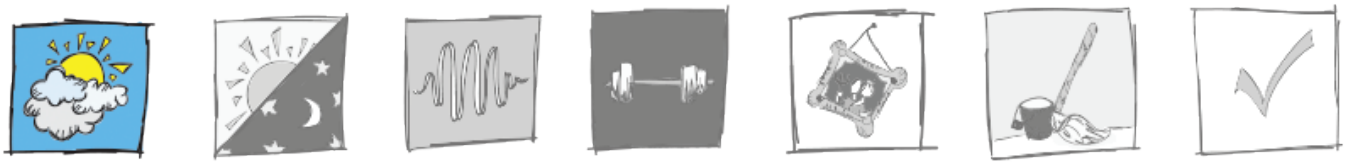
Oil or Grease: Climate (Part 1/4)

June 16, 2016

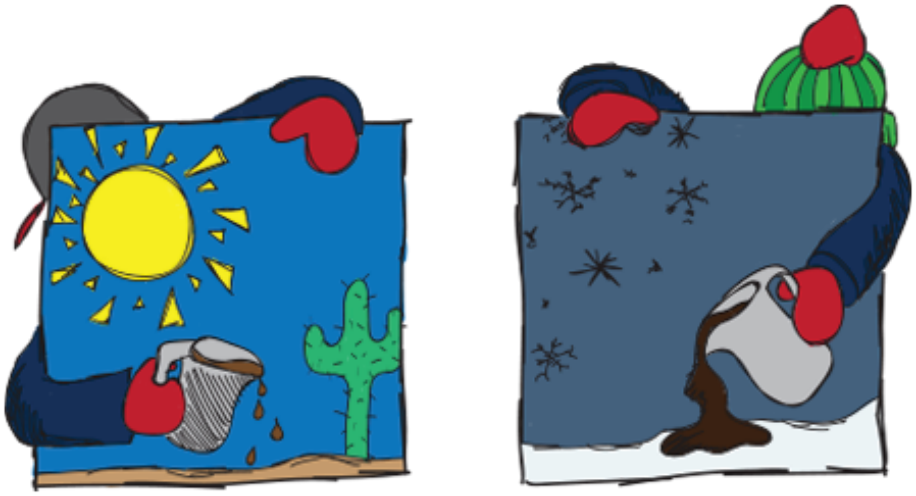
Factor #1: Climate



Unless a person lives on a space shuttle or in a vacuum-sealed, climate-controlled, sterilized building where no one leaves and nothing enters, people can expect to find the evidence of climate on the surrounding area and its objects—machinery, motors, patio awnings, washing machines or otherwise. Both internal and external wear on outdoor (and indoor) applications will occur. Oil and grease are easily influenced by weather and temperature variations, and as a result, lubrication type is exceedingly dependent on climate.

Oil has a lower viscosity than grease—in a way, grease is simply oil's thicker cousin (it's composed of an oil base, thickener, and additives). As a result, since oil and grease typically perform the same function, they are often thought to be interchangeable. However, because grease starts with a higher pour point (the lowest temperature point at which the lubricant can still flow) as well as a lower dropping point (the temperature at which heat makes grease so soft that it will be unable to function properly), climate greatly affects which lubricant to use.

Extreme heat and cold affect grease more than oil. While oil remains primarily the same consistency, grease functions much like a mechanical kind of Jell-O.



Hotter temperatures = softer, more liquid consistency
Colder temperatures = harder, more gelatin or molasses consistency

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Heat can potentially soften grease until it's too thin and fails to provide adequate coatings, while cold can congeal grease. This makes the lubricant coating is so thick that any points of intersection tend to be completely wiped of the lubricant, exposing the raw surfaces and causing gears to deteriorate. Because of these differences, grease is classified at different viscosity levels, which is captured in the following chart.

NLGI Class	Typical Consistency
000	Fluid
00	Semi-fluid
0	Very soft
1	Soft
2	Normal grease
3	Firm
4	Very firm
5	Hard
6	Very hard

As the chart indicates, NLGI 2 grease is considered normal thickness. It's probably what the everyday layman would think of when they hear the word, "grease." As you can see from this chart, the lower the number, the lower the viscosity (or thickness) of the grease. Consequently, lower numbers are used in colder climate situations, whereas higher numbers are used for the reverse. Specific consistencies are used for specific temperatures.

Seems simple, right? But what happens when we consider the internal climate, or rather, the temperatures within the application itself?

Each application has two temperature indices—an external and an internal one. In other words, your gearboxes and their lubricants are not only affected by the surrounding environment, but also by how often the motors are used, what they are used for and how they are made.

Next week's blog will demonstrate how operation and application walk hand-in-hand with internal temperatures.