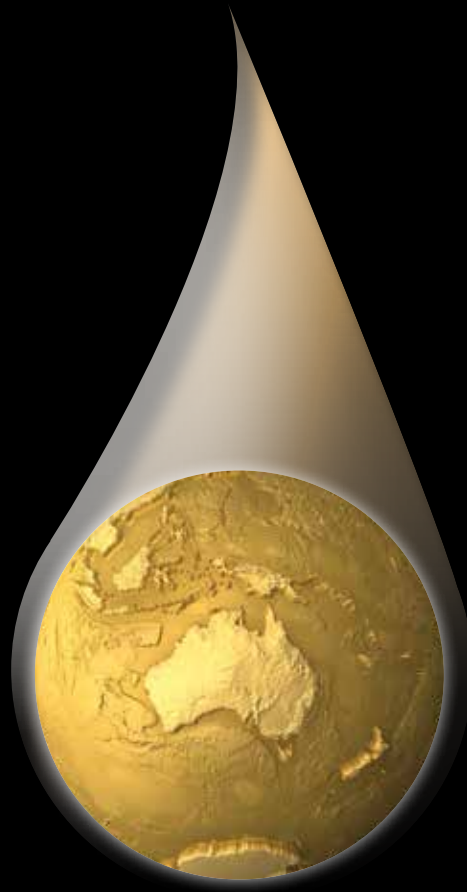


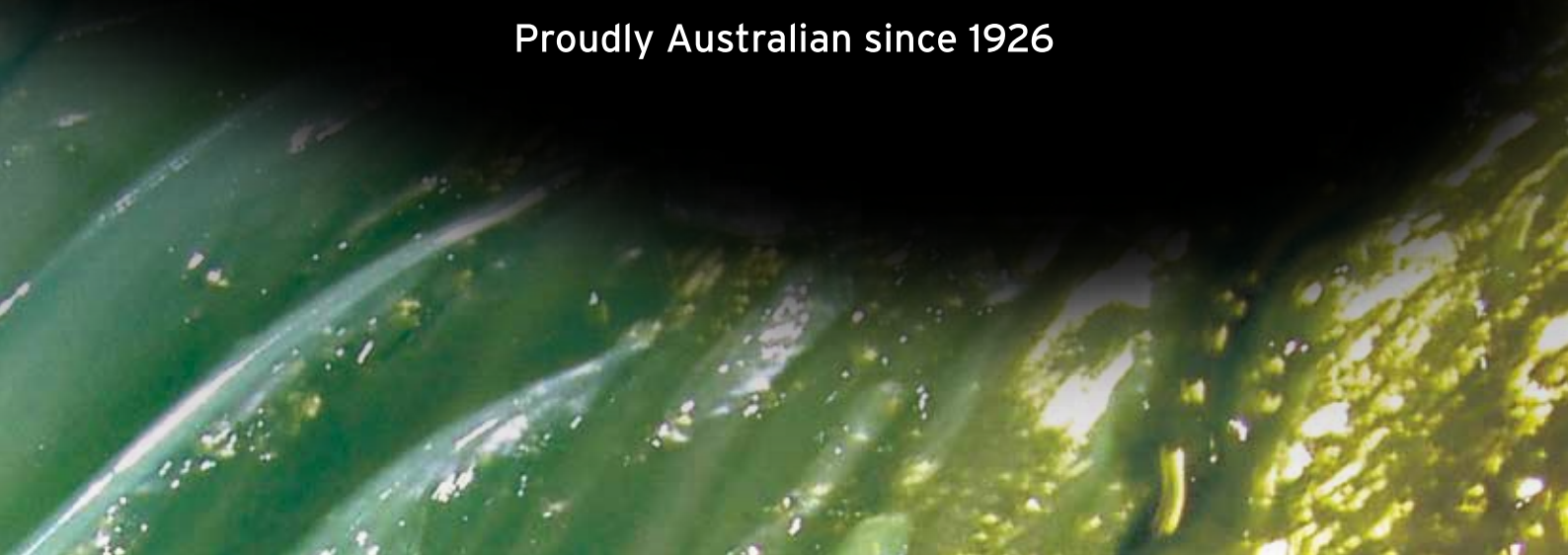


A Better Class of Oil



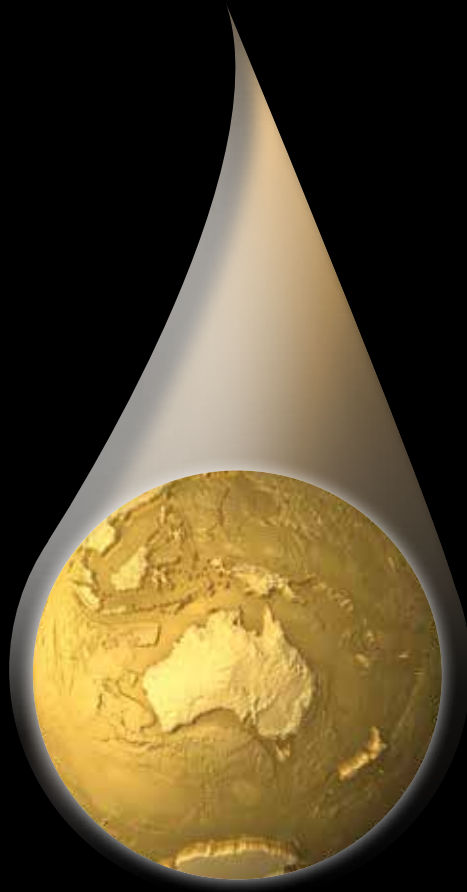
GREASES GUIDE

Proudly Australian since 1926





A Better Class of Oil



GREASES GUIDE

Proudly Australian since 1926

A grease is designed to lubricate bearing and gear applications where a continuous oil supply cannot be maintained or retained.

Greases are defined as solid or semi-solid materials produced by the dispersion of a thickening agent in a liquid lubricant (like adding a sponge to water).

Greases are manufactured in either a grease kettle or in a contractor. A soap-based grease uses a thickener made by reacting a metallic hydroxide with a fatty acid, which is where we get our basic types from, eg lithium soap.

Non-soap greases include silica, polyurea and clay (bentone).

Depending on what the grease needs to achieve, different thickeners and base oils can be used.

When selecting a grease for an application, factors such as operating temperature, water resistance, oxidation stability and the grease characteristics, come into play. Please see the section on grease selection.

GREASE CHARACTERISTICS

The most important factors affecting the properties and characteristics of a grease are:

- Amount and type of thickener
- Additives
- Base oils

A grease is expected to:

- Reduce friction and wear
- Provide corrosion protection
- Seal bearings from water and contaminants
- Resist leakage, dripping and throw off
- Resist change in structure or consistency during service
- Maintain mobility under conditions of application
- Be compatible with seals
- Tolerate or repel moisture

GREASE DEFINITIONS

Consistency - is the degree of hardness of a grease and may vary considerably with temperature. This has been classified by the National Lubricating Grease Institute (NLGI) into the following categories:

| NLGI GRADE PENETRATION @ 25°C (1/10th mm) | |
|---|-----------|
| 000 | 445 - 475 |
| 00 | 400 - 430 |
| 0 | 355 - 385 |
| 1 | 310 - 340 |
| 2 | 265 - 295 |
| 3 | 220 - 250 |
| 4 | 175 - 205 |
| 5 | 130 - 160 |
| 6 (Block Grease) | 85 - 115 |

Oil Separation - is the percentage of oil which separates from the grease under static (eg. storage) conditions. It cannot predict separation tendencies in use under dynamic conditions. Some greases have more tendency to bleed than others depending on the soap type and base oil in use.

High Temperature Stability - is the ability of a grease to retain its' consistency, structure and performance at temperatures above 125°C.

GREASE SERVICE CLASSIFICATION

There are 5 categories for Automotive Service Greases developed by the NLGI. The classification (ASTM D 4950) covers greases designed for the lubrication of chassis components and wheel bearings of passenger cars, trucks and other vehicles. The NLGI classifies automotive service greases into two main groups. Chassis greases, designed by the prefix L and Wheel Bearing greases designated by the prefix G. These are shown in the following table.

| CATEGORY | SERVICE | PERFORMANCE |
|--------------------------|---|---|
| LA Chassis | Frequent relubrication intervals (<3200 km). Mild duty (non-critical applications.) | Oxidation resistant, shear stable, and corrosion and wear protective. |
| LB Chassis | Prolonged relubrication intervals (>3200 km). Mild to severe duty (high loads, vibration, exposure to water). | Oxidation resistant, shear stable, and corrosion and wear protective even under heavy loads and in presence of aqueous contamination. Temperature range: -40°C to 120°C |
| GA Wheel Bearings | Frequent lubrication intervals. Mild duty (non-critical applications.) | Temperature range: -20°C to 70°C |
| GB Wheel Bearings | Mild to moderate duty (cars, trucks in urban and highway service). | Oxidation and evaporation resistant, shear stable and corrosion and wear protective. Temperature range: -40°C to 120°C with occasional excursions to 160°C |
| GC Wheel Bearings | Mild to heavy duty (vehicles in frequent stop-and-go service, trailer hauling, mountain driving, etc). | Oxidation and evaporation resistant, shear stable and corrosion and wear protective. Temperature range: -40°C to 120°C with frequent excursions to 200°C |

GREASE SHELF LIFE

The shelf life of any grease is affected by the type and amount of thickener used, consistency of the grease, manufacturing method employed and the formulation complexity. Generally straight Lithium, Lithium Complex, Calcium and Calcium Complex greases remain stable for a long time. Aluminium Complex greases tend to set and harden, but remain stable. Bentone and Barium greases tend to soften on aging.

Based on these observations: The shelf life of most Penrite greases is about 5 years. However, Semi Fluid Grease, Indgrease Lith EP 00, and QCS Grease MXG 0 only have a 2 year shelf life.

Grease Service Classification

Grease Shelf Life



GREASE TYPES

There are many types of greases which are shown below. As can be seen they have different properties which helps to define where they are best suited.

| Thickener | Typical Drop Point °C | Max Service Continuous Operating Temp, °C | High Temp Use | Shear Stability | Water Resistance | Structure |
|-------------------|-----------------------|---|---------------|-----------------|------------------|-----------|
| Calcium | 100 | < 80 | ☐ | ○ | ■ | ☐ |
| Lithium | 160 - 200 | 125 | ■ | ■ | ■ | ☐ |
| Calcium Complex | > 260 | 150 | ■ | ■ | ■ | ☐ △ |
| Lithium Complex | > 240 | 160 | ■ | ■ | ■ | ☐ |
| Aluminium Complex | > 260 | 150 | ■ | ■ | ■ | ☐ ▽ |
| Barium Complex | > 200 | 150 | ■ | ○ | ■ | ▽ |
| Polyurea | > 230 | 150 | ■ | ■ | ■ | ☐ |
| Bentone | NA | 150 | ■ | ○ | ■ | ☐ |
| Sodium | 170 - 190 | 125 | ■ | ■ | ■ | ▽ |

☐ Very Poor ■ Poor ○ Fair ■ Good ■ Excellent
 △ Buttery ☐ Smooth ▽ Fibrous ▽ Gel ■ Opaque

Standard or conventional soap greases include lithium, aluminium and calcium and are made via a simple reaction of a metal hydroxide and a fatty acid. These are commonly used for general purpose applications. Sodium soaps have also been used in the past but are comparatively rare.

Complex soap greases are made with two or more carboxylic acids similar to the standard greases, but the thickener contains two dissimilar fatty acids one of which is called a "complexing agent". The finished grease has improved high temperature performance compared to conventional soaps. Lithium, aluminium and calcium complexes are the most common type.

Functional Soaps are complex soaps where the additives are part of the soap structure rather than blended in with the oil. This further enhances the anti-wear and load carrying ability of the grease. Examples include calcium sulphonate soaps, some mixed calcium/lithium complex soaps and lithium/bismuth complexes.

Non-soap thickeners are where inorganic solids (usually insoluble in the base oil) or polymers are used as thickeners. This can impart very high temperature resistance to the extent there is no drop point for the grease and it is termed "non-melt". In these cases, the application of the grease is determined by the stability of the base oil. Commonly used non-soap greases are clays (bentone), silica gel, PTFE, polyurea, polypropylene and polyethylene.

GREASE COMPATIBILITY

Occasionally, grease substitution in an application may be necessary to correct problems arising from the original product in service. If the thickeners are incompatible, the mixture will not meet the properties of the individual greases and in some cases, the greases will fall apart. The below table provides a rough guide.

| | Calcium | Lithium | Calcium Complex | Lithium Complex | Aluminium Complex | Barium Complex | Polyurea | Bentone | Sodium |
|-------------------|---------|---------|-----------------|-----------------|-------------------|----------------|----------|---------|--------|
| Calcium | | ✓ | ✓ | ✓ | ● | ✗ | ✓ | ✗ | ✗ |
| Lithium | ✓ | | ✓ | ✓ | ● | ● | ✓ | ✗ | ● |
| Calcium Complex | ✓ | ✓ | | ● | ✗ | ● | ● | ✗ | ✗ |
| Lithium Complex | ✓ | ✓ | ● | | ● | ● | ✓ | ✗ | ● |
| Aluminium Complex | ✗ | ● | ✗ | ● | | ✗ | ● | ✗ | ✗ |
| Barium Complex | ✗ | ● | ● | ● | ✗ | | ● | ✗ | ✗ |
| Polyurea | ✓ | ✓ | ● | ✓ | ● | ● | | ✗ | ✗ |
| Bentone | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ | | ✗ |
| Sodium | ✗ | ● | ✗ | ● | ✗ | ✗ | ✗ | ✗ | |

✓ **Compatible** ✗ **Incompatible** ● **Borderline**

With the great variety of greases found on the market it is important to know whether or not there may be a compatibility issue before a new grease is introduced in the application. Compatibility depends on whether or not the thickener systems and/or base oils are mixable. In rare cases there can be problems between different additives, but it seldom destroys the thickener matrix.

When mixing two different greases, the below things can occur:

- Nothing happens. This means that the two products are compatible.
- Softening. The components are incompatible and the soap structures break down. The result is a high degree of leakage which can lead to starvation in the bearing and then failure.
- Stiffening. This is a rare reaction but imagine if this was to happen in a centralized lubrication pipe-line.

Compatibility of greases can sometimes be temperature dependent. Sometimes it is not until the equipment reaches operating temperature does a problem occur and by that stage, equipment failure is likely.

As a general rule, soap types should not be mixed if the chart shows borderline compatibility.

APPLYING GREASE

Over-packing and over-greasing of bearings accounts for more failures than any other factor. Excess grease in a bearing cavity increases internal friction, which in turn raises the bearing temperature above the dropping point of the grease. This causes oil separation and eventually lack of lubrication. When packing a split housing pillow block bearing ensure that the grease cavity is **only one-third full**.

Applying Grease

GREASING INTERVALS

Determination of regreasing interval depends on the following factors:

- Severity of service
- Shock loading
- Condition of seals
- Contamination from the environment

If the bearing is running a temperature above normal, with no indication of grease leakage, a small amount of grease should be applied. In approximately two hours the bearing should be running cool.

However, if the bearing's temperature has increased, the grease fitting should be removed to determine if excess grease is present.

If removal of the grease fitting does not release grease from the bearing, the grease may have oxidised. The bearing should then be thoroughly cleaned and refilled with new grease.

Greasing Intervals

METHODS OF APPLICATION

PUMPING

Positive displacement (fixed delivery) gear and piston pumps are used to transfer grease because of their low shear characteristics.

Vane or centrifugal pumps should never be used as they tend to shear stress the grease.

PACKING

Over-packing accounts for more bearing failures than any other factor. Excess grease in the bearing increases internal friction, which can raise the temperature of the grease beyond its dropping point. The grease will then separate and lose its lubricating properties.

For bearings in housings without vents, gun greasing should be applied with care to protect seals from rupturing. For example, even hand guns can generate up to 10,000 psi (68,970 kPa).

Procedure for greasing bearings with vents:

1. Remove vent plug with the bearing stopped
2. Wipe off grease fitting and apply until new grease comes out of the vent
3. With the vent plug still removed, rotate the bearing slowly for a minute or two so that it can expel any excess grease.
4. Close the vent and clean off the fitting.
5. After several hours operation, check to ensure that the bearing temperature is normal.

Methods of Application

GREASE SELECTION

The type of the load, size and the direction is also important to know. For heavily loaded applications a high viscosity is needed to keep the surfaces separated. If it is a question of shock loads or boundary lubrication, EP additives or solids could be necessary.

Vibrating applications could also lead to lubricating problems. Vibrations often cause increased oil separation and leakage. To deal with this the grease needs to have a high thickener content and a good mechanical stability. In many cases, greases with solid lubricant additives are used.

The first thing is of course to identify the component. What is actually going to be lubricated? The most common components are rolling bearings, plain bearings, gears and couplings. There are different demands on the properties of grease not only depending on type, but also on the manufacturer of the component and guidance is best found there.

Position aspects:

- Vertical position: The bearing is preferably mounted in a vertical position in order to avoid leakage of the grease.
- Horizontal position: If the bearing is mounted horizontally it is critical to take the leakage resistance properties of the grease into account.

Two important factors are the size and speed. These stand in relation both to the stress and the thickness of the lubricating film. Small bearings rotating at high speed require a stiff grease with a high degree of thickener and a base oil with rather low viscosity. Large bearings on the other hand often operate at low speeds and are heavily loaded hence the grease should have a highly viscous base oil.

Speed Aspects:

- Rotational speed: Bearing speed, in number of revolutions per minute (rpm),
- Oscillating movements (in bearings which do not revolve but swing back & forth): This parameter is used to give preference to greases with good anti-brinelling performance and/or greases with favourable oil separation properties.
- Frequent start-up / shutdown.

Re-greasing intervals are determined from:

- severity of service
- environment
- condition of seals
- shock loading

The following chart provides a guide to re-greasing intervals and the amount of grease to be applied.



GREASE LUBRICATION SCHEDULE SPHERICAL ROLLER BEARINGS

| Shaft Size | | Amount of Grease | | Operating Speed (RPM) | | | | | | | | | |
|--|-----------|------------------|-----------------|----------------------------|------|------|------|------|------|------|------|------|------|
| | | | | 500 | 1000 | 1500 | 2000 | 2200 | 2700 | 3000 | 3500 | 4000 | 4500 |
| Inches | MM | IN ³ | CM ³ | Lubrication Cycle (months) | | | | | | | | | |
| 3/4 - 1 | 25 | 0.39 | 6.4 | 6 | 6 | 6 | 4 | 4 | 4 | 2 | 2 | 1 | 1 |
| 1/8 - 1/4 | 30 | 0.47 | 7.7 | 6 | 6 | 4 | 2 | 2 | 2 | 1 | 1 | 1 | 1 |
| 1/16 - 1/2 | 35 | 0.56 | 9.2 | 6 | 4 | 4 | 2 | 2 | 1 | 1 | 1 | 1 | 1/2 |
| 1/8 - 3/4 | 40 | 0.80 | 13.1 | 6 | 4 | 2 | 2 | 1 | 1 | 1 | 1 | 1/2 | |
| 1 ⁵ / ₁₆ - 2 | 45 - 50 | 0.89 | 14.6 | 6 | 4 | 2 | 1 | 1 | 1 | 1 | 1/2 | | |
| 2 ³ / ₁₆ - 2 ¹ / ₄ | 55 | 1.09 | 17.6 | 6 | 4 | 2 | 1 | 1 | 1 | 1/2 | | | |
| 2 ³ / ₁₆ - 2 ¹ / ₂ | 60 | 1.30 | 21.3 | 4 | 2 | 1 | 1 | 1 | 1/2 | | | | |
| 2 ¹ / ₁₆ - 3 | 65 - 75 | 2.42 | 39.7 | 4 | 2 | 1 | 1 | 1/2 | | | | | |
| 3 ³ / ₁₆ - 3 ¹ / ₂ | 80 - 85 | 3.92 | 64.2 | 4 | 2 | 1 | 1/2 | | | | | | |
| 3 ¹ / ₁₆ - 4 | 90 - 100 | 5.71 | 93.6 | 4 | 1 | 1/2 | | | | | | | |
| 4 ³ / ₁₅ - 4 ¹ / ₂ | 110 - 115 | 6.50 | 106.5 | 4 | 1 | 1/2 | | | | | | | |
| 4 ¹⁵ / ₁₆ - 5 | 125 | 10.00 | 163.9 | 2 | 1 | 1/2 | | | | | | | |

TEMPERATURE 90°C (200°F) HORIZONTAL SHAFT EQUIPMENT

Load aspects:

- Load ratio (C/P): Ratio of the dynamic load (C) divided by the calculated dynamic load (P). This parameter is used to select the lubricants load ability, such as anti-wear properties and EP.
- Shock load: Bearings subjected to short, impulse-like loads, like railway bogie bearings or wind peaks acting on wind turbines and their gearbox bearings.
- Heavy vibrations (as in rail axle boxes & vibrating screens): preference for greases with good mechanical stability.
- Low friction requirement: Relevant in applications where a low start-up or running torque is required, or if a low running temperature is wanted. Preference for low base oil viscosity. Typical example: textile industry, spindles and robots.

It is important that new grease gets into the contact zone, but with oscillating movements (in for example sliding on excavators), it is hard to build up a strong lubricating film. Depending on the bearing manufacturer, the lubricating grooves are designed differently and it is important to assure that these grooves spread the lubricant in the right way. Traditionally greases containing molybdenum disulphide have been preferred but other options are available.

To use a centralised lubricating system is a popular and good way to ensure that the bearings are continuously lubricated. But again the manufacturers of these systems have different specifications on what types of greases should be used. It is important that this is investigated and that the actual application determines which lubricating grease to use and that the right centralised lubricating system is then chosen.

Maintenance aspects:

- Centralised lubrication system: Greases with good pumpability are essential.
- Sealed / shielded bearing applications: Very long grease life is required especially when applications are running at high temperatures. Typical examples are car alternators, high-speed electromotor (in which bearing life depends upon grease life).

TEMPERATURES

The temperature interval for basic multipurpose greases runs from -30°C to approximately 120°C. This range covers the majority of the grease lubricated applications and temperature-wise, mineral oil based lithium grease is a good candidate here. But problems occur rapidly at both ends of the temperature range.

Increased temperatures lower the lifetime of a grease. A good rule of thumb is that above 70°C lifetime halves with every 15°C. It is therefore important to increase the thermal stability of all the components in a lubricating grease (thickener, base oil and additives) if the product is to be used at temperatures above 120°C.

The range between 120°C and 150°C is basically covered by complex greases and thermally stable base oils. The dense fibre structure of the complex thickeners protects the oil from oxidation allowing use at higher temperatures. It is also important that the thickener keeps the oil in the structure since increased temperature lowers the base oil viscosity and hence increases the separation rate.

Real problems occur at temperatures between 150°C and 200°C. Most of the additives start to decompose. These reactive degradation products speed up the oxidation of the grease. Mineral oil based products seldom cope with these conditions for more than shorts periods of time. Often synthetic based oils are chosen, but even then it is important to assure good lubrication with frequent lubrication intervals.

To lubricate at temperatures above 200°C is extremely difficult. Some of the high temperature greases found on the market today can handle this challenge, but will only operate well for a very limited period of time. If the temperature is continuously over 200°C solid lubricants, such as graphite or copper, might be the solution.

Greases based on perfluoropolyether can be used for special applications at temperatures between 200°C and 280°C. The drawbacks of these types of products are that they are expensive, and that they can form toxic gases at temperatures above 290°C.

Even so called non-melt greases such as bentone clay are limited by the base oils oxidation resistance. In extreme cases, the oil can oxidise and/or bleed out leaving the clay behind.

Low temperatures usually require the use of low viscosity and/or synthetic base oils to ensure proper lubrication occurs.

Environmental aspects:

- Rust protection: Important in case of aggressive water contamination, such as in pulp and paper applications, steel manufacturing and marine.
- Water resistance: Important in case of a highly humid environment or water spraying onto the bearing. Typical examples: water cooled bearings such as in the steel industry, car wheel bearings.
- Non-toxicity in case of (incidental) food contact.
- Biodegradability, important in case of significant loss lubrication. I.e. applications where the grease leaks into the environment. Typically in applications in heavy vehicle and heavy off-road equipment in farming and forestry.
- Low noise requirement.
- Radiation resistant, as in nuclear radiation.

APPLICATION AREAS

A General Guideline

The following are recommendations of different kinds of lubricants and their usage.¹

| APPLICATION AREAS | APPLICATION CHARACTERISTICS | LUBRICANT PROPERTIES | RECOMMENDED GREASE |
|--|--|--|---|
| AUTOMOTIVE | | | |
| HEAVY DUTY TRUCKS | | | |
| Serviceable wheel bearing characteristics | Typical bearing size vary from 40 to 120mm Wide operating temperature range Medium operating speed Medium Loads | High temperature performance Wear resistance and load carrying capacity Low temperature start-up Corrosion Protection | Lithium complex thickened with EP and Rust protecting properties Base oil viscosities (Depending on Operational Speed) between ISO 100 and 320. |
| Sealed for life wheel bearing hub units for cars, vans and truck characteristics | Typical bearing size vary from 40 to 120mm Wide operating temperature range (Very high peak temperatures) Medium Operating Speed Medium Operating Loads | High temperature performance Wear resistance and load carrying capacity Low temperature start-up Corrosion protection Oxidation stability and mechanical stability Seal compatibility | Lithium complex thickened with EP and rust protecting properties. Base oil viscosities (Depending on Operational Speed) between ISO 100 and 320 Oxidation stable (Synthetic) Base oil preferred. |
| BICYCLES AND SKATES | Bearing sizes from 10 to 30mm Low operating temperature range Generally low operating speeds Low Loads | Low running torques Seal compatibilities | Lithium or anhydrous calcium thickened with very low base oil viscosities. |
| INDUSTRIAL, OFF HIGHWAY AND AGRICULTURAL | | | |
| Argo, Forestry and Off-Highway excavators, Dumpsters, Cranes, Fork Lift Trucks, etc. Mast rollers, Slewing Bearings, (Open) Gears, and Elevator guides. | Bearings of all sizes Medium operating temperature range Generally low operating speed High loads common | Mechanical Stability, Load carrying ability Water Resistance Long Grease life Corrosion Protection | Lithium mixed Lithium calcium and/or Anhydrous Calcium thickened with EP and Rust protecting properties. Base Oil viscosities (Depending on operational Speed) from ISO 100 to above 1000 if necessary. |
| RAILWAY | | | |
| Generators & Traction Engines | Large bearings (>120mm) Low to Medium Operating Temperatures Medium to Very High Operating Speeds Medium Loads | Mechanical Stability Long Grease life Low temperature start-up | Lithium complex thickened with relative low base oil viscosities (Below ISO 150) |
| Axle box bearings (Labyrinth) sealed | Large bearings (>120mm) Low to Medium Operating Temperatures Low to Medium Operating Speeds Medium Loads, however with the Peak Shock Loads. | Mechanical Stability Load Carrying Capacity Long Grease life Low temperature start-up | Lithium complex thickened with EP properties. Base oil viscosities depending on operational speeds. Environmental and operating temperatures (From ISO 46 up to above 220) |
| ELECTRIC MOTORS Small / Medium / Large | All bearing sizes (>10mm) Medium to High operating Temperatures Medium operating speeds Relatively low loads | Long grease life Quiet running Low resistance Calculated oil separation to prevent leakage seal compatibility | Lithium (Complex) thickened with relatively low base oil viscosities, non-EP or non-aggressive EP and ISO 100 base oil. |

| APPLICATION AREAS | APPLICATION CHARACTERISTICS | LUBRICANT PROPERTIES | RECOMMENDED GREASE |
|---|---|--|---|
| INDUSTRIAL, OFF HIGHWAY AND AGRICULTURAL (CONTINUED) | | | |
| Centrifugal Fan | Bearing sizes >30mm Medium to high operating temperatures Medium to Very High operating speeds Medium loads Vibrations | Rust Protection Water Resistance Mechanical Stability Quiet Running Calculated Oil Separation to prevent leakage Seal Compatibility | Lithium (Complex) Thickened with relatively low base oil viscosities |
| Spindles | Bearing sizes 80mm to 160mm Relatively low operating temperatures Very high to extremely high Operating Speeds Low to medium Loads | Very good oil bleed operation to avoid risk of "Starvation" | Lithium (Complex) Thickened with relatively low base oil viscosities |
| STEEL MANUFACTURING | | | |
| Rolling Mill | Bearing sizes 150mm to 300mm Medium to high operating temperatures Low to medium Operating Speeds High Loads | Water Resistance Rust Protection Good Lubricating ability | Water resistance and mechanical stable greases with EP and Rust protecting properties, complex thickened at high temperatures |
| Continuous Caster | Bearing sizes 50mm to 150mm Very high operating temperatures Very Low Operating Speeds High to Very High Loads | High temperature performance Rust Protection Good Lubricating ability and Load carrying ability | Water resistance and mechanical stable greases with EP and Rust protecting properties, complex thickened at high temperatures |
| PULP & PAPER | | | |
| Wet Section | Bearing sizes 60mm to 800mm Low to medium operating temperatures Low to medium Operating Speeds Relatively Low Loads | Water Resistance Rust Protection Wear Protection Lubricating ability | Lithium complex thickened with relative low base oil viscosities (Below ISO 150) |
| Dry Section | Bearing sizes 60mm to 800mm Medium to high operating temperatures Medium to high Operating Speeds Relatively Low Loads | High Temperature Performance Rust Protection Wear Protection Lubricating ability | Very oxidation stable (synthetic base) Lithium complex thickened greases with relatively high base oil viscosities (depending on operational speed above ISO 320) with good Rust preventing properties, but usually without any EP additivity |

| APPLICATION AREAS | APPLICATION CHARACTERISTICS | LUBRICANT PROPERTIES | RECOMMENDED GREASE |
|----------------------------|--|---|---|
| MINING AND QUARRIES | | | |
| Vibrating Screens | All bearing sizes Medium to high operating temperatures Medium operating speeds Heavy shock loads | Mechanical Stability Load carrying ability Good EP properties Rust protection Eventually water resistance | All products, mixed Lithium / Calcium thickened, combining mechanical stability with calculated oil bleed to avoid false brinelling, Good rust preventing and EP properties, Water resistance if required |
| Roll Crushers | Bearing sizes 400mm to 1000mm Low to medium operating temperatures Low to very low operating speeds Very high shock loads | Mechanical Stability Load carrying ability Wear Protection | High base oil viscosity (ISO 1000) product containing EP additives, ideally mixed Lithium / Calcium thickened |
| Open Gears | Any operating temperatures Relatively slow (Rolling Sliding) speed Very high shock loads | Mechanical Stability Load carrying ability Wear Protection | High base oil viscosity (ISO 1000) products, preferably functional thickened (EP additives attached to the thickener matrix, as in ALASSCA) |

Please note that the samples and selections are suggestions only. They are based on general rules and since every application is unique, these listings are meant to be general guidelines. They do not take into account any detailed characteristics as features of the specific application, hence we cannot take responsibility for any lubricant selection based on these charts alone. The final choice of lubricant should be based on careful evaluation of the specific circumstances of each individual application.



LITHIUM GREASES

EXTREME PRESSURE GREASE

EPGR00045, EPGR0005, EPGR0025, EPGR020, EPGR055, EPGR180

Red coloured lithium grease for general-purpose industrial and automotive greasing applications.
Key Specifications: NLGI 2

MOLYGREASE EP 3%

MOLY00045, MOLY0005, MOLY0025, MOLY020, MOLY055, MOLY180

Lithium grease containing molybdenum disulphide for the lubrication of ball joints, king pins and universal joints and open surfaces such as trailer couplings.
Key Specifications: NLGI 2

INDGREASE LITH EP 0

IGRLITHEP0020

An NLGI 0, lithium based, mineral lubricating grease. It is made with a combination of antioxidants, corrosion inhibitors and Extreme Pressure (EP) and Anti Wear (AW) additives. It has a base oil viscosity of ISO VG 150 and is a semi-fluid type grease for use in many types of automotive and industrial applications including heavy duty service where high loads are encountered. It is suitable for rolling element bearings, plain bearings, gears and couplings, where an NLGI 0 grease is required.

Key Specifications: NLGI 0, DIN 51502: KPOK-20, ISO 6743: ISO-L-XCCFBO

INDGREASE LITH R3

IGRLR300045

A high quality NLGI 3 consistency multi-purpose Rust & Oxidation (R&O) type, lithium soap thickened grease. It is designed as a multi-service grease for industrial applications, particularly high speed, low load bearing applications. It is an NLGI 3 grade with a base oil viscosity of ISO VG 100. Recommended for use in most types of industrial applications operating under high speed, low load conditions. It is suitable for rolling element bearings, plain bearings, gears and couplings. Applications include electric motors, pumps, fans & generators.

Key Specifications: NLGI 3, DIN 51502: KP3K-20, ISO 6743: ISO-L-XCCFA3

SEMI FLUID GREASE

SEMIO0045, SEMIO20

NLGI 00 semi-fluid grease. Ideal for industrial applications requiring an extreme pressure fluid grease such as centralised systems, slasher gear boxes, fifth wheel and grease filled hubs. Can be used where either NLGI 00 or 000 grades are required.

Key Specifications: NLGI 00



LITHIUM COMPLEX GREASES

HIGH TEMPERATURE WHEEL BEARING GREASE

HTGR00045, HTGR0005, HTGR0025, HTGR020, HTGR055, HTGR180

Purple-coloured, lithium complex grease for the lubrication of wheel bearings, particularly those in vehicles fitted with disc brakes, trailer applications, marine use and for general chassis greasing. Excellent resistance to water washout and high load carrying capability. Ideal as a general purpose plant grease where a wide range of operating temperatures and applications are found.

Key Specifications: NLGI 2

ACT GREASE XEP2

ACTXEP200045, ACTXXEP2180

A tenacious, highly specialised semi-synthetic lithium complex grease designed for use in Agricultural and Construction equipment as well as on highway Trucks. Manufactured from a bismuth EP/AW system and utilising carefully blended polymers, it is coloured bright red-orange and meets NLGI 2 as well as having a 560 cSt base oil viscosity. This product is not recommended for use in high speed bearings in cars or other applications.

Key Specifications: NLGI 2, DIN 51502: KP2N-20, ISO 6743: ISO-L-XBDIB2

INDGREASE MOLY HT

INDGRSMOLYHT180

Indgrease Moly HT is a premium heavy duty, NLGI No. 2 grease designed for the mining industry. It is a smooth grey/black grease based on a lithium complex thickener. It is formulated with high quality high viscosity base stocks combined with extreme pressure additives for maximum loading applications and anti-wear protection, molybdenum disulphide for boundary protection against the heaviest sliding and shock or impact loading conditions, and other solids and effective rust, oxidation and corrosion inhibitors. It is also adhesive and cohesive. It will resist "squeeze out" from surfaces requiring lubrication under load conditions. The extreme load capability makes it ideal for bucket pins, plain and roller bearings and all other heavy duty applications in the mining, sugar milling, construction and industry in general. ISO 460 base oil.

Key Specifications: NLGI 2

INDGREASE 100 LXEP2

INDGR100LXEP200045

A premium, high melting point, long life lithium complex grease of NLGI 2 consistency made with a non-aggressive extreme pressure additive. It has a base oil viscosity of ISO VG 100 and is recommended for use in most types of industrial applications operating under high speed and conditions where shock loads, extreme pressure and vibration may occur. It can provide long time protection for rolling element bearings, plain bearings, gears and couplings in applications that include electric motors, pumps, fans & generators.

Key Specifications: NLGI 2, DIN 51502 KP2N-20, ISO 6743: ISO-L-XCDIB2

MARINE GREASE

MARGR00045

Marine Grease has been formulated for use in many marine grease applications. These include boat trailer wheel bearings and general on-board greasing points in leisure craft and fishing fleets including winch gears, bearing buddies, stern drives, steering tubes and cables and prop shaft splines. It may also be used in wheel bearings of vehicles fitted with disc brakes. It is also suitable for other automotive and industrial applications requiring excellent rust and corrosion protection. These include rolling element bearings, plain bearings, chassis parts, gears and couplings, particularly where water is present such as in steel mills, underground tunnelling or mining and ore crushing plants. Contains additional rust inhibitors compared to standard products. ISO 220 base oil and coloured green.

Key Specifications: NLGI 2



CALCIUM COMPLEX GREASES

INDGREASE 1615 WR

INDGR1615WR018, INDGR1615WR180

A calcium sulphonate complex thickened, extreme pressure lubricating grease based on mineral oil. The grease contains antioxidants and corrosion inhibitors. The product does not contain conventional EP- and anti-wear additives since they are built in as an integral part of the soap structure. It is an NLGI 1.5 grade with a base oil viscosity of ISO VG 460. The extreme load carrying capacity and the excellent water resistance make the product a perfect choice for heavily loaded applications or wet and corrosive environments.

Key Specifications: NLGI 1.5, DIN 51 502:KP1.5N-20, ISO 6743: ISO-L-XBDFB1.5

INDGREASE CX 220 WR

INDGRCX220WR020, INDGRCX220WR180

Indgrease CX 220 WR is a NLGI 2, calcium sulphonate complex thickened, extreme pressure lubricating grease based on mineral oil. The grease contains antioxidants and corrosion inhibitors. The product does not contain conventional EP- and anti-wear additives since they are built in as an integral part of the soap structure. It can be used to provide enhanced lubrication and protection for bearings, wire ropes and open gears found usually in marine environments. Other applications include boat trailer wheel bearings and general on-board greasing points in leisure craft and fishing fleets as well as automotive applications. It is also suitable for rolling element bearings, plain bearings, chassis parts, gears and couplings, particularly where water is present such as in steel mills, underground tunneling or mining and ore crushing plants.

Key Specifications: NLGI 2, DIN 51502: KP2N-20, ISO 6743: ISO-L-XBEIB2an NLGI 0.5 grade with a base oil viscosity of 800 cSt. Recommended for use in severe heavy duty applications where high shock loads are common including those in corrosive environments. These include in industrial plants and off-highway equipment used in the mining, agricultural, forestry and construction industries. Especially suited for open gear applications where greases containing solids are normally used. Suitable for use as a wire grease in marine applications. The microcrystalline structure of this grease functions in the same manner as the molybdenum type additives normally used.

Key Specifications: NLGI 0.5, DIN 51502 KPGOG0.5N-30, ISO 6743: ISO-L-XCDIB0.5



MIXED COMPLEX GREASES

QCA GREASE MX9

QCAG00045, QCAG020

Advanced mixed complex grease with 9% solids and with “built-in” extreme pressure and anti-wear properties and based on mineral oil for ultimate performance in agricultural, mining and construction equipment. It also uses special tackifiers to help the product stay in place and adhere to critical surfaces where it can better lubricate metal surfaces. Can be used for the lubrication of ball joints, king pins and universal joints and open surfaces such as trailer couplings and CV Joints.

Key Specifications: NLGI 2



QCS GREASE MXG 0

QCSMXG0018, QCSMXG0180

An advanced technology grease made using a lithium-calcium complex soap with “built-in” extreme pressure and anti-wear properties and based on mineral oil. It is further enhanced by the addition of an anti-oxidant, corrosion inhibitors and 9% graphite. It also uses special tackifiers to help the product stay in place and adhere to critical surfaces where it can better lubricate metal surfaces. It is an NLGI 0 with a base oil viscosity of 500 cSt. Recommended for use in severe heavy duty applications where extreme, heavy shock loads are common. These include in industrial plants and off-highway equipment used in the mining, agricultural, forestry and construction industries. Applications include king pins, sleeve bearings, U-joints, chassis points. Recommended to replace QCA Grease MX9 where NLGI 2 is considered too heavy.

Key Specifications: NLGI 0, DIN 51 502: GOGON-20, ISO 6743: ISO-L-XBDIB0



INDGREASE CXOG-05

INDGRCXOG5018, INDGRCXOG5180

An advanced technology, mixed-complex grease. It is made using a lithium-calcium complex soap with “built-in” extreme pressure and anti-wear properties. These are further enhanced by the addition of anti-oxidant and corrosion inhibitors. It also uses special tackifiers to help the product stay in place and adhere to critical surfaces where it can better lubricate metal surfaces. It is an NLGI 0.5 grade with a base oil viscosity of 800 cSt. Recommended for use in severe heavy duty applications where high shock loads are common including those in corrosive environments. These include in industrial plants and off-highway equipment used in the mining, agricultural, forestry and construction industries. Especially suited for open gear applications where greases containing solids are normally used. Suitable for use as a wire grease in marine applications. The microcrystalline structure of this grease functions in the same manner as the molybdenum type additives normally used.

Key Specifications: NLGI 0.5, DIN 51502 KPGOG0.5N-30, ISO 6743: ISO-L-XCDIB0.5



INDGREASE LCX1100

INDGRLCX1100018, INDGRLCX1100180

A lithium-calcium complex thickened lubricating grease based on a high viscous mineral oil. The grease contains antioxidants, corrosion inhibitors and EP/AW additives based on bismuth technology. The thickener, together with the high viscous base oil, make the product suitable for the lubrication of slow moving and heavily loaded bearings and is ideal for sugar mills. The product has good adhesion and mechanical stability even in presence of water and corrosive fluids. The specially developed bismuth additive package gives the grease a very high load carrying capacity and excellent wear protection. The product is the primary choice for applications where shock loads or severe water flushing can occur and is ideal for marine applications.

Key Specifications: NLGI 2



CLAY (BENTONE) BASED GREASES

INDGREASE BM3

IGRBM300045

A bentone based grease containing molybdenum disulphide. It is particularly suitable for Terex Finlay BL - Pegson Cone Crushers. May also be used for the lubrication of ball joints, king pins and universal joints and open surfaces such as trailer couplings and where high temperatures are experienced and in marine environments.

Key Specifications: NLGI 3

BENTONE HD GREASE

BENHDGR00045

An NLGI No. 2, high temperature automotive and industrial grease manufactured from high quality base oils and a bentonite (clay) based thickener. It is formulated with extreme pressure additives to assist in the protection against wear in equipment involved in heavily loaded applications. Being a clay based grease, it is excellent at withstanding high temperatures. It has a base oil viscosity of ISO VG 460.

Key Specifications: NLGI 2

COPPER EZE

CEZE00005, CEZE0005, CEZE0025

Non-melt, bentone-based anti-seize compound containing copper and other solid lubricants. Ideal for protecting external components against seizing and corrosion. Recommended for coating threads, nuts and bolts, exhaust manifold studs and drum/disc brake external parts. NB: Must not be applied to brake friction surfaces nor used for lubricating/assembling engine/gear train internal components.

Key Specifications: NLGI 1.5

OTHER GREASE PRODUCTS

RUBBER GREASE

RUBGR0005, RUBGR020

Red, clay-based grease with castor base oil for lubrication of natural or synthetic rubber components where a grease is required that will not perish rubbers.

Key Specifications: NLGI 2

GRAPHITE GREASE

GRGR0005

Calcium-based grease containing graphite for lubrication of brake cables, flexible drives, exposed chains and for general chassis lubrication of pre-1960 vehicles.

Key Specifications: NLGI 3



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