Techni-Tips 120
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Grease Compatibility

Greases are available with many different thickener types, base oil types, and base oil viscosities. Compatibility of these different grease types can be very important for users of grease-lubricated equipment. Mixing of different greases can result in changes in physical and performance characteristics, leading to inferior properties of either of the original greases before mixing. Mixing incompatible greases often results in softening, but may also lead to hardening. In extreme cases, bleeding, or separation of the thickener and liquid, can be so severe that the mixture may run out of the greased component. Other properties that may be affected are dropping point, shear stability, pumpability, and oxidation stability. Extreme cases of grease incompatibility can lead to catastrophic failure of the components being lubricated.

It is always best practice to avoid mixing any types of grease. However, at some point in an organization's reliability journey there will be instances when different grease types are inadvertently or purposely mixed. When this happens, a thorough evaluation should be performed in order to ensure that lubricated components receive effective lubrication and avoid damage. Compatibility testing can be performed; however, the test method's strict parameters can make it difficult for two greases to pass as compatible. Fortunately, there already has been extensive testing and research done by many different sources to give practical guidelines when it comes to grease compatibility. Using this information, LE has developed the grease compatibility chart shown on the next page, which provides guidelines based on the thickeners.

Compatibility Considerations

It is important to note that even though grease thickener types may be compatible, there are other ingredients and properties that should be evaluated as well when considering a change in grease. Base oil type and viscosity are the most important. If the base oil types are not compatible, then the mixture will most assuredly not be compatible, even if the thickener types are the same.

In addition, if the base oil viscosities are significantly different, mixing the greases may result in a product that cannot provide adequate lubrication for the application.

Lab Testing

The generally accepted laboratory test for grease compatibility is *Standard Practice for Evaluating Compatibility of Binary Mixtures of Lubricating Greases, ASTM D6185.* This test evaluates binary mixtures of greases by evaluating the component greases by themselves and then evaluating a mixture of the two. The testing criteria of *ASTM D6185* are: Unworked Penetration, Worked 60 Penetration, Extended Worked Penetration (100,000) and Dropping Point. If the binary mixture passes the initial screening, the components and the mixture are subjected to a 70-hour storage test at 120°C (248°F) and the testing criteria are again repeated.

Compatibility within this test is defined as the characteristic of greases to be mixed together without significant degradation of properties or performance. Two greases are considered incompatible when these properties or performance criteria are substantially inferior to both of the unmixed, constituent grease. Two greases may be considered borderline compatible if the mixture results in only slight degradation of physical properties and performance.

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When Mixing Is Necessary

Most equipment manufacturers recommend never mixing different greases. If switching to new grease is unavoidable, however, it is recommended that the old grease be completely cleaned out before installing the new grease. This is especially necessary when changing to a grease type that may be incompatible with what is currently in use.

When mixing greases that are considered compatible, purging of the old grease might be acceptable.

More frequent relubrication with the new grease is recommended until it is certain that all of the old grease has been purged.

Remember, it is always best to avoid mixing different greases. When mixing is inevitable, consult with your lubricant supplier and equipment manufacturer to ensure that the mixture of greases will be acceptable. Best practices should also be implemented to avoid inadvertent mixing of greases within a facility, such as clear grease gun tubes and proper labeling of greasing equipment and grease points.

Grease Compatibility by Thickener

	Aluminum Complex	Calcium	Calcium 12-Hydroxy	Calcium Complex	Clay Inorganic "Bentone"	Lithium	Lithium 12-Hydroxy	Lithium Complex	Polyurea	Calcium Sulfonate Complex
Aluminum Complex		No	No	No	No	No	No	Yes	No	No
Calcium	No		Yes	No	No	Yes	Borderline	Yes	No	Yes
Calcium 12-Hydroxy	No	Yes		Borderline	No	Yes	Yes	Yes	No	Yes
Calcium Complex	No	No	Borderline		No	No	No	Yes	Yes	Yes
Clay Inorganic "Bentone"	No	No	No	No		No	No	No	No	No
Lithium	No	Yes	Yes	No	No		Yes	Yes	No	Yes
Lithium 12-Hydroxy	No	Borderline	Yes	No	No	Yes		Yes	No	Yes
Lithium Complex	Yes	Yes	Yes	Yes	No	Yes	Yes		Borderline	Yes
Polyurea	No	No	No	Yes	No	No	No	Borderline		No
Calcium Sulfonate Complex	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	

This chart is for reference only; it is intended as a starting point to determine whether two greases might be compatible. Additional testing might be warranted.

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