

LUBE

TECHNI-GRAM



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POTENTIAL MISUSE OF HYDRAULIC OILS IN CENTRALIZED LUBE SYSTEMS

Hydraulic Fluid – fluid serving as the power transmission medium in a hydraulic system. The most commonly used fluids are petroleum oils, synthetic lubricants, oil-water emulsions, and water-glycol mixtures. The principal requirements of a premium hydraulic fluid are proper viscosity, high viscosity index, anti-wear protection (if needed), good oxidation stability, adequate pour point, good demulsibility, rust inhibition, resistance to foaming, and compatibility with seal materials. Anti-wear oils are frequently used in compact, high-pressure, and capacity pumps that require extra lubrication protection.

Without question, there is no other component of a hydraulic system that is so critical and so multi-functional as the hydraulic oil itself. In a hydraulic system, the functions of a hydraulic oil can be summarized:

- 1.) Transmit power from one point to another.
- 2.) Lubricate and protect the system components from friction, wear and contamination.
- 3.) Transfer and disperse heat generated in the system.
- 4.) Provide a seal and maintain pressure.

Yes, hydraulic oils are multi-functional, but there is a limit to their multi-functional capabilities. Periodically, we come across cases where hydraulic oil is being used in centralized oil systems to lubricate heavily loaded gears and bearings in industrial applications. This practice should be discouraged.

Granted, it would be easy to assume that a hydraulic oil should be okay for lubricating bearings and gears. After all, in addition to providing a means of transmitting energy in a hydraulic system, it lubricates hydraulic pumps, bearings, cylinders and other system components, as well as protecting them from rust, contaminants or oxidation. The downside to this “all in one” way of thinking is A.) there are different types or degrees of wear and B.) there are different types of hydraulic oils.

Hydraulic oils are generally divided into three main categories:

- 1.) Rust and oxidation (R&O) oils.
- 2.) Anti-wear (AW) oils.
- 3.) Multi-Viscosity Anti-Wear (HVI, AW) oils.

These categories are determined by the various levels of additives used. For example, R&O hydraulic oil will contain rust and oxidation inhibitors and anti-foaming agents, but no anti-wear additive. An AW



... to keep it running

hydraulic oil will contain an anti-wear additive, usually a zinc type (typically a zinc-phosphorus compound such as zinc dialkyldithiophosphates or ZDDP), along with the R&O and anti-foam additives. Higher quality hydraulic oils may also contain extreme pressure (EP) additives. These additives have the ability to establish tough, sacrificial films on moving parts to reduce friction, heat and metal-to-metal contact under heavy loads (EP additives are not normally found in hydraulic oils, unless specifically required for high-pressure systems where heavy loads might occur). More often than not, even if maintenance personnel are able to determine what type of engineering specifications the hydraulic oil on hand is suited for (i.e. AW versus R&O only), unfortunately, the quality of these products are often sacrificed in favor of the initial low cost.

Yet another concern in utilizing hydraulic oils as a “*one oil to do all*” in centralized oil systems is the different types and quantities of protective chemical additives used in different oils. In simplistic terms, finished oils are a blend of “*base*” oils fortified with special chemical additives designed to perform specific tasks. When these additives are mixed in the with the base product, the finished lubrication oil for specific applications are created. The problem is that some oils may look the same in packaging, but can vary greatly in performance between oil changes. A cheap oil may “*meet*” the basic requirements set forth by equipment manufacturers, but a better quality oil will “*exceed*” those requirements.

Typically, no one formulation can satisfy all of the requirements on a cost-effective basis. Even if a hydraulic oil contains zinc type anti-wear additives, is there enough for the protection of the application the oil is being used for? The zinc type anti-wear additives are designed to protect against the “*scuffing*” or “*rubbing*” type wear that bearings in hydraulic systems...and engines for that matter...experience.

Under heavily loaded conditions, such as industrial gear sets, more active extreme additive chemistry is necessary for protection. Extreme pressure additives, such as sulfur-phosphorus, are used in lubricants that must protect against heavy loads or high temperature conditions, such as gear reducers, heavily loaded rolling element bearings, or mobile equipment differentials and transmission systems. These EP additives work by forming a sacrificial film on the metal surface of the metal. After the film is formed, any motion or meshing action between the surfaces tend to wear away the EP surface film, rather than the metal.

In summary, it is our recommendation that hydraulic oils be used for lubrication in hydraulic systems. For centralized oil systems lubricating heavily loaded bearings or industrial gear sets, a premium quality oil containing EP additive protection should be used. There are four important aspects to having a good lubrication program:

- 1.) You must have the right product
- 2.) It must be applied at the right place
- 3.) It must be applied at the right time
- 4.) It must be applied in the right amount

By following these four steps, you can greatly prolong the life of equipment, increase production and reduce downtime related expense through proper lubrication.