



Photo by Eddie Konrad



## Why Proper Lubrication is Necessary

Lubrication can be a daunting obstacle to someone unfamiliar with its basic concepts. Even those with experience can be confused by the technology of current machinery combined with the multitude of lubricants available on the market today. Reviewing a few of the basic principles of lubrication can make it easier to see why proper lubrication is necessary in every application.

Friction is defined as the 'rubbing of one body against another' and 'resistance to relative motion between two bodies in contact.' Friction can be beneficial. As this resistance to motion between two objects in contact is overcome, heat is generated.

Friction is also the principle behind the braking systems on equipment. In fact, once the equipment gets moving, there is nothing to stop it without friction, with perhaps the exception of gravity or other objects.

Since contact is required to generate friction, wear in the areas of contact can occur. This can lead to material failures,

overheating and the formation of wear deposits. The most common way to reduce friction is through the use of a fluid.

The key characteristic of such lubricants is that they are not readily compressible. Fluid and semi-fluid lubricants minimize component contact or eliminate contact altogether. When a fluid lubricant is present between two rolling and/or sliding surfaces, a thicker pressurized film can be generated by the movement of the surfaces (at their respective velocities). The non-compressible nature of this film separates the surfaces and prevents any metal-to-metal contact. To minimize friction, an effective lubricant should be able to handle the pressures and speeds of the surfaces it will separate.

Though the ability to minimize friction is the number one function of a lubricant, there are other major functions to be considered. A lubricant is also required to:

**Clean**—A lubricant must maintain internal cleanliness by suspending contaminants or keeping contaminants from adhering to components.

**Cool**—Reducing friction will reduce the amount of heat generated and lower the operating temperature of components. A lubricant must also absorb heat from the components and transport it to a location where it can be safely dissipated.

**Prevent contamination**—The lubricant should act as a dynamic seal in locations such as the piston, piston ring and cylinder contact areas. This minimizes contamination by combustion byproducts in the lubricating system.

**Dampen shock**—The lubricant may be required to cushion the blows of mechanical shock. A lubricant film can absorb and disperse energy spikes over a broader contact area.

**Transfer energy**—A lubricant may be required to act as an energy transfer medium as in the case of hydraulic equipment, lifters or in hydrostatic transmissions.

**Prevent corrosion**—A lubricant must also have the ability to prevent or minimize internal component corrosion. This can be accomplished either by chemically neutralizing the corrosive products or by setting up a barrier between the components and the corrosive material. ☺

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