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GoldenStar LA 77-51

SAE 10W-40

Fully Synthetic lubricant with **LOW S.A.P.S. technology** (low content of Sulphated Ash, Phosphorus, Sulphur) for all latest on/off road HD Diesel engines.

PAKELO GOLDENSTAR LA 77-51 SAE 10W/40 is a **fully synthetic** lubricant developed for latest generation on/off road Heavy Duty Diesel engines.

Thanks to its special additive package and to the selected synthetic base-stocks used, PAKELO GOLDENSTAR LA 77-51 SAE 10W/40 satisfies, at the same time, the severe international **API CJ-4** and **ACEA E9, E7, E6, E4** specifications and has been developed to satisfy main OEMs specifications. Such performance within one single product means obtaining a key fundamental result that is necessary also to unify lubrication when engines have sometimes slightly different requirements.

The emission reduction systems used by OEMs, depending on the different technology, are very sensitive to the presence of some chemical elements that could also be found in lubricants of recent formulation. In particular the chemical elements that are considered to be harmful are **Sulphur** (present in the additives and in solvent neutral base stocks), **Phosphorus** (generally bound to Zinc in order to give greater anti-oxidative and anti-wear protection) and **Sulphated Ash** (mostly from detergent additives).

PAKELO GOLDENSTAR LA 77-51 SAE 10W/40 has been formulated with the lowest content of these elements and thus with the use of an innovative chemistry and special almost sulphur free synthetic base stocks.

This innovative new allows to obtain a product with high TBN (Total Base Number) and to fulfill at the same time ACEA E6 and E4 specifications.

Furthermore this chemistry is ideal to guarantee high detergency with a moderate ash content and in this way the same lubricant can be used for different engine requirements.

The particular formula of PAKELO GOLDENSTAR LA 77-51 SAE 10W/40 thus provides the following properties:

- **LOW S.A.P.S.** (low content of Sulphated Ash, Phosphorus and Sulphur) **technology**: furthermore it satisfies **MID S.A.P.S. technology** requirements;
- **suitable for long drains**; it enables *Extended Service Interval*;
- **excellent low temperature** properties: easy start-ups at very low temperatures to guarantee the lubricant action for all engine moving parts right from the first working periods and to reduce to the minimum the hazards of wear especially when comparing the product with SAE 15W/40 Viscosity Grade lubricants;
- **very high thermal-oxidative stability** at high temperatures also thanks to the synthetic base stocks used to formulate the product;
- **HT-HS** (High Temperature, High Shear) **value optimized** for severe and specific needs of modern Heavy Duty Diesel engines;
- **low formation of lacquers and varnishes** at low temperatures and in particular during stop-and-go service;
- **low volatility** of the product results into a very significant reduction of oil losses due to evaporation;
- **very high detergent properties** that guarantee cleanness performance and long drain intervals;
- **excellent dispersant properties** that guarantee a great control of sludge and oil thickening phenomena also in case of high presence of soot and deposits;
- **excellent wear control** in every working and ambient temperatures;
- **excellent pumpability** at low temperatures of used oil too.

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Application fields

PAKELO GOLDENSTAR LA 77-51 SAE 10W/40 is a very high performance lubricant recommended for on/off-road Heavy Duty Diesel engines also working under severe conditions.

Furthermore, thanks to synthetic base stocks used and to the low ash content, the product can also be used for CNG (Compressed Natural Gas) engines.

The product satisfies the main international OEMs' performance levels.

The product can be adopted to extend oil drain intervals, with respect of Constructors' Recommendations and combined with a complete monitoring of oil in service through specific oil analyses.

Please also follow recommended oil drain intervals to obtain maximum engine life.

Performance level

ACEA E9 / E7 / E6 / E4, **API** CJ-4, **JASO** DH-2 / DH-1, **MB** 228.51 / 228.31, **MAN** M3477 / M3575 / M3271-1, **Volvo** VDS-4, **Renault** RLD-3 / RLD-2, **MTU** Type 3.1 / Type 2.1, **Mack** EO-O Premium Plus / EO-N Premium Plus, **Caterpillar** ECF-3, **Cummins** CES 20.081, **Deutz** DQC IV-10LA, **Detroit Diesel** 93K218.

Approvals

MB-Approval 228.51, **MAN** M3477, **MAN** M3575, **MAN** M3271-1.

Meets: JASO DH-2, JASO DH-1.

Chemical-Physical Characteristics

GoldenStar LA 77-51	Method analysis	Unit measure	Value SAE 10W-40
Density at 15°C	ASTM D1298	kg/l	0,866
Kinematic Viscosity at 40°C	ASTM D445	cSt	86,5
Kinematic Viscosity at 100°C	ASTM D445	cSt	13,3
Viscosity Index	ASTM D2270	-	145
C.C.S. Viscosity at -25°C	ASTM D5293	cP	6.600
HT-HS Viscosity at 150°C / 10 ⁶ s ⁻¹	ASTM D4683	cP	3,90
T.B.N. (Total Base Number)	ASTM D2896	mg(KOH)/g	12,8
Sulphated Ash	ASTM D874	% (w/w)	< 1,00
Typical phosphorus content	ASTM D5185	ppm	< 800
Typical sulphur content	ASTM D5185	ppm	< 3000
Flash Point (C.O.C.)	ASTM D92	°C	> 220
Pour Point	ASTM D97	°C	-33
Noack evaporability test	ASTM D5800	% (w/w)	11,0

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

This Technical Data Sheet has been carefully checked to guarantee complete and precise information. However, we do not take any responsibility in case of damages caused by any mistakes or omissions. Due to continual product research and development, the information contained herein is subject to change without notification.