RV Reducer Lubrication Applications



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Improvement of load carrying capacity and service life of planetary gearboxes

With the rapid development of planetary transmission technology, by virtue of the planetary reducer's small size, light weight, compact structure, large carrying capacity, high transmission efficiency, smooth operation, shock resistance, large ratio, can realize the synthesis and decomposition of the movement and many other advantages.

In the modern planetary transmission, in order to meet the performance of the use of heavy load conditions (outer diameter size should be small), however, the planetary transmission, often the weaker link in the transmission of gears, in order to improve the reducer load-bearing capacity, so it is necessary to improve the performance of involute cylindrical gears under heavy load to meet the demand for heavy loads.

In addition to factors such as gear module, tooth angle, gear precision and error, tooth root and tooth surface reinforcement, input speed, gear repair, gear materials, etc., improper selection and use of lubricants is one of the main reasons for gear failure.

Lubricant parameters are directly related to the gear load, operating speed, gear form, operating temperature, the selection of appropriate and reasonable lubrication and lubricant can effectively improve the service life of the equipment.

- As a general principle, according to the classification of circumferential speeds, grease lubrication is used for low speeds (V > 7m/s), oil bath lubrication is used for medium speeds $(2.5m/s \le V \le 15m/s)$, and forced lubrication is used for high speeds (V > 15m/s).
- For gears to maintain efficient power transmission, a stabilized oil film must be formed on the meshing tooth surfaces to prevent metal contact.vv To achieve this, it is necessary to select grease of the appropriate viscosity. A high viscosity index indicates that the oil has a small change in viscosity with temperature change, which is favorable for maintaining a small amount of viscosity change within the operating temperature range, thus improving lubrication performance.
- In the actual selection of lubricating grease is selected according to the load, speed, but also consider the transfer of power, meshing efficiency, bearing efficiency and temperature difference between the inlet and outlet, and other factors. Reduce the roughness of the tooth surface is favorable to lubrication, easy to form a full oil film.
- For involute gear meshing point line contact problem, must choose the appropriate oil film thickness and strength, and then choose the appropriate lubricating grease.
- The value of lubricating grease loading, too little lubricating grease, can not achieve the purpose of lubrication; on the contrary, in the sealed gear box, too much lubricating grease will cause excessive loss of agitation.

Wallimore series grease provides a good solution for planetary gearbox lubrication application.



Fueling Innovation in Industrial Automation Next Generation Robot Grease Technology

Wallimore HRE 00 is a new generation of grease specifically designed for RV gearboxes.

- Designed to improve the overall performance of industrial robot lubrication systems .
- Maintain robot precision and increase operational reliability
- Reduce maintenance and extend the service life of RV gearboxes

A Performance Jump

Field trials and laboratory test reports show that RV gearboxes lubricated with Wallimore HRE 00 exhibit better overall performance for the following challenges.





Load and wear resistance

The Challenge

- Metal surface contact triggered by high loads can lead to rupture of the oil film, which in turn increases the wear of the equipment
- Excellent grease with good lubrication properties under high loads reduces wear and maintains precision in robotic arm movements
- Wallimore HRE 00 showed increased load carrying capacity and wear protection in a test.

Four-ball wear and extreme pressure test

- "Composite Wear Index" is a load factor calculated from the results of wear marks under a series of specified loads.
- "Maximum non-seize load" is the test load when the oil film ruptures and the ball seizes.



Reducing Friction

The Challenge

Surface friction due to poor lubrication causes energy consumption and increases the operating temperature of the RV gearbox.

The Solution

- Robotics greases should outperform conventional greases in terms of friction reduction
- Superior robotics grease reduces equipment operating temperatures, which in turn reduces wear, extends grease life and reduces the risk of grease . leakage due to temperature rise.

Wallimore HRE 00 has a similar and superior performance to the leading products on the market.



- Thrust bearings under axial load for restricted reciprocating motion
- Measurement of bearing mass loss after 22 hours
- Typical mass loss of normal . grease is about 5mg







Vibration Wear Protection

The Challenge

- . Frequent starts and stops create unavoidable vibration wear
- Conventional grease does not provide adequate lubrication protection for RV gearboxes.

The Solution

Wallimore HRE 00 is formulated to provide adequate lubrication protection against this type of vibrational wear.

Avoiding Leakage

The Challenge

. additives, and reduced lubricating capacity, resulting in wear of the RV gearbox.

The Solution

- .
- .

50ml

Wallimore

HRE OO

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Centrifugal Oil Separation Test

- · Centrifugal oil separation of grease at 2000 rpm for 6 hours.
- The test temperature was 50°C
- The oil separation trend is clearly visible

Wet and Humid Environments

Wet and even corrosive working environments can make the . proper functioning of RV gearboxes even more challenging. Wallimore HRE 00 offers excellent rust protection. .



Wallimore HRE 00 RV Reducer Field Test - Wear, Friction, Vibration and Load Evaluation In field tests, Wallimore HRE 00 reduced operating temperatures by an average of 5°C compared to the competition, demonstrating the grease's excellent anti-wear and friction reduction properties.

Leakage and extreme environments

Base oil loss is the main factor that triggers grease leakage. Loss of base oil leads to increased grease consistency, reduced fluidity, loss of

Wallimore HRE 00 has a more stable microfiber structure, which effectively reduces excessive oil separation and thus inhibits grease leakage. Competitor 2 (NLGI 0) exhibited similar product performance to Wallimore HRE 00 due to its higher consistency grade. However, the higher NLGI consistency grade reduces the fluidity of the grease in the gearbox, which in turn affects the overall lubrication performance.

Competitor 1 and Competitor 3 have a more pronounced tendency to split grease, which can cause more serious grease leakage problems.



Extreme Weather Conditions

 In practical RV gearbox applications, the Wallimore HRE 00 operates in temperatures ranging from -40°C ~ 130°C.



Compatibility and Enhancement





RV Reducer Testing

Wallimore partnered with a leading RV reducer manufacturer to test the performance of Wallimore HRE 00 Harmonic Reducer Grease under realistic operating conditions.

This trial tested Wallimore HRE 00 in parallel with a mainstream market product (Competitor 1).

Test Conditions:

- One model RV reducer from a different reducer manufacturer (e.g. Nabtesco)
- More demanding loads to verify grease performance and accelerate the test process
- Long, uninterrupted operation (24 hours a day, 7 days a week)

Main test results After several months of continuous operation:

- RV gearboxes lubricated with Competitor 1 reached the warning value of 800ppm of iron powder in the grease after 3 months.
- RV gearboxes lubricated with Wallimore HRE 00, after 6 months the concentration of iron powder in the grease was still well below the warning value of 140ppm.

The test results highlight the following advantages of Wallimore HRE 00 as the best performing grease:

- Increased service life of RV gearboxes
- Extended oil change intervals, reducing maintenance costs
- Reduced energy consumption by monitoring operating temperatures approximately 5°C lower than the competition 1.

Compatibility

- Metals and seals used in RV gearboxes
- Other common industrial robot greases

It is recommended that you consult your Wallimore technical advisor to confirm product suitability prior to use.





Twenty years ago, Wallimore Grease began gear cleaning, lubrication, and corrosion and rust prevention services to satisfy customer needs for gears requiring non-standard lubricants.

Over the years, Wallimore Grease has gained additional experience in cleaning and relubricating gearmotors, planetary gearboxes, harmonic gearboxes, worm gearboxes, open gears, plastic gears, drum motors and more. At the same time, Wallimore also provides products and services for gear cleaning, hardening, repairing and metal processing.

There are many types of grease, and the product system is complex, targeted research on different working conditions, in order to meet the needs of gearheads in the development of intelligence, lightweight, integration, durability, Wallimore lubricating grease is inclined to the research on the chemical stability of the grease, the stability of the structure and the tribological properties, in order to ensure that the lubricating grease has a good ability to adhere to the strength of the film, effectively reduce the fatigue wear of the gearhead, fully meet the requirements of the fatigue wear of the gearheads. It can effectively reduce the fatigue wear of the reducer, fully meet the needs of the boundary lubrication state of the reducer at the moment of starting and stopping, and effectively solve the situation of rapid temperature rise, high noise, abnormal wear, tooth heel fracture, and reduced fatigue life of the reducer, so as to improve the load carrying capacity of the planetary speed reducer and increase its service life. The core products of 1688 series, 2597 series and HRE00 series have been used for many years in the head enterprises of the industry on various kinds of straight teeth, helical teeth, bevel teeth, conical teeth and harmonic.

Our customers, often have ultra-high temperature, ultra-low temperature, heavy load, high speed, high vacuum, high-energy radiation, strong oxidation, strong corrosion, long life, low noise, waterproof, damping, sealing and other special media, special working conditions, such as lubrication, cleaning, corrosion and rust needs; Wallimore grease in-depth understanding of the industry's application needs, on the basis of the common research personality, combined with the actual situation to design a targeted overall grease application program to ensure that the grease can maintain a high degree of corrosion resistance and prevent material fatigue aging, and then further enhance the lubricating effect of grease even under extreme conditions. Wallimore grease in-depth understanding of industry application needs, based on the common study of individual problems, combined with the actual design of the overall grease can maintain a high degree of corrosion resistance and to prevent fatigue aging of the material, even in the extreme state of the lubricating grease can maintain excellent lubricating effect, and then further enhance the lubrication of lubricated parts of the lubrication accuracy, in order to prolong the life cycle of the equipment, to reduce the uncertainty of the equipment damage, and effectively help the user to solve various lubrication problems;

Wallimore also has a wide range of services in the use of dry film lubricants, such as molybdenum sulfide, tungsten sulfide, boron nitride, ceramics, titanium composite and other materials, to meet the customer's requirements for use in corrosive chemicals or extreme temperatures;

Wallimore grease is also widely used in bearings, gears, motors, slides, chains, wire ropes and other moving parts, providing nearly 1,000 specifications and models of grease products, which can meet the harsh lubrication requirements of -70 $^{\circ}$ C to 1400 $^{\circ}$ C. This provides a brand new possibility for localized substitution in the current environment.

At the same time, Wallimore grease can also be customized to meet the requirements of the user's working conditions based on the analysis of incoming samples.

Wallimore Grease focuses only on grease, only researches grease, and only concentrates on solving grease field application problems.

About Wallimore