



Grease Compatibility and Grease Lubrication Practices

Often, for one reason or another, it becomes necessary to change the brand of grease or thickener type used to lubricate a particular application. If the grease in use will become mixed with a new brand or thickener, the question of grease compatibility should be addressed to ensure trouble-free changeover.

Definition of Grease Incompatibility

The NLGI Lubricating Grease Guide, Fifth Edition, 2006 defines grease incompatibility as follows:

“When greases made from different thickeners are mixed, the mixture may be poorer in service performance or physical properties than either of the component products. This lessening in performance capability is called incompatibility. It may show up in any of several areas, such as (1) lower heat resistance; (2) change in consistency, usually softening; or (3) decrease in shear stability. Mixtures which show none of these changes are considered compatible.”

“Incompatibility is not always caused by the thickener, since each of the greases in the mixture is a complete package—thickener, fluid and additives. Sometimes the thickener of one grease is incompatible with the fluid of the additives present in the second formulation. If the mixture proves to be significantly softer, less shear stable, or less heat resistant than the original grease, the mixture must be deemed incompatible.”

“Incompatibility is best determined in service or in service-related tests; it is not predictable. Certain thickener combinations often have been found unsatisfactory and are generally so recognized. These would include lithium and sodium greases and organo-clay and most soap greases. Tests should be run on the specific greases of interest.”

Grease Compatibility Overview

Grease compatibility is a complex subject because of the many variables and changing conditions involved. At one end of the scale, mixing a fresh lubricant with a severely oxidized portion of the same lubricant may produce immediate or progressive changes in the mixture. At the other end of the scale, greases with different thickeners may be mixed resulting in hardening or very soft or low melting mixtures which may not provide adequate lubrication and may lead to early failures. Add to this the diverse operating conditions of

time, temperature and contaminants – and the uncertainties of predicting or measuring compatibility of greases are apparent. There is no practical rule one can apply to all mixtures of different greases to determine compatibility properties - **Reference Table I as a guide for general incompatibilities - but it's not an absolute reference.**

Grease compatibility is, nevertheless, of more than academic interest, especially when a current or potential customer questions a grease recommendation on the basis of compatibility. Incompatibility alone should not prevent a change in lubricating grease; product performance and overall economics determine lubricant selection. Once the proper lubricant type is thus selected, unwarranted and arbitrary changes should be discouraged.

Grease Conversion Options

Ideally, the best procedure to follow when changing grease brands is to completely remove all old grease before new grease is added. This is usually done, for example, when automotive wheel bearings are repacked with grease. In some pieces of equipment such as electric motors, the grease-lubricated bearings are not designed to be relubricated, as the grease lubrication life and the bearing life are about the same. In these cases, the bearing is replaced with a new, pre-greased bearing and the old one discarded.

In the majority of cases, however, grease lubrication is performed periodically by adding grease to the existing grease in a piece of equipment. During a change from one grease thickener type to another, when complete removal of the old grease is impractical, much of the old grease may be removed by purging with new grease. This can be done initially and/or progressively by temporarily shortening the application interval and increasing the quantity of grease applied. Purging old, hard, contaminated grease with new

grease is advisable even if grease brands are not changed to ensure that all parts of the equipment are actually receiving new grease. Sometimes, small openings in the grease-lubricated area become clogged with contaminated or old grease and normal relubrication is not sufficient to distribute fresh lubricant to all parts of the equipment. The potential for clogged passageways must be checked carefully.

After thoroughly purging with the new grease, the equipment should be monitored for signs of possible incompatibility such as grease leakage, abnormally high operating temperatures (if equipment is not overpacked with grease), or noise. Many larger bearings are equipped with purge plugs that can be removed at time of grease conversion. As new grease is pumped into the “zerk fitting” the grease being replaced will begin to come out through the purge plug opening. These are located in various locations on the bearing and may actually be recessed and not easily visible at first glance. As the new grease is pumped into the bearing, the old grease that is being replaced will “purge” out the purge plug opening. This procedure should be continued until the new grease is visually seen coming out the opening with little to no cross contamination of the old lubricant.

Another option for smaller bearings that do not have purge plugs is to replace the existing zerk fitting with one that contains a pressure relief opening built into the fitting. Similar in nature to having a purge plug in place, the opening in this fitting allows the grease to purge out the side of the zerk

fitting. As was noted above, this procedure is done until the new grease is visible to the lubricator at time of changeout. The small opening allows the old grease to come out until the new product is fully visible, thus insuring a proper purge. The other added benefit to this type of fitting is that they also prevent overgreasing and seal blow out. The grease comes out the relief slot before damaging the seal components. In most instances these devices can be left installed unless severe pressure washing is done on a continual basis, in which case after greasing, the standard zerk fitting can be re-installed.

Summary

Incompatibility is a factor only during changeover or conversion and, therefore, is always a temporary matter. Good sound recommendations can usually overcome or minimize any field difficulties during conversion. If circumstances warrant, selected equipment can be changed under close surveillance prior to plant-wide conversions. Also, laboratory bench tests can determine whether a compatibility problem exists. They are not, however, conclusive.

In general, your best recommendation is to assume that the new product and old product are not always going to be compatible. This assures that the user will properly purge the existing grease with the new one. It also insures that the new properties that the customer likely wanted in the new grease product they have chosen will be at their full potential.

Table I - Compatibility of Binary Grease Mixtures

Compatible
 Check Compatibility with Chevron Lube Tek
 Not Compatible - Full Clean Out Required for Change

	Lithium	Lithium Complex	Aluminum Complex	Calcium	Calcium Sulfonate Complex	Barium Complex	Sodium	Bentone (Clay)	Polyurea
Lithium	Compatible	Compatible	Not Compatible	Compatible	Check Compatibility	Not Compatible	Not Compatible	Not Compatible	Check Compatibility
Lithium Complex	Compatible	Compatible	Not Compatible	Check Compatibility	Check Compatibility	Not Compatible	Not Compatible	Not Compatible	Check Compatibility
Aluminum Complex	Not Compatible	Not Compatible	Compatible	Not Compatible	Not Compatible	Not Compatible	Not Compatible	Not Compatible	Not Compatible
Calcium	Compatible	Check Compatibility	Not Compatible	Compatible	Check Compatibility	Not Compatible	Not Compatible	Not Compatible	Check Compatibility
Calcium Sulfonate Complex	Check Compatibility	Check Compatibility	Not Compatible	Check Compatibility	Compatible	Not Compatible	Not Compatible	Not Compatible	Check Compatibility
Barium Complex	Not Compatible	Not Compatible	Not Compatible	Not Compatible	Not Compatible	Compatible	Not Compatible	Not Compatible	Not Compatible
Sodium	Not Compatible	Not Compatible	Not Compatible	Not Compatible	Not Compatible	Not Compatible	Compatible	Not Compatible	Not Compatible
Bentone (Clay)	Not Compatible	Not Compatible	Not Compatible	Not Compatible	Not Compatible	Not Compatible	Not Compatible	Compatible	Not Compatible
Polyurea	Check Compatibility	Check Compatibility	Not Compatible	Check Compatibility	Check Compatibility	Not Compatible	Not Compatible	Not Compatible	Check Compatibility

Table I should be used only as a guideline for determining compatibility. For the purpose of changing products in the field, the compatibility of the greases in question should be determined by laboratory testing.

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