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The right lubricant and oil analysis program is key...

How can you adequately protect your company's investment in a modern hydraulic system?

Critical to countless industrial and commercial market operations, today's hydraulic units are far more sophisticated than they used to be. The need to improve productivity and lower costs has led to significant changes in hydraulic component technology and designs, resulting in systems that are more compact— *and more powerful*—than ever.

In fact, modern hydraulic systems feature reservoirs that can be anywhere from 60 to 80% smaller than those of older systems, use ever-increasing system pressures and operate with sophisticated computer-controlled valves. These advancements, however, also have a downside.

Smaller, more power dense hydraulic systems have limited residence time to reject contaminants, such as solid particles and air. They also operate at higher temperatures. Both of these situations stress the fluid and system components. Precision hydraulic components—*especially servo and proportional valves*—are sensitive to contamination and even a small amount of contamination or fluid degradation by product can quickly damage the equipment.

Protecting your investment

There are two important ways to help enhance the performance and durability of your company's hydraulic systems:

1. Use high-performance hydraulic fluids.
   and
2. Institute a proactive maintenance and oil analysis pla**n.**

By heeding the following tips, plant managers, equipment maintenance professionals and purchasing agents can make informed decisions when it comes to selecting the right hydraulic oil and developing the right hydraulic system maintenance plan.

What to look for in a hydraulic fluid

The right specifications…
One starting point for selecting a hydraulic lubricant is the original equipment manufacturer's (OEM's) recommendation. This may be specific to the machine manufacturer or the hydraulic component manufacturer, e.g., Eaton, Denison and Bosch. The OEM's recommendation typically provides the appropriate viscosity grade for the expected operating temperature and pressure range and indicate a minimum level of specifications and performance, such as having HF-O, Eaton M2950, CM P69 and P70, ISO11158 HV, DIN 51524, and JMAS HK-1-approval.

The right viscosity…
Above all, viscosity is the most critical factor when selecting a hydraulic fluid. It is important to match the appropriate viscosity grade to operating temperatures and load conditions that a hydraulic system may undergo on a daily basis. Without the proper viscosity, the system will not operate as designed and the system will likely never reach peak efficiency.

In factoring in the conditions that a hydraulic system will face, it's equally important to realize that OEM-suggested guidelines may not always provide detailed recommendations if systems are subjected to extreme working conditions—*such as high or low ambient temperatures*. Furthermore, for equipment that is used outdoors and subjected to both hot and cold extremes, a high-viscosity, multigrade lubricant that features a balanced formulation may be recommended. In such cases, field application advice from your lubricant supplier can be valuable in helping you make the right choice.

The right performance attributes…

Given the higher pressures, higher temperatures and smaller size of modern hydraulic systems, hydraulic fluids must do more than simply satisfy the correct viscosity and OEM specification. High temperatures and pressures demand fluids that are oxidatively and thermally stable. At the same time, they need to prevent system deposits and provide a high degree of anti-wear protection under those extreme conditions. The fluids must also possess excellent air release properties, filterability and seal compatibility. The latest generation of hydraulic fluids can also help increase overall hydraulic system efficiency.

Best practices for hydraulic system maintenance

Keep it clean…

Keeping hydraulic systems clean is a must for all environments. The combination of high pressures, small reservoir size and tight tolerance control systems make the exclusion of contaminants crucial in all systems. A good place to start in keeping such a system free of contamination is in the proper storing and handling of oil.

Hydraulic lubricants should be stored in a closed container in a controlled temperature environment with adequate spill containment. Transferring hydraulic lubricants should be done through the use of a filter cart and dedicated, sealed clean oil dispensing equipment.

Finally, the hydraulic system reservoir should have a quality desiccant breather and system filter, as recommended in the manufacturer's guidelines. Some systems utilize auxiliary filtration systems, sometimes known as a kidney loop, that continually "polish" the hydraulic fluid to maintain system cleanliness.

Conduct oil analysis…

As part of routine maintenance, one should be rigorous in checking the "health" of the hydraulic oil and the hydraulic system itself.

Typically, quarterly oil analyses and annual system inspections are recommended. For systems that are most critical to a plant's operation—*or are subjected to challenging conditions*—more frequent oil analysis should be considered.

The oil analysis should include a measurement of fluid viscosity, water content, particle count and dissolved metals to determine how well the system is operating. Examining changes in the oil analysis data over time, also known as "trending," is necessary to assess the condition of the hydraulic fluid. Through the trending oil of analysis data, it is possible to proactively address undesirable conditions before they become problems.

Perform visual inspections…

Beyond oil analysis, visual system inspections should be conducted regularly to check and document the condition of the hydraulic systems. Inspection data can be used to establish the optimum time to perform maintenance on critical hydraulic components, such as filters, breathers, valves, hoses, heat exchangers and pumps.

Comprehensive leak detection should also be performed—*especially if excessive hydraulic oil usage is noted during a routine system inspection.*

They aren't your grandpa's hydraulic systems

It's a good bet that the hydraulic units you're now using in your operations are far more sophisticated than their predecessors. These new, compact, high-pressure systems simply must be protected differently than those of yesteryear. Fundamental best practices for doing so include using high-performance hydraulic lubricants and implementing a proactive oil analysis program.

The right lubricant and maintenance program clearly can help improve productivity through efficiency benefits, more reliable equipment performance, and increased machine availability. Moreover, your organization's ability to make informed decisions will help maximize both the performance and the life of your critical hydraulic systems. **MT**

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High-Performance Systems Call For High-Performing Fluids

Mobil DTE 10 Excel Series is the latest addition to the Mobil DTE family of hydraulic oils. Designed to handle the lubrication requirements of both industrial and mobile high-pressure hydraulic systems, these products feature a formulation that delivers exceptional oil life while maintaining hydraulic system cleanliness, enhanced system efficiency and component protection in modern hydraulic systems.

Because the lubricants in this series keep hydraulic systems cleaner, they can help extend machine reliability and increase productivity through improved machine availability. In fact, proprietary Mobil Hydraulic Fluid Durability (MHFD) testing has demonstrated that Mobil DTE 10 Excel Series' ultra keep-clean performance keeps systems cleaner for up to three times as long as competitive products. Their high-viscosity index and notable shear stability enable hydraulic efficiency benefits and hydraulic pump protection over a wide range of operating temperatures. As a result, Mobil DTE 10 Excel Series lubricants provide plant managers and equipment maintenance professionals with maximum equipment protection at high- and low-temperature extremes and the valuable option of using one hydraulic fluid brand across many applications, helping to simplify inventory management.

Hydraulic efficiency benefits can translate to increased machine productivity and/or reduced fuel consumption. In controlled laboratory testing, Mobil DTE 10 Excel demonstrated up to 6% hydraulic pump efficiency increases. And, in controlled field testing, up to a 6% reduction in fuel

consumption* per work cycle was documented in a hydraulically driven excavator.

**Results may vary depending on operating conditions.*

Effective Oil Analysis Can Save Time And Money

ExxonMobil's proprietary online Signum Oil Analysis Program offers customers immediate access and direct control of their lubricant sampling program. With a few keystrokes, users can manage all of their oil analysis needs including:

- Update equipment registrations and select analysis options based on equipment or maintenance needs;
- Track the status of samples at the lab;
- Direct actions based on analysis results, request sample kits; and,
- Share critical results with colleagues in a secure, password protected environment.

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