

By the Numbers



Mikkel Pates, Agweek Staff

▲ The two outer filters on the system are pin filters, meaning they're removable and interchangeable with assemblies specific to difference oils.

◀ Doug Mickelson is testing an in-line laser particle counter with a digital readout that determines four difference ISO code readings on oil as it moves through the system.

■ RATING SYSTEM TELLS OF OIL CONTAMINATION

By Mikkel Pates,
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Horace, N.D. - ISO numbers mean a lot when it comes to oil, according to Doug Mickelson of Oil Transfer Systems L.L.C. The ISO number systems involve particle size, expressed in microns (1 millionth of a meter).

Readings are expressed either as two- or three-digit readings, but the two-digit system is most common for ag equipment. The digits represent the size and concentration of pollutant particle size in oil.

In the two-digit system, the first digit is the number of smaller, 5-micron parts per million. The second digit is the larger, 15-micron particles and greater per

million of the smaller particles and 7 parts per million of larger particles.

At the other extreme "24/21" rating would be very dirty. Mickelson cites statistics from Noria Corp., which teaches courses on oil lab analysis techniques and procedures. Noria says that every time the first ISO code number improves by one digit - say from 24 to 23 - it is doubling the cleanliness level.

"You extend your overall equipment life by five times per number, according to Noria," Mickelson says. "Bearings can have an infinite life when particles larger than the lubricant film are removed," according to SKF, a bearing manufacturer.

According to Mark Mathys, Butler/Caterpillar lab manager in Bismarck, Caterpillar recommends a minimum of 16/13

for new crankcase oil and 18/15 for used hydraulic oil.

Meanwhile, Mickelson says a typical cleanliness level for "new" crankcase or hydraulic oil is only 21/18 - far dirtier than either of those recommendations. Noria quotes a British Hydromechanics Research Association study on how machines wear under various oil cleanliness levels. The association says a 21/18 ISO (a typical rating for new hydraulic fuels from the drum, according to a 2002 Insider Secrets to Hydraulics publications) caused breakdowns at 430 hours. Meanwhile, 16/13 ISO (Caterpillar's minimum cleanliness level for new oil) would cause breakdowns at 1,900 hours. And 18/15, Cat's recommended level for used hydraulic oil would allow breakdowns 1,050 hours.

Sampling a must

How do you test the quality of your oil? You have to sample and send it to laboratory, says Mickelson. Third-party verification is always good.

"It's just smart," Mickelson says. "If they're going to run hydraulic oil for 10,000 and 15,000 hours, they're going to have to test on a regular basis."

Here's how to sample:

- Run the machine to operating temperature.
- Take sample with a vacuum sample collection gun, about a \$15 machine at many dealerships.
- Collect oil in sampling bottles obtained from some implement dealers, or from the labs themselves.
- It can take a few days to get an analysis back. Analysis includes ISO codes, as well as numerous other ratings, including viscosity, water content and general comments.

Mickelson note that farmers should make sure the lab provides an actual ISO code number. Some report only qualitative

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ratings such as "No corrective action required."

"If you tell them you require it, they will supply it," he says, although there can be an extra charge.

Filters and filters

Everybody knows about engine oil filters. They're needed, but in fact do only a "crude job" of filtering oil, according to Mickelson.

That's because engine filters have a "bypass." When cold or when the filter is dirty, allow engine-damaging particles to simply pass by.

"Even if it doesn't have a bypass, the micron filter levels is huge," Mickelson says.

On hydraulic systems, the filter lets by particles of 10 microns or less, while an engine lets anything less than 25 microns. The filtering system for Oil Transfer Systems cleans out any particle over three microns. As the filter becomes dirty, the system simply slows down, and the filter starts to plug. Gauge pressure goes up, indicating that the filter needs to be changed.