ELBA GREASES

Comprehensive Understanding of Elba Greases

The following should serve to enable you to discern an application and address it in the proper manner, making the proper recommendation for usage. You will find that our **ELBA GREASES** will be suited for most of the applications you encounter and will perform much better than the grease already being used, especially if there are lubrication problems encountered due to friction-related heat and wear.

When it comes to water resistance, dropping point, mechanical stability, shear, oxidation, rust and corrosion protection, pump ability, dispensability and anti-wear capabilities, no other multipurpose grease can compare on either quality or price. Our **ELBA GREASES** is truly the all-temp/water resistant/anti wear grease of the new millennium. It saves and pays to use ELBA greases . . . the leaders in semi-solid lubrication.

On various occasions, we have received calls regarding the differences in greases and why those differences exist. Questions ranging from the areas and reasons for usage to the differences in bases and thickeners are worthy of discussion so that you may better understand the whys and reasons for their diverse applications. Also, the dangers involved in the mixing of greases that are not compatible must be understood and avoided in order to prevent a lubrication failure.

First, *what is grease?* A lubricating grease mixture contains a metallic soap made from natural fatty materials which are rendered from the fatty tissue of plants, animals and fish. The differences between fats and oils are such: If the product solidifies at a temperature of approximately 68°F, it is called a fat. If it is liquefied at this temperature, then it is oil. We should not confuse these with petroleum oils due to their origin and will refer to both fats and fatty oils as fats.

The process of making soaps out of fats is called saponification. This is when a mass of fatty molecules are brought into contact with certain kinds of metallic compounds under the right conditions whereupon they start a process of trading chemical properties. The metal part of a metallic hydroxide atom trades places with the acid hydrogen atom that is attached to an oxygen atom on the end carboxyl group. This is saponification, with the end result being a molecule of metallic soap. This soap supplies a fiber structure which gives the grease a semi-solid body. This, in turn, determines to a large extent the physical characteristics of the grease and the way it will perform its lubricating tasks.

This metallic soap is then mixed with a petroleum or synthetic oil to form a base lubricating grease. This procedure is done at the end of the saponification process while the soap is still hot. The proper quantity of oil must slowly be worked into the soap in order to give it the desired consistency. By using different kinds of metallic compounds and fats and varying the method of manufacturing, many different types of grease can be produced, each possessing a distinct physical characteristic to perform the job for which it was designed.

The factors that influence these characteristics are:

1. The kind of metal atom in the soap
2. The fats from which the soap is made
3. The percentage of soap which is used
4. The physical characteristics of the fluid phase
5. Other materials that form an integral part of the original mix
6. Chemical additives
7. Techniques in manufacturing

Greases have long been classified on the basis of the metallic atom that is used in the soap. They are still classified as such in the commercial system today. Let's look at some and understand their characteristics and abilities.

CALCIUM GREASE

Elba Calcium greases are some of the oldest greases manufactured. They are made by chemically reacting hydrated lime with tallow fatty acid in the presence of mineral oil. After saponification is complete, more mineral oil is added, along with water as a structure modifier, to obtain the desired consistency. They are smooth and buttery in texture, have excellent water resistance, a fair mechanical stability, are easy to apply and have melting points just under the boiling point of water. Their lower temperature characteristics are governed by the mineral oil that is used as a dilution. Their maximum temperature is usually limited to about 150°F, while they may survive 200°F for short periods of time. Calcium grease is used in areas where temperatures axe not encountered that would destroy the structure.

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CALCIUM 12 HYDROXY STEARATE GREASE

This grease is made by reacting 12-hydroxy-stearic acid with hydrated lime and diluting with mineral oil. It does not require the addition of water to modify structure and is sometimes referred to as anhydrous calcium grease. It has excellent water resistance, good mechanical stability, and its low temperature properties are also dependent on the mineral oil used. The melting or dropping point is usually around 250°F and can be used in areas where conventional calcium cannot perform.

CALCIUM COMPLEX GREASE

Elba Calcium complex grease is the most current of the three, being around the marketplace for about 30 years. It is made by reacting two dissimilar acids with hydrated lime to form a complex molecule. These dissimilar acids, acetic and stearic, when increased to the proper amounts, will yield a natural, high, extreme-pressure rating, usually around a 55 on the Timken O.K. Load. This is one of their advantages. They also have the advantage of good stability at higher temperatures and are extremely resistant to water washout. The disadvantages are that they harden considerably at elevated temperatures, separate under pressure, cause caking when used in pressurized central systems, have poor pump ability and mechanical stability, softening rapidly when sheared. Calcium complexes should not be considered as multipurpose greases. They are very useful, but should be considered carefully beforehand.

CALCIUM SULFONATE GREASE

Elba CSC Tacky calcium sulfonates are the most versatile of the calcium greases. They have good EP properties and are very water resistant. They have good mechanical stability, corrosion resistance, and higher temperature applications. Calcium sulfonate is the only one of the calcium greases that can be considered multipurpose grease.

SODIUM SOAP THICKENED GREASE

Most sodium greases have a very fibrous texture, but can be made smooth by altering the raw materials and manufacturing methods. They are made by reacting sodium hydroxide with fats, dehydrating and adding mineral oil after saponification is complete. They have been a long-time standard for wheel bearing grease. Their advantages are high melting points, good adhesive properties and good cohesive properties allowing the grease to flow in a stream with the moving part and not channel out when in use. Because of this, it also resists centrifugal forces. The main disadvantage is its solubility in water. This lends to high water washout and should not be used in areas where water is a problem. This is one reason there has been an objection to its use as a wheel bearing grease. Automotive manufacturers are switching to greases that have a better resistance to water washout. The dropping point ranges from 300° - 400°F and is dependent on the raw materials used and the methods of manufacturing. Sodium greases are still used widely in bearings, universal joints and anti-friction bearings where low to medium speeds and light to heavy loads are encountered.

BARIUM COMPLEX GREASE

Elba BC 2M and Elba BC 2S are barium complexes were one of the first multipurpose greases. They are made by reacting barium hydroxide in a crystalline form with a fatty acid, complexing the soap with stabilizing substances and then blending with the desired amount of oil. Textures can vary from buttery to fibrous depending on the complexing agent used. The fibrous is the most common. The dropping points range from 380° - 485°F, and is fairly stable to shear and working. They are water resistant and act as fair rust preventatives. They are not very pump able at cool temperatures, but can be made so by adjusting the base oil. Barium complexes a fairly good multipurpose grease, but is

expensive and difficult to manufacture. These greases work very well in wheel bearings, water pumps, chassis and universal joints. They also work well as an outside gear lubricant because of water resistance and have excellent adhesive properties.

ALUMINUM STEARATE GREASE

These greases are usually made by a process called double-decomposition. The aluminum soap is prepared by the action of a water soluble alkaline soap on a solution of aluminum sulfate. The precipitated aluminum soap is washed free of impurities and dried. It is then dissolved in mineral oil and thickened to the required nature. These greases are not very popular due to their high costs in relation to some of their poor properties. They are clear, transparent and smooth, but have significant texture changes with a change in temperature. They can be used only in low temperatures below 170°F because they begin to soften rapidly at this point. They have excellent water resistance, but very poor mechanical stability. For the cost, conventional calcium grease has much more to offer than aluminum soap base grease.

ALUMINUM COMPLEX GREASE

Elba FG AC 2 these greases provide a wider range of applications than multipurpose types. They are made from two dissimilar acids reacted with aluminum iso-propoxide to form a complex soap molecule. They have high dropping points, excellent water resistance, good shear stability and good pump ability depending on the mineral oil used. They respond well to additive treatments which fortifies the grease for high loads. They're oxidation and rust inhibited.

LITHIUM SOAP THICKENED GREASE

Elba Lithium soap greases hold the highest value as true multipurpose grease at a reasonably inexpensive cost. Lithium greases are buttery in texture, with high melting points above 350°F. When blended with 12-hydroxy-stearates and complexing agents, incredible qualities can be obtained. Those include very high melting points, excellent water resistance and excellent resistance to breakdown or softening by working.

These greases show no physical change after being heated above their melting points and then cooled. Their pump ability and dispensability are also excellent and are truly multipurpose. Our ELBA WHITE LITHIUM is the highest in quality of the lithium greases available. Being the pinnacle of multipurpose greases, our ELBA GREASE combines in a single product the most desired characteristics found in several products at a cost that is much less than its true value. Our ELBA White Lithium Grease offers all of the unique features with the exception of its high dropping point. This factor is brought about by the addition of very special but expensive additives. The advantage of our Lithium Grease is its enormous ability to prevent wear at a lower price.

MIXED SOAP THICKENED GREASE

These greases are made with two or more metallic soaps in combination to produce a lubricant that contains some of the desired properties of both. The most successful of these has been a 16% sodium soap combined with a 2% calcium soap with a highly inhibited oil base plus additives. This has been very effective in packing for the so-called pre-lubricated anti-friction bearing. Other combinations have been used, such as aluminum-sodium, calcium-zinc, lithium-calcium, lithium-calcium-sodium and lithium-sodium, however, most of these have been developed for highly specialized use, and some are still in the experimental stage.

NON-SOAP THICKENED GREASE

Elba Non-Soap Greases are numerous types of non-soap thickeners, but primarily the most common is bentone with polyurea being a distant second runner-up. Commercial bentone powder used as a thickener is basically an organophillic montmorillonite type of clay. They are formed by slurrying in the bentone powder in a portion of the oil, pre-gelling by adding a dispersant and stirring, then heating to drive off the remainder of the dispersant. Finally, the oil is blended in to adjust to the proper consistency.

Elba Bentone have a buttery texture, virtually no melting point, good adhesiveness, fair mechanical stability and poor rust preventative properties. They are extremely valuable in high temperature applications and can be used as a multipurpose grease. The greatest disadvantage occurs if maintenance is neglected and an offing-out or breakdown of the grease occurs. The end result is bentonite clay in the bearing which will cause a rapid catastrophic failure of the system. Elba Polyureas are made with ashless organic thickeners and have a good resistance to oxidation. These greases are very specialized and have limited applications.

SELDOM USED GREASE

There are other metallic soaps that are used in grease making, but are restricted to usage for one reason or another. Strontium soaps, for example, are made but very expensive to produce due to the scarcity of the strontium. Lead soaps are also produced, but are being rejected from the market and use due to the toxic properties of lead and its effect as a cumulative poison. Others, such as organic silicones and exotic synthetics, are being used on a limited basis primarily because of the expense of materials and production involved.

For more information on Elba Lubricants and Greases please contact us:-

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