Bearing Lubrication Applications White Paper

WALLIMORE®
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Bearing Lubrication Service

As a leading grease brand and manufacturer, we understand the importance of bearing lubrication in mechanical engineering. Whether it's in rolling bearings, plain bearings or linear guide bearings, we are committed to providing superior lubrication solutions to ensure that your mechanical equipment runs smoothly at high speeds, extends service life and reduces maintenance costs.

In our product line, we have lubricants and greases to meet the needs of different types of bearings. Not only that, but we also offer specialized bearing lubricants, bearing greases, and dry film lubrication products to meet the needs of a wide variety of different operating conditions. Whether your bearings operate at high temperatures, high pressures, high speeds or in extreme environments, we have a lubrication solution for you.

Our team has extensive experience working with customers on a daily basis on a wide range of bearing issues. Whether you are faced with lubricant selection, lubrication intervals, lubrication methods or the development of a maintenance program, we are able to provide you with expert advice and technical support. Our goal is to build long-term relationships with our customers to help them achieve optimum performance in bearing lubrication, increase productivity and reduce equipment downtime.

Our re-lubrication facility handles many bearing problems for our customers on a daily basis, so if you wish to use bearing lubricants, greases or dry film lubricants, please read on.

Use Cases

Chemical Resistant Grease

A manufacturer of air filtration equipment was experiencing a serious problem with early bearing failure. Some of their products were used in specialized applications involving the use of geraniol, and the sealed bearings came into contact with the geraniol mist and failed within a few weeks.
We examined some of the failed bearings and found that they left virtually no grease behind. Apparently, the geraniol breaks down grease much faster than expected. The bearing manufacturer was unable to provide an alternative because the bearing dosage was too small.
We recommended the use of chemically resistant PFPE grease; after six months, the sample bearings were still functioning properly, and the specifications we recommended had been incorporated into their design.

Cleanroom Applications

When manufacturing equipment for use in cleanrooms, it is important that bearings be properly lubricated to avoid contamination of the surrounding area.
One cleanroom equipment manufacturer found that the sealed thin-walled bearings used in lens adjustment equipment emitted very fine vapors at high temperatures. This caused fog to form on some of the mirrors, leading to customer complaints.
The manufacturer sent us some of the bearings they were using, and we relubricated them with a selection of cleanroom and vacuum greases for testing. Samples of the newly commissioned lubricants were quickly selected, the customer's problem was resolved within weeks, and the new bearing specifications were quickly approved for all future production.

Low Friction Lubricants

If the speed measuring instrument is to respond to very weak winds, it needs bearings that offer very little resistance to rotation. Standard greases create too much resistance, so lightweight instrument oils are often the preferred choice.
Our experience and research and development capabilities enable us to quickly find suitable lightweight oils for cleaning and relubrication.

Choosing The Right Lubricant

Bearings are often supplied with standard lubricants suitable for a wide range of applications. However, for many special lubrication requirements, standard bearings may not perform to the customer's expectations. In this case, the only way to extend bearing life is to develop a lubricant that meets the requirements.

High-speed Applications

Multi-purpose greases are generally not suitable for high-speed bearings because the base oil viscosity may be too high or the grease may be agitated in the raceways, both of which can generate excessive heat. Overheated grease may become too thin and leak from the bearing.
High-speed greases require a low-viscosity base oil and a high-performance thickener that produces less heat; we can relubricate the bearing with an ultra-high-speed grease, varying the amount of grease filled to suit the application.

Computational Applications

Grease used on vertical shafts is usually not recycled into the raceways as easily as bearings on horizontal shafts, and the grease may penetrate down into the lower seals or shrouds, resulting in inadequate lubrication.
We use harder greases, or greases with more adhesive properties, which stay in place better. Another option is to use sealed (not shielded) bearings and increase the grease fill to keep the lubricant in the ball/race contact area.

Extreme Temperature Applications

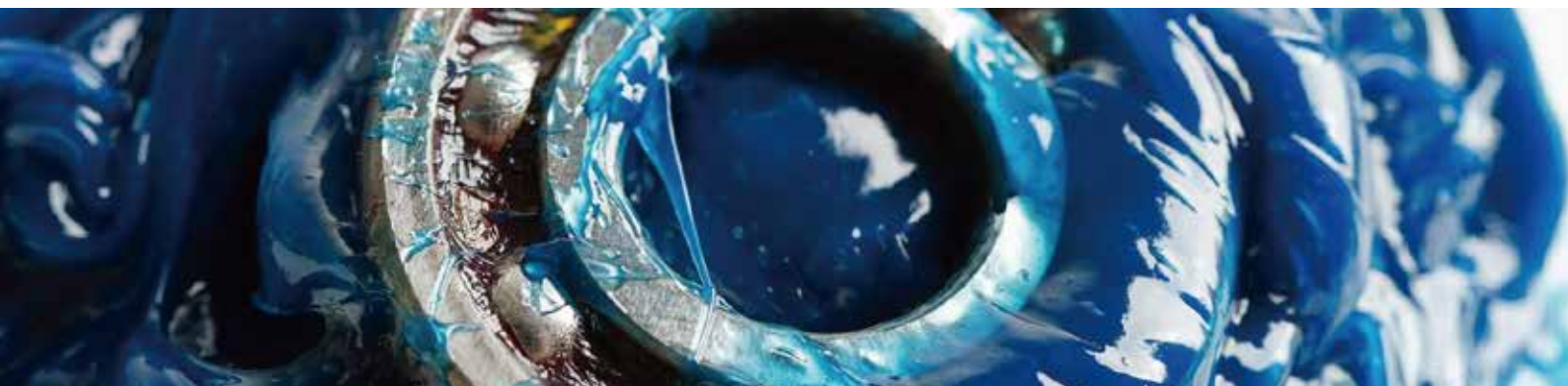
Below a certain temperature, grease will not lubricate properly and the grease may become hard, making the bearings difficult to rotate or unable to start at all. Cryogenic lubricants are used in aerospace, cold chain transportation, or any outdoor environment subjected to extremely low temperatures. Some of our low-temperature greases will continue to lubricate at temperatures as low as -70° C. The greases are available with recommended upper and lower temperature limits.
Lubricants have recommended upper and lower temperature limits, and use of a lubricant that exceeds these limits will result in lubricant breakdown and rapid failure. Multi-purpose greases are rated up to 100° C ~ 120° C, which is good for most applications, but bearing life will be shortened if grease temperatures exceed this limit. Some of our greases can be used continuously at 288° C and up to 300° C for short periods of time.

Food / Beverage Applications

The food and beverage industry employs very strict sanitation controls, and for many applications, approved lubricants are required.
We offer a range of product-grade lubricants, some of which can withstand aggressive cleaning chemicals or high temperatures.

Low Torque Applications

For many instruments, a very low bearing torque is important. This can be provided by dry lubricants such as two-molybdenum sulfide or lightweight instrument oils, or by using a very low viscosity grease with reduced filler volume.
A variety of options are available, depending on the acceptable starting torque and bearing speed.



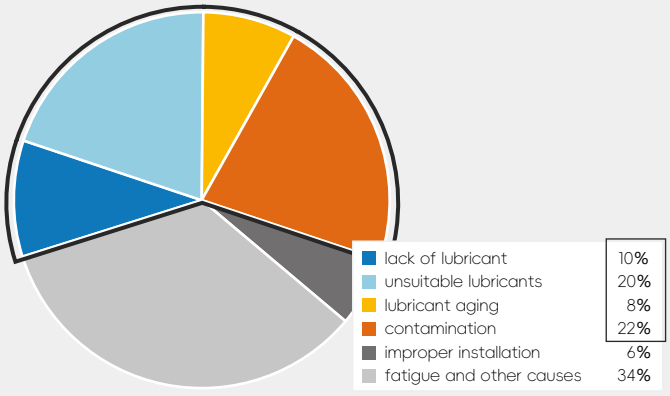
Bearing Lubrication Conditions

More than 80% of rolling bearings are lubricated with grease, 40% of rolling bearing damage is due to poor lubrication, and 91% of bearing failures are lubrication and maintenance related.

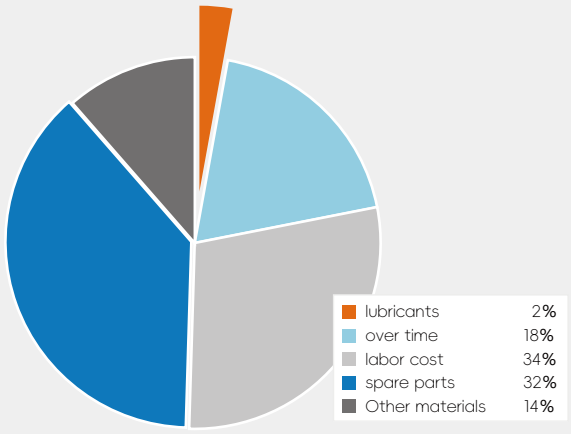
In industry, bearing failure is accelerated by some forms of corrosion, at high temperatures, high loads and in harsh environments. Is your bearing equipment also operating in the following harsh environments?

- Water/vapor
- High temperature/high speed
- Heavy load/high pressure
- Low noise
- Frequent on/off switching
- Corrosive gases
- Sterilizer

As a special grease for rolling bearings, Wallimore focuses on the research of bearing vibration and noise control technology, comprehensive operating temperature, service life, vibration resistance, extreme pressure performance, high and low temperature requirements, noise characteristics, rust resistance, water resistance and other technical research, to ensure that the bearings good operating performance and sustainable lubrication to provide the possibility.



Early Bearing Failure Causes



Maintenance Costs Distribution

Common product solutions

HIGH TEMPERATURE

HTG 1400 series high temperature grease, with high dropping point and remarkable mechanical stability, can carry high loads and high impact loads; its resistance to water and corrosion is very strong, and it is suitable for the lubrication of boiler bearings of large-scale chemical factories, sleeve bearings of plastic extruders, compressors, stretching and stenting machines, hot-melt blowers, heat-setting drying room, high-temperature dyeing cylinders and other bearings of various kinds with higher rotational speeds that work under high temperatures.
Applicable temperature range: -40℃ ~ 250℃.

HTG 1700 Series Ultra High Temperature Grease adopts fully synthetic base oil and special compound thickener, and adds various solid lubricants to meet the lubrication requirements of the equipment under the high temperature condition of 250℃ ~ 1400℃.

HIGH SPEED

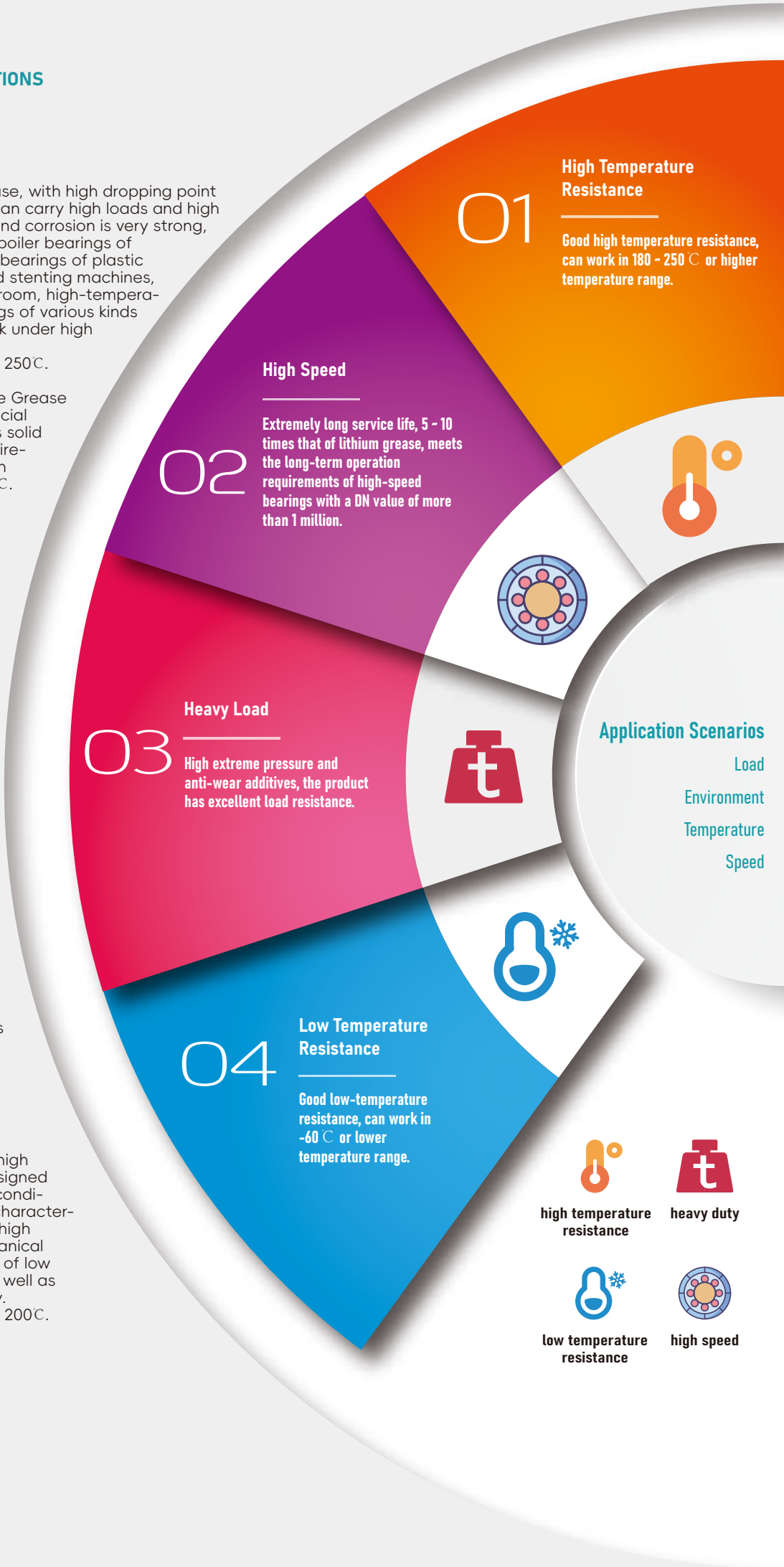
HBG 1800 special series grease is specially designed for high speed and precision bearings with DN value up to 1 million. It can be applied to the lubrication of high-speed and light-load bearings of long-life gyro motors, high-speed grinding heads and other precision instruments.
Applicable temperature range: -45℃ ~ 150℃, short-term up to 160℃.

HEAVY LOAD

HLP 400 series grease is designed for low-speed, heavy-duty bearings in harsh environments and can maintain strong film strength under extreme loads. HLP 400 series grease is specially developed for low speed and heavy load bearings in harsh working conditions; it is suitable for lubrication of low speed, heavy load, dust, and harsh industrial devices with shock loads.
Temperature range: -30℃ ~ 200℃.

LOW TEMPERATURE

LTG 2000 series cryogenic grease is a high quality, long life grease specifically designed for bearings in ultra-low temperature conditions. The excellent low-temperature characteristics of the base oil and the naturally high viscosity index can help improve mechanical efficiency to guarantee the realization of low starting torque and running torque, as well as excellent low-temperature pumpability.
Applicable temperature range: -60℃ ~ 200℃.



Common product solutions

WATER RESISTANCE

Water pollution is one of the important factors causing early failure of bearings, but also an important source of rust and corrosion of equipment, especially in the iron and steel metallurgy industry, mines, ships, offshore platforms, agricultural machinery, construction machinery and so on.
CVG 45 series grease specific strong adhesion, good sealing performance, good anti-emulsification performance, good resistance to water washout, can effectively extend the life of the equipment in low temperature, water environment, cold and other outdoor environments.

CHEMICAL RESISTANT

The FMZ series is a stable, non-flammable, chemically inert grease designed for long life and seal life applications. Insoluble in most solvents, non-sensitive to a wide range of chemical media, fuels, water, lubricants, gases, very compatible with elastomeric sealing materials and plastics, and relatively radiation stable compared to conventional lubricants. Designed for use in chemical agitators, needle bearings in circuit breakers, valves and pumps, fuel and solvent handling equipment, lifetime sealed bearings that must operate at high speeds, heavy loads, and high and low temperatures.
Operating temperature range: -40°C ~ 280°C

LOW NOISE

Precision bearings use more and more harsh conditions, the bearing noise also has higher requirements, the requirements of the equipment can be maintained for a long time in a stable state of operation, will not be due to the lubrication film rupture, resulting in direct contact with the metal surface of the sliding friction vice metal surfaces, wear and tear suddenly intensified, the coefficient of friction suddenly increased, resulting in high-frequency vibration, and even the emergence of a state of dry friction, resulting in a whistling sound. lb 200 series of low-noise bearing grease is the Ideal choice.
Temperature range: -30℃~150℃.

MOTOR BEARING GREASE

MBG 2500 Series Grease is a high quality, long life grease specifically designed for industrial motor bearings. Its advanced soap base formula gives it anti-wear, long life and low noise characteristics, which can improve the performance of bearings, protect and extend the service life of motors.
Applicable temperature range: -20℃ ~ 120℃.

Commonly Used Synthetic Base Oils

Synthetic Oil	Temperature Range@℃	Main Features / Typical Applications
Polydiol	-40 ~ 125	Good load capacity, good compatibility with most synthetic rubbers, will not carbonize. Commonly used in arc switches.
Polyhydrocarbon Cyclopentane	-40 ~ 125	Highly specialized fluids that combine the low vapor pressure of perfluoropolyether (PFPE) with the lubricity and film strength of synthetic hydrocarbons (PAO). Typically used in aerospace and other critical vacuum environments.
Synthetic Hydrocarbons (PAO)	-60 ~ 125	A stable lubricating fluid that is compatible with most plastics and synthetic rubbers. It is a direct substitute for petroleum and is widely used in many industries.
Synthetic Ester	-65 ~ 150	Excellent wear resistance, stability and metal affinity for heavy loads. Ideal for all kinds of load bearing.
Silicone Oil	-70 ~ 200	Stable liquid with good wetting properties. Commonly used in plastic bearings, control cables and seals.
Perfluoropolyether (PFPE)	-90 ~ 250	Extremely stable, non-flammable, weak chemical activity and low vapor pressure. Used in extremely harsh environments, it eliminates compatibility problems with plastics and synthetic rubber.
Polyphenylene Ether	10 ~ 250	Radiation, chemical and acid resistant fluids. Typically used for precious metal connectors and high temperature mechanical components.

Modern businesses often require equipment to operate at the limit, which means that it will continue to operate under conditions that are on the verge of being extreme. When machines and equipment are challenged with these extreme lubrication conditions, we must be able to provide the necessary protection to minimize downtime and increase operational efficiency.

In the real world, many manufacturers can present reams of grease quality data and performance ratings and claim that their grease is exactly what the user needs. But all of that means nothing if the grease doesn't work for the user's product.

Wallimore carefully selects each ingredient to meet the customer's product materials, performance criteria, life cycle and operating conditions, and then tests, reorganizes and retests the ingredients until it develops a grease that "knows" what the customer expects from the product.

Wallimore also offers customers a full range of technical services, including engineering support, pre-qualification testing, failure analysis and standardized lubricant testing to ensure reliable quality and consistent performance from batch to batch.

Whether mineral or synthetic, Wallimore's technologically advanced greases help provide better equipment protection.
Wallimore greases offer the following significant benefits:

- Enhanced reliability and performance of equipment: enables it to operate as usual, even under extreme conditions.
- Optimize cost-effectiveness and reduce unnecessary waste: Innovative greases have a longer service life and enable longer replenishment intervals.
- Increase productivity: Expert advice from our field engineers, strong relationships with equipment manufacturers, and technical resources help users increase productivity and reduce costs.

Wallimore also facilitates the following by providing the user with:

- Reducing complexity in the purchasing process: Purchasing is facilitated by Wallimore's comprehensive range of lubrication solutions.
- Take the worry out of it for the user: consistent quality, so the user knows it's trustworthy.

Wallimore, Lubrication Protection Under Harsh Conditions

Wallimore began its bearing cleaning, lubrication, and corrosion and rust prevention services 20 years ago to satisfy the needs of customers who required bearings with non-standard lubricants.

As a result of these years, Wallimore has gained additional experience in cleaning and relubricating center ball bearings, roller bearings, needle bearings, tapered roller bearings, linear bearings, and actuator bearings for automotive components, oilfield chemical, rail transportation, cement, steel, mining and other heavy equipment, food and beverage equipment, aerospace and ultra-high vacuum equipment, clean rooms, and semiconductors. Vacuum equipment, cleanrooms and bearings in semiconductor plants, which often require lubricants or greases for use with aggressive chemicals or extreme temperatures.

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, etc. to meet the needs of customers for lubrication, cleaning, anti-corrosion and rust prevention in special media and special conditions such as ultra-high temperatures, ultra-low temperatures, heavy loads, high rotational speeds, high vacuums, high-energy radiation, high oxidization, high corrosion, long service life, low noise, waterproofing, damping, sealing, and so on. The lubrication, cleaning, anti-corrosion and rust prevention are the needs of special media and special working conditions.

There are many kinds of lubricants, product system is complicated, targeted research on different working conditions, in order to meet the needs of modern industrial equipment in the development of intelligent, lightweight, integrated, long life cycle, Wallimore in-depth understanding of the industry application needs, on the basis of common research personality, combined with the actual situation of designing targeted overall lubricating grease application program to improve the performance of lubricating grease products continue to improve the performance of lubricating grease products. The performance of grease products is constantly refined, and then further enhance the lubrication accuracy of lubricated parts, in order to extend the life cycle of the equipment, reduce the uncertainty of equipment damage, and effectively help users to solve a variety of lubrication problems, at the same time, Wallimore can also be based on the analysis of samples, customized to meet the requirements of the user's personalized solutions to their working conditions.

Grease ensures high corrosion resistance and prevents fatigue aging of materials, and must maintain excellent lubrication even under extreme conditions.
Wallimore grease is also widely used in gear reducers, slide rails, wire ropes and other moving parts, providing nearly 1,000 specifications and models of grease products, which can meet the demanding lubrication requirements of -70 ℃ ~ 1400 ℃. This provides a brand new possibility for localized substitution in the current environment.

Wallimore only focuses on grease, only researches grease, and only concentrates on solving the problems of grease application in the field.

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