic toxicity**: any component of the lubricant must not exhibit an aquatic toxicity according to OECD criteria (Organisation for Economic Cooperation and Development) 201-202-203;
3. **Biodegradability and bioaccumulation potential:** any component of the lubricant must be ultimately aerobically biodegradable and with low bioaccumulation. Accordingly, a substance is classified biodegradable if CO2 generation shows a biodegradation of more than 60% after 28 days in OECD 301 test. The product is formulated with more than 98% of biodegradable raw materials (Ecolabel limit > 90%) that all show a biodegradable value superior to 70%.
4. **Exclusion of specific substances** listed in “OSPAR” list (“Oslo/Paris convention” for the Protection of the Marine Environment of the North-East Atlantic) as hazardous for environment and for man such as nitrites, organic halides and metallic compounds (i.e. zinc);
5. **Renewable raw materials**: the carbon included in the product formulation must derive from renewable materials in a percentage superior to 50% according to “Ecolabel” criteria. PAKELO GEOLUBE ECO HYDRAULIC ISO 46 shows a content of carbon deriving from renewable materials of more than 80%.
6. **Performance requirements** according to the kind of lubricant: the product must exceed performance levels required by ISO 15380 that rules hydraulic lubricants specific requirements.

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PAKELO GEOLUBE ECO HYDRAULIC ISO 46, beyond all specific Ecolabel requirements, satisfies the following properties:

- **Very High Viscosity Index** that enables minimum viscosity changes, if compared to common hydraulic lubricants, when the fluid is exposed to different operating temperatures;
- **high shear stability**: this allows PAKELO GEOLUBE ECO HYDRAULIC ISO 46 to maintain during service viscosities almost equivalent to new lubricant;
- **very low Pour Point** that enables easy start-ups at low temperatures in hydraulic systems;
- **high anti-wear properties** to increase efficiency, life of pumps and of the operating parts in the system;
- **very high thermal stability**, also thanks to the use of synthetic base stocks, that allows the use of the product in hydraulic systems operating also at high temperatures and pressures without causing deposits and sludge;
- **high oxidative stability** that allows longer oil drain intervals and thus avoids early oil thickening;
- **high hydrolytic stability** which enables to protect the oil being used also when contaminated with small percentages of water;
- **good demulsivity**: the lubricant can easily separate from the water that could contaminate the system avoiding an accelerated process of oxidation;
- **high filterability** even with presence of water avoiding in this way filter plugging and guaranteeing longer filter life;
- **anticorrosion and antirust capability** to provide efficiently the protection of all metallic components of the hydraulic system;
- **antifoam properties** to avoid the presence of foam and air that reduce system efficiency due to the different compressibility ratio between lubricant and air/lubricant mix;
- **compatible/miscible** with mineral oils (if blended performance will be reduced);
- **HEES hydraulic fluid**: its special fully synthetic base stocks allow the product to be classified as HEES "Hydraulic Oil Environmentally Synthetic Ester";
- **compatibility** with **gaskets** normally used in hydraulic systems: the product provides complete compatibility with fluorocarbon polymers, fluorosilicone rubber, nitrile rubber (>30% acrylonitrile), polyacrylate, polyurethane and silicone rubbers. It has partial compatibility to be evaluated case by case with natural and butyl rubber, ethylene-propylene copolymers, nitrile rubber (<30% acrylonitrile), ethylene-propylene terpolymers and polychloroprene;
- **very low value of Iodine number (< 3 g I_2 / 100g according to ISO 3961)**: in this case the Iodine number indicates the unsaturation degree (presence of double bonds) of the esters bases used, as double bonds of these bases react with Iodine. A low value of Iodine number indicates a high degree of saturation and therefore a better thermal-oxidative resistance.

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Application fields

PAKELO GEOLUBE ECO HYDRAULIC ISO 46, thanks to its chemical-physical characteristics, has been specifically developed for hydraulic systems operating under all ambient and working conditions.
It transfers power with great promptness and uniformity, and it is suitable for lubricating stationary and mobile hydraulic systems (such as agricultural and earth moving machines) operating in particular areas where, according to the final user or to specific legislative regulations, high biodegradable lubricants are requested.

PAKELO GEOLUBE ECO HYDRAULIC ISO 46 satisfies a wide range of applications, in terms of types of pumps (vane, gear, piston pumps, etc.), of metals used in the working system and of resistance to severe working conditions (high temperatures, pressure, etc.) which they may face without causing stress and/or decomposition. Its fully synthetic base stocks and its specific additive package used allow to extend oil drain intervals when compared to conventional synthetic hydrocarbon lubricants.

Please follow drain intervals Constructors' recommendations to obtain maximum hydraulic system life.

Performance level

Blue Angel, DIN 51524 Part 1, 2, 3 (Dry ISO 4263-1), **Eaton Brochure** 03-401-2010 (Dry ASTM D943), **ISO** 15380 HEES (Dry ISO 4263-3), **JCMAS** P042 HKB, **Parker Densison** HF-6, **Swedish Standard** SS 155434 category V (Dry ASTM D943), **USDA** Biopreferred®, **VDMA** 24568, **VDMA** 24570, **US Vessel General Permit** (VGP).

Chemical-Physical Characteristics

Geolube ECO Hydraulic	Method analysis	Unit measure	Value ISO 46
Density at 15°C	ASTM D1298	kg/l	0,930
Kinematic Viscosity at 40°C	ASTM D445	cSt	47,3
Kinematic Viscosity at 100°C	ASTM D445	cSt	8,1
Viscosity Index	ASTM D2270	-	144
Demulsibility at 54°C - Oil/Water/Emulsion - (time)	ASTM D1401	ml - (min)	40 / 40 / 0 - (15)
Air Release properties	ASTM D3427	minutes	1,4
Foaming Test - Sequence I, 24°C	ASTM D892	ml/ml (s)	10 / 0 (10)
Foaming Test - Sequence II, 94°C	ASTM D892	ml/ml (s)	0 / 0 (0)
Foaming Test - Sequence III, 24°C after 94°C	ASTM D892	ml/ml (s)	0 / 0 (0)
Flash Point (C.O.C.)	ASTM D92	°C	250
Pour Point	ASTM D97	°C	-39
Test FZG (A/8,3/90) Failure Load Stage	ASTM D2882	Stage	11

The data just above refer to average values and must not be understood as guaranteed characteristics.

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