GREEN GREASE LGGB 2

An Environment-Friendly Biodegradable Grease for all Bearing Applications

by Peter Oosterman, SKF Maintenance Products, Mijdrecht, the Netherlands

A new biodegradable grease from SKF can match traditional grease performance in bearing applications. It also meets the increased demand for environmentally friendly products in the engineering industry. It is believed to be the first of its kind on the open market.

Green Grease

SKF has launched its "green" grease, LGGB 2 product, as a general-purpose lubricant. As such it is suitable for many different types of bearing applications. This contrasts with other biodegradable and non-biodegradable greases, which often require one particular type of grease per application. The grease is also a highly competitive alternative to traditional greases.

The development has come about through SKF working with its own suppliers to identify the suitable characteristics and performance requirements for environmentally friendly grease. The application of biodegradable lubricants and greases has been studied at the SKF Engineering & Research Centre for a number of years. This has led to a formulation that can meet the stringent demands of a range of engineering applications without adverse effects on the environment.

Although only a portion of lubricants used may pose a threat to the environment, this can add up to several millions tonnes worldwide. In particular, equipment users in the construction, earthmoving, forestry and farming industry are increasingly seeking "green" solutions because environmental contamination may be an issue.

Until recently, it was thought that current generations of biodegradable and low-toxicity lubricants could not satisfactorily meet the requirements of rolling bearing applications.

SKF has managed to overcome the inherent disadvantages of biodegradable greases, which have led to premature bearing failure. LGGB 2 has been tested and approved for steel-on-steel spherical plain bearings, ball and roller bearings. The grease is based on synthetic ester oil, lithium/calcium thickener and other biodegradable ingredients, and it has low toxicity.

Study of Requirements

The search for a suitable biodegradable and low-toxicity lubricant involved a number of key issues. These included:

- current and proposed environmental legislation relevant to lubricants;
- existing products on the market and their performance;
- demand for the product;
- properties for the product, and
- current research.

A central issue was to establish a clear definition of the term "green grease." Most materials will degrade in some way over time. There are many processes responsible for these changes, mostly commonly biodegradation, oxidation and photolysis. Chemical and physical changes over time often occur simultaneously.

The LGGB 2 grease formulation performs well with ball, roller and plain bearings

With regard to the development of clear parameters on material breakdown in the context of a green grease , the understanding of biodegradation is vital. In biodegradation, the material is gradually broken down through the metabolic action of such living organisms as bacteria, fungi, yeast and algae. Hydrocarbons, which are the main constituent of biodegradable lubricants, are transformed into carbon dioxide and water by this process.

Living Organisms

Naturally, this process is not entirely predictable as it can be influenced for example by the mix of living organisms present, temperature and humidity. It can happen that a material that may easily degrade under one set of circumstances may not readily degrade under others.

The minimum basic requirements are sufficient bacteria population, correct oxygen levels and a suitable temperature range. The rate of degradation is also affected by such factors as fluid viscosity, sunlight, mineral salt content, availability of nitrogen, pH levels, solubility and the ability of bacteria to adapt to the source of oil nutrient. Ultimately, of course, the lubricant should be reduced to its simplest natural form while leaving no harmful by-products that could have a detrimental and long-term effect on the local environment.

Traditional lubricants based on mineral and synthetic oils are ultimately biodegradable though the slow rate of decomposition means, under some conditions, that they can exist as a contaminant in groundwater for close to a century.

Test Criteria

Any tests to establish the biodegradable performance of a new lubricant have to bear in mind the often unpredictable and complex processes at work. With no single universal standard that clearly defines biodegradability, SKF opted to use a number of existing tests. These were used to establish whether toxicity and biodegradability occurred within a reasonable length of time.

Basically, biodegradability means that microorganisms in the soil, rivers and oceans can break down greases with relative ease.

From exhaustive studies, SKF has found that ester or vegetable fluids formulated carefully into lubricants perform well in real applications. In particular, SKF researchers found that a combination of synthetic ester oil and a lithium/calcium thickener resulted in good properties as defined in terms of water and corrosion resistance without the need to use toxic additives.

Bearing Tests

The LGGB 2 grease formulation, based on these constituents, performs well with ball, roller and plain bearings. This is a significant development, as conventional lubricating greases are normally considered suitable for only one bearing type.

Each bearing class has a different contact surface, which can affect lubricant performance. For instance, the lubricant film in ball bearings has a point contact; in roller bearings it is a line contact; and for plain bearings it is full contact over the area. SKF selected four different formulations that were subjected to stringent bearing tests. These included:

- the SKF R0F test to determine performance in ball bearings and determine the maximum operating temperature limit;
- the SKF EMCOR test, which tests corrosion inhibition properties;
- the R2F test to establish grease lubrication performance in roller bearings, and
- the SKF steel-on-steel plain bearing test.

From these tests, it was found that LGGB 2 offered superior performance over a range of operating conditions and bearing types and established a steady operating temperature set at 90°C.

Summary

Overcoming the limitations of biodegradable lubricants has been a goal of SKF for many years. Thanks to its specialist knowledge of bearing behaviour and the effects of lubrication, the company has now launched its first green grease, which is believed to be the first of its kind on the open market. Developed to meet a range of bearing applications, the new grease, called LGGB 2, meets the strict criteria that SKF places on bearing greases. It has been tested and approved for steel-on-steel spherical plain bearings, ball and roller bearings.

The new grease is part of the group's continued commitment to the environment and the adoption of sound environmental practices within the bearing industry.

For more information contact:

For further details, please contact:
SKF Engineering & Research Centre,
Nieuwegein, The Netherlands;
Phone +31 30 60 75608,
Fax + 31 30 60 43812;
E-mail: colin.roberts@skf.com

HSB

MTU OPENS SUBSIDIARY IN FRANCE

MTU France Takes over Sales & Service Activities of MTU in France

MTU has expanded its activities in France. In July 2001 the company celebrated the official opening of its new subsidiary MTU France in Cannes. The new company takes over all activities for DaimlerChrysler Off-Highway propulsion systems in France, with a focus on the MTU, Detroit Diesel and Mercedes-Benz diesel engine brands. The activities of MTU France include sales and marketing, service, technical information and spare parts service.

Christian Courcelles, Head of MTU France (left) and Dr. Rolf A. Hanssen, Chairman of MTU Friedrichshafen during the inauguration of MTU France in Cannes

Corporate Strategy

Christian Courcelles was appointed Head of MTU France. The new company will maintain its corporate management offices, sales operations and one service center at the Paris headquarters; another important service center is located in Cannes on the Mediterranean Coast. For Dr. Rolf A. Hanssen, MTU Chairman and Head of DaimlerChrysler Powersystems Off-Highway, the formation of the new subsidiary is an important milestone of the corporate strategy: "In the context of our globalization, we have strengthened our worldwide sales organization in our key markets, most recently with the newly founded subsidiaries in Japan and South Africa. The opening of MTU France was yet another logical step for us because of the great importance of the French market."

In the year 2000, MTU reported total revenues of Euro 72 million in France.

Sales Orders

MTU France was founded in April 2001. Undergirded by its two service centers and Penven as distributor, MTU France disposes of a powerful infrastructure. The company currently services well over 1,000 engines, including numerous engines in ships and yachts along the Mediterranean.

MTU has sold well over 3,000 engines to France up to now. The main emphasis is on generator systems; MTU has delivered nearly 2,000 Genset engines to its partner company SDMO. French shipyards also play an important role in the construction of large speed ferries and France currently ranks third after Italy and England in the European yacht business. This year the company also gained entry into the French rail market with the new 4000 series.

Government Business

The government business in France has also developed favourably for MTU. Numerous fast ships and patrol boats of the French marine are powered by engines from Friedrichshafen. The French company GIAT ordered over 470 MTU engines for the main battle tank Leclerc tropicalis on behalf of the United Arab Emirates; these engine deliveries are currently in progress. MTU France acquired the company's long-time distributor, Deyel. In the course of the company formation, MTU bought Deyel's building in Cannes and took over all employees. Under the management of the company's founder Julien d'Eysmond the company has provided an excellent base for the corporate activities of MTU France for over 50 years.

Initially, the company was entrusted with distribution of Mercedes-Benz industrial engines. In 1962 it became the general distributor for the products of Maybach-Motorenbau GmbH and later of MTU Friedrichshafen.