What about my Hydraulic Fluid?

Recently we have been getting a lot of questions in regards to Hydraulic Fluids; “what’s the difference between R&O and AW”? “Is it necessary to sample my hydraulic fluid”? “What do I look for on my used hydraulic fluid sample results”?

Let’s start with the basics. R&O oil, which stands for Rust & Oxidation inhibited fluids, can be formulated with either a mineral base oil or a synthetic base oil. These fluids contain an additive package designed for hydraulic systems where environmental issues or soft metals are a concern. These oils are often used in circulating systems and turbine applications where a highly refined, mildly treated fluid is desired. The more highly refined a lubricant is, the better it will stay in grade, i.e., an ISO 46 will remain an ISO 46 during its time in the system. Unlike gasoline or diesel engine oils, a hydraulic fluid is not subjected to severe acid attack from the combustion process, therefore certain additives are not needed. When the wrong additive package is used, for example an engine oil formulation is used where an R&O oil is recommended, the extra additives in the engine oil formulation can leave deposits, leading to reduced clearances, reduction in heat transfer ability, adhesive wear, and ultimately a prematurely failed system. The metals used to build hydraulic pumps and hydraulic motors can also negatively interact with certain additives. For instances ZDP, or zinc dithiophosphate (here on out simply referred to as “zinc”), which we will talk about later when we discuss AW hydraulic fluids, if exposed to high temperatures and moisture may cause the formation of mild acids. These mild acids may cause corrosion or pitting of the softer yellow metals.

AW hydraulic fluids, which stands for anti-wear, are similar to R&O inhibited fluids but have an additional anti-wear additive. Typical AW hydraulic fluids contain approximately 200-400 ppm (parts per million) of this anti-wear additive. Most AW hydraulic fluids use a zinc/phosphorus molecule as an anti-wear additive. These additives form a protective sacrificial layer between moving parts. Zinc is sometimes used as an anti-oxidant in certain fluid formulations. As mentioned in the paragraph above, there are certain disadvantages to using zinc in your system. One reason is that zinc is not considered bio-degradable. This means that the element will take longer than the EPA standard to decompose. Another critical factor is that zinc cannot be considered non-toxic. Tests have concluded that zinc is toxic to certain aquatic species. In typical situations, the benefits of using zinc in systems recommending an AW hydraulic fluid are perceived to outweigh the risks.

Presented by D-A Technical Services Department; offering training, product recommendations and problem analysis to help you keep your equipment running longer and more efficiently.

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What about my Hydraulic Fluid?

Is it necessary to sample my hydraulic fluid?

Typical drain intervals for hydraulic systems can range from 1000 hours to 2000 hours, or, once a year to once every two years. The most detrimental elements to a hydraulic fluid are; heat, dirt and moisture. Heat can cause the oil to oxidize, seals to weaken and hoses to deteriorate. Dirt can cause abrasive wear to components in the hydraulic system. Excessive moisture can lead to viscosity loss, which in turn can reduce the boundary layer of oil between moving parts. Moisture can also cause corrosive wear of the metal components and sealing material. These are just a few of the items that can reduce the efficiency and performance of your hydraulic system. Monitoring your fluid through routine oil analysis is the only way to determine if the hydraulic system is functioning properly. Oil analysis will also provide indications of premature component failure. The cost of oil analysis is much less than production down-town to fix a catastrophic failure that occurred to the hydraulic system. Safety is also an important factor when analyzing your hydraulic system's overall health. Over stressed hoses or seals can cause high pressure, high temperature fluid to spray operators or cause equipment fires.

Oil analysis will deliver a complete snapshot of what's happening in your hydraulic system. Elevated oxidation levels, will let you know your oil is either overextended or being subjected to above normal temperatures. Metal fragments can be identified helping you to determine which component may be wearing excessively. Dirt in the system can indicate a seal, line or hose leaking, or improper maintenance procedures. Water or moisture can indicate leaks, condensation, vandalism or overcooling of the fluid. Small monetary investments up front can save large expenditures in the future.

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