

INCOMPATIBILITY OF GREASES

A lab technician tests grease from a problem bearing and finds that, although the grease meets all specifications, it is not performing as it should. A hot strip steel mill changes over to a grease that has won high praise from other mills, but complaints are pouring in. During a rush production run, a critical motor fails even though it had been properly lubricated as specified in the maintenance manual. What happened?

In every case, the company had changed from one grease which met specifications to another type which also met specs. All were victims of grease incompatibility. Some greases cannot be mixed with others, even when both types meet specifications. Unless incompatibility is understood and accounted for, a switch to a different grease can be disastrous.

Incompatible Greases

Incompatibility occurs when a mixture of two greases shows properties or performance significantly inferior to those of either grease before mixing. Some grease bases are intrinsically incompatible. Different fatty acids and/or additive packages also affect compatibility. To make it even more confusing, sometimes two types of greases are manufactured as a mixed base grease, although they are incompatible when mixed in operation.

Usually, problems are not obvious until the bearing is in use. By that time, major problems can develop. It's best to know in advance which types of greases can be used together and which should not.

Mixing Greases in the Field

Why doesn't everyone see more problems when greases are mixed either deliberately or accidentally? Even a soupy mix of incompatible greases may work for a while when the bearings are in good shape, if shock loading isn't too severe, the seals are adequate, and demands are not extreme. And most instances of incompatibility are brief: a little old grease gets mixed in with a different grease for a short time.



Making a Change Safely

What if changing grease is necessary? There are ways to ensure a safe changeover. Incompatible greases don't have to be eliminated completely; if the user is careful, a little intelligent attention can prevent problems:

1. Ask the supplier about compatibility. They should have the information or be willing to run tests.
2. Use up as much of the old grease as possible before bringing in the new grease. It is ideal to completely drain and clean the system before changing over.
3. Once the new grease is added, grease consumption should be increased temporarily. This will move the interface (the area of grease mixing) through the system and out as quickly as possible. The increased grease flow also assures good lubrication and proper sealing, while overly soft grease may be in the bearings.
4. When there is doubt, expect incompatibility, watch for problems.

TABLE 1 | Grease Compatibility Guide

	Aluminum complex	Barium	Calcium	Calcium 12-hydroxy	Calcium Complex	Clay	Lithium	Lithium 12-hydroxy	Lithium Complex	Polyurea
Aluminum complex	C	I	I	C	I	I	I	I	C	I
Barium	I	C	I	C	I	I	I	I	I	I
Calcium	I	I	C	C	I	C	C	B	C	I
Calcium 12-hydroxy	C	C	C	C	B	C	C	C	C	I
Calcium Complex	I	I	I	B	C	I	I	I	C	C
Clay	I	I	C	C	I	C	I	I	I	I
Lithium	I	I	C	C	I	I	C	C	C	I
Lithium 12-hydroxy	I	I	B	C	I	I	C	C	C	I
Lithium Complex	C	I	C	C	C	I	C	C	C	I
Polyurea	I	I	I	I	C	I	I	I	I	C

I = Incompatible C = Compatible B = Borderline

➔ **Table 1** shows the results of compatibility on ten different types of grease. The worked penetration test was used because it is rapid and reliable. For the series of tests, two greases were tested separately, then blended at three different ratios at room temperature. The blended greases were tested at room temperature and again after storage at 250°. Every grease proved to be incompatible with at least one other grease. Most difficult to use in mixtures were aluminum complex, calcium complex, clay and polyurea thickened greases. Usually, substantial softening occurred when greases were incompatible. This is especially dangerous since softened grease can run out of a bearing. However, lithium greases hardened in some mixtures, as did some clay mixes. Barium grease blends exhibited oil separation.

Conclusion

When two greases are mixed, the result may be disappointing. Frequently the mixture is much less grease-like than the original, and this can be disastrous. By being aware and following a sensible procedure when switching greases, a user and supplier can assure that grease incompatibility will not create serious problems.



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