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Leakage control – Hydraulic Fluid Index

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It can be a constant battle maximizing the availability of your equipment and managing limited manufacturing resources at the same time. Sooner or later, lubricant selection will come under review to determine if a less expensive alternative exists. While higher-quality fluids are recognized as having the potential to better protect equipment and deliver an overall lower total cost basis, the final decision often comes down to leakage. Historically, high leakage facilities, such as metalworking facilities and steel mills, end up using minimum cost hydraulic fluids as a result.

This is a classic "double whammy" scenario because facilities with high leakage rates end up paying more on two fronts: oil consumption and reduced equipment life.

However, you can take action now to reduce short-term expenses and gain better maintenance control by establishing a regular routine of tracking consumption on major reservoirs. When you track consumption, you place a value on each system monitored and can then prioritize those machines that give you the greatest return on your investment.

It's not unusual to expect a reduction in lubricant consumption of at least 10 percent by implementing the following steps:

1. Identify systems to be tracked:
Catalog all major hydraulic systems by reservoir capacity, a unique registration number and name of the fluid each system contains. In the process of cataloging, label each system with an identification tag. This first step is crucial as it accurately assesses plantwide capacity and visually marks those systems that are being monitored.

2. Accurately meter fluid usage:
 Install a metering device on lube storage tanks to accurately measure actual gallons delivered.

3. Record "delivered gallons:"
Establish a method for lube personnel to record delivered gallons on each fill. Industrial PDAs with bar code scanners can help minimize administrative workload.

4. Calculate baseline Hydraulic Fluid Index (HFI):
Spend the time to establish a reasonable baseline that can be used to measure actual cost savings. We recommend collecting at least two months of data. HFI calculations would give you a consistent measure of leakage rates independent of capacity, allowing performance tracking as equipment setup changes. This calculation can be done with individual reservoirs or groups of reservoirs.

$$HR = \frac{\text{Annual usage}}{\text{Reservoir capacity}} \quad \text{or} \quad \frac{\text{Total fluid used}}{\text{Total site capacity}}$$

The average industrial plant has an annualized HFI of about 3:1. The best plants have ratios of 1:1 or less.

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5. Summarize monthly consumption:
Pinpoint reservoirs with leakage problems.

6. Schedule ultraviolet/ultrasonic leak inspections:
Once a unit is noted as a high user, schedule inspections to identify the source of the leakage. By focusing on the identification and quantification of leakage up front, you help minimize the impact on production until repairs can be scheduled.

7. Continue to monitor HFI:
Maintain and update documentation as this will be key to your program's success. You may also want to track "percent capture," an indicator of lubricant volume used versus volume purchased. This will help ensure that you stay on target and reach your cost-savings objectives.

Reference: "Preventing Leaks From Draining Your Bottom Line" by Toby HIlade. The Engineered Difference (2007).

Oil lost from leakage

Leakage rate	Lost oil (gals) per day	Lost oil (gals) per month	Lost oil (gals) per year
One drop in 10 seconds	0.113	3.38	41
One drop in 5 seconds	0.225	6.75	81
One drop per second	1.125	33.75	405
Three drops per second	3.275	101.25	1.215
Drops break into stream	24	720	8,640

Why implement leakage control?
It may seem obvious that leaking oil costs money, but there may be costs that you haven't considered. Reduced leakage means reduced:

Material costs
- Replacement of leaked oil

Labor costs
- Cleanup of leaked oil
- Oil replacement in system

Safety costs
- Chance of slips trips and falls
- Add-oil events

Environmental costs
- Used-oil generation

Productivity costs
- Oil purchase
- Oil inventory

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