



THE IMPACT OF SAMPLING DEVICES ON FLUID ANALYSIS OUTCOMES



By Mark Minges



There are many different ways to pull a fluid sample for fluid analysis. However, fluid analysis is sensitive enough it can be affected by the method of how the sample was pulled. There are a variety of sampling devices. Each device is designed to be used with a different system, pull a sample in a different way, prevent contamination of the sample or pull a sample quickly.

CONSIDER THE OPTIONS

One type of sampling device will not be right for every preventive maintenance program. A program may even use several different sampling devices to pull fluid from one piece of equipment. Cost of the sampling device and disposable equipment, time spent taking the sample, environmental conditions around the component and accuracy of the sample results are all factors that need to be weighed when selecting the best sampling devices for your program.

SAMPLING DEVICES

None (drain catch)

Taking a fluid sample doesn't need an actual sampling device. The sample can be "caught" as the fluid is drained out of a component. However, this

method is extremely messy and sediment caught in the drain may not represent the fluid as it moves through the equipment. It also does not allow fluid analysis to tell the customer to extend drains, only the status of the fluid before drain.

Vacuum Pump

The most common type of sampling device is the vacuum pump. It can be used for pressurized and unpressurized systems and for all types of fluids. However, vacuum pumps require new tubing for each sample, samples take time to pull and the system must be turned off.

Installed Sampling Devices

Sampling devices, commonly referred to as "valves", are physically installed into equipment. There are a variety

of installed sampling devices for pressurized or unpressurized systems or dirty and clean environments. Installed devices also allow a component to be sampled in areas other than a fluid reservoir. Installed devices are the quickest way to take a sample, many do not require disposable equipment and they provide the most representative samples of the fluid flowing through the system. However, installed devices can only pull samples from one location and take time to install.

BENEFITS AND DRAWBACKS

Disposable Items/ Maintenance

Vacuum pumps require tubing to be measured, cut and disposed of, and probe devices require disposable tubes and probes. Most installed sampling devices do not require disposable equipment, but they may require periodical cleaning or maintenance.

Return on Investment

Drain catches take little extra time and do not require specialized equipment, but the cost of fluid analysis cannot be recovered through extended drains.

Vacuum pumps require disposable equipment, take additional time to pull the sample and a different pump is recommended for each type of fluid sampled. However, they allow you to extend drains and identify potential maintenance problems.

Installed sampling devices have the benefits of vacuum pumps, but most do not use disposable equipment. Installed devices can reduce sampling time by 90 percent and can make fluid sampling easier and more consistent during hot and cold seasons.

COST RECOVERY OF SAMPLE DEVICE INSTALLATION

The cost of installing a sampling device can be recovered quickly through decreased sampling time. The following example is typical for sampling the engine oil from a long- or short-haul truck.



Cost of Device: \$20

Labor Cost of Installation: \$25

Total Cost: \$45



Labor Cost of Vacuum Sample: \$15

Labor Cost of Installed Device Sample: \$5

Labor Cost Saved Using Installed Sampling Devices: \$10

Installation Cost Recovery: After five samples

IMPACT ON ANALYSIS

Consistency

Using a vacuum pump and tube to pull a sample from a reservoir is not as consistent as installing a sampling device. Installing devices in the right location can ensure no sediments are pulled in by accident and future samples are taken from the same level of the reservoir.

Multiple Sampling Locations

Installing sampling devices allows samples to be pulled from consistent locations that are not accessible through drain catches and vacuum pumps alone. This can have many benefits, such as:

- Determining contamination ingress points
- Measuring before and after filters to see how efficient it is
- Determining if one bearing or gear in a system is wearing faster than the others

Representative Samples

Vacuum pumps can't pull samples from a system that is operating. The cool-down time allows heavy particles to fall out of suspension.

Contamination

The most common contaminant in equipment and samples is dirt, which appears in metals analysis as silicon. Alumina levels may increase due to dirt contamination since there is typically some aluminum in dirt compositions. Only installed sampling devices protect both the sample and equipment from exposure to dirt and other contamination.

MAKE YOUR DECISION

It is important to evaluate the needs of your fluid analysis program before deciding the best sampling devices for your company. Sometimes there is a clear choice after determining how much time your company can spend, the funds available for upfront investment and if equipment and samples need to be protected from contamination.

ABOUT THE AUTHOR

Mark Minges has been involved in oil analysis for more than 35 years. His experience ranges from owning and operating a small trucking fleet to repairing and maintaining off-shore drilling platforms in the Gulf of Mexico. Minges began his career with POLARIS Laboratories® as vice president of sales and marketing before becoming chief operating officer nine years ago to capitalize on his strengths as a data analyst and technical consultant. Minges is a member of the Society of Tribologists and Lubrication Engineers (STLE), the American Society of Mechanical Engineers (ASME) and Technical Maintenance Council (TMC) of the American Trucking Association. He holds STLE certifications for Oil Monitoring Analyst I (OMAI), OMAII and Certified Lubrication Specialist (CLS).

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