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Lubricating Oil for Precision Planetary Gearboxes and Reducers

The selection of lubricating oil for gearboxes is crucial for planetary gearboxes and reducers as it reduces friction between components, cools the system, and protects internal components from damage. The limited space and poor heat dissipation in the enclosed environment and temperature conditions make it particularly important to choose the appropriate lubricating oil. The suitable grease should possess good adhesiveness, load resistance, extreme pressure resistance, oxidation resistance, foam resistance, rust protection, high-temperature flowability, and high-temperature stability. Excellent lubricating oil must have the ability to withstand loads.

Academic Research: Performance and Selection Factors of Lubricants

There are various academic studies available for reference regarding the research and discussion on lubricating oils. For example, Huang, S.-J. proposed the addition of MoDTC during the lubrication process and studied the relationship between the lubricant's wear resistance, contact load, temperature, and rolling-to-sliding ratio using the Taguchi method in 2005 [1]. Wu, M.-R. calculated the minimum dynamic oil film thickness based on the elastohydrodynamic lubrication theory in 2005 and studied the effect of lubrication damping on the gear motion equation using numerical methods [2]. Wu, S.-T. developed a new type of four-ball wear testing machine in 2013, calculated the steel ball scratch area using a white light interferometer, and measured the weight loss of the steel ball using an electronic balance. The study found the maximum frictional force generated by lubricants such as medium viscosity ester oil during the lubrication process [3].

How the GearKo R&D Team Selects Lubricants for Planetary Gearboxes and Reducers

When developing planetary gearboxes, the GearKo research and development team selects and tests lubricating oil based on the design requirements, operating conditions, and material characteristics of GearKo planetary gearboxes. The team conducts detailed analysis, including understanding factors such as operating speed, load, temperature, and pressure to determine the performance indicators required for the lubricating oil and ensure its smooth operation and long lifespan under various conditions

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Please note that the lubricant properties listed in the table are provided for reference only and may not be the lubricants used in GearKo gearboxes. The selection of lubricant formulas is confidential information held by individual gearbox manufacturers and cannot be disclosed.

Base oil	highly refined PAO
Base oil viscosity	150 cSt at 40°
Thickener	special li-complex soap
Operating temperature	-40 to 120°
Apparent dynamic viscosity	very soft
Water resistance	0% at 45°
Oil separation	<5% / 80 hours at 72°
Drop point	free flowing
Density	0.9 g / cm3 at 20°
Four ball running load value	2600 N

[1] Huang, S.-J. (2005). "Prediction Model and Optimization of Friction and Wear Performance of Gear Lubricant Additives" (Doctoral dissertation). National Chung Cheng University, Chiayi.

[2] Wu, M.-R. (2005). "Dynamic Analysis of Spur Gears Including Lubrication Characteristics" (Master's thesis). Chung Hua University, Hsinchu.

[3] Wu, S.-T. (2013). " Developing a novel four-ball wear tester and its application to study the relationship between viscosity and antiwear ability for gear oils " (Master's thesis). National Yunlin University of Science and Technology, Yunlin.

If you encounter any issues with the use of Planetary gearboxes or reducers, please feel free to contact us. We are dedicated to resolving your problems.