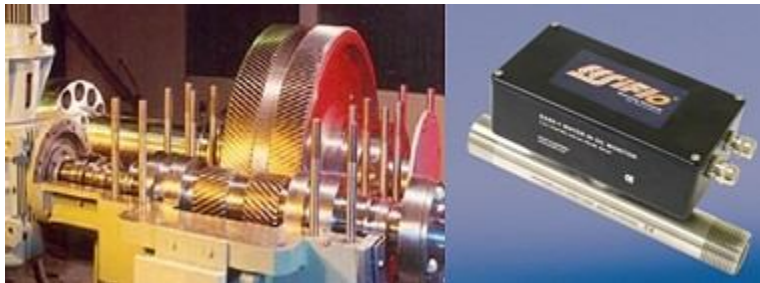




- » Home
- » Flowmeter Products
- » Water in Oil Sensors
- » Rental/Flow Surveys
- » Measuring Principle
- » Applications
- » Distributors
- » Company Profile
- » **Contact Us**
- » Links
- » Flow Calculator
- » Reynolds number Calculator
- » Site Map
- » News
- » Research and Development

Water Contamination in Gear Boxes

The EASZ-1 online water emulsion monitoring - Monitors dry oil and emulsified oils
 PDF DATASHEET>>



ONLINE MONITORING OF WATER IN GEAR OIL APPLICATIONS

Application Notes:

Most Gearbox systems generally consist of white metal or rolling element bearings, steel on steel gear bronze gears of various configurations. The assembly is invariably fitted within an enclosure that provides protection from external contamination and geometric alignment for the gear mesh.

Speeds and loads vary considerably depending upon the application and position of the gear within the

Simple, usually smaller, gear train systems rely on oil bath and splash lubrication. Larger and more complex systems may have pumped oil supply with coolers as well as associated oil cleaning equipment such as coalescers. Dedicated centrifugal oil treatment systems are desirable but rarely applied because of their

The more critical, usually much larger gear boxes systems where there is a risk of contamination from sources particularly water from a cooler and oil deterioration. Such systems tend to have relatively large capacities. Oil management will usually be by periodic oil sampling and monitoring of oil conditions. Cleaning may not routinely take place and oil will only be changed when necessary to rectify problems.

For those systems where it is appropriate to manage the oil by periodic oil sampling, testing should aim to determine the extent of any oil contamination and also the degree of oil degradation that has occurred. Oils with high water content systems require to be regarded as a wearing component. Online Monitoring using the EASZ-1 online and periodic maintenance provide assurance that the machinery will continue to operate predictably with a low risk of problems occurring.



ONLINE EASZ-1 WATER OIL TRANSMITTER

The two most important contaminants for gear oils are water (fresh or salt) and engine lubricants that demulsification properties of the oil. The combination of both will of course present the risk of stable emulsion and water being formed. This can cause a variety of problems, the more important of which may be:

- Spoilt oil film conditions at bearing and at gear teeth contacts.
- Erosion/corrosion of gear/bearing surfaces.
- Spoiling of oil through microbiological contamination.

Online monitoring of water content in gear oils can be an added advantage .

When interpreting analysis data on water content in gear oil systems, the key points to bear in mind are that water will adversely affect oil film conditions. Effects on oil film conditions are likely to be more significant as the water content increases.

Where the contamination is sea water, additional problems are potentially created. Sea water is likely much more aggressive than freshwater with respect to corrosion at all bright metal surfaces (gear/bearing). Corrosive activity associated with sea water contamination is likely to be pervasive and continue to damage machinery is shut down. It is possible that corrosion rates could increase when oil drains down from gear internal bare metal surfaces.

EESIFLO's loop powered lightweight water in oil transmitter can measure water in dissolved state, emulsion free water. The fact is, it measures total water. It does not rely on the need to stay well below the saturation level of the oil to keep working. Gear box applications have been known to work well with smaller amounts of water. However, the amounts will usually be well over the saturation level of the oil.

The EASZ-1 is a very accurate capacitance measuring device. However, to turn this capacitance information into accurate reporting of water content in oil, the unit must correlate measured capacitance (at temperature) to water content in the process oil.

Each EASZ-1 electronics unit is factory calibrated to reference capacitances. This calibration data is stored in the unit, and due to the low, or almost non-existing, drift in modern components, there is no need to recalibrate the electronics. Older types of capacitive instruments had onboard trimmable capacitors requiring recalibration now and then. The EASZ-1 has no such requirements.

The only important aspect of calibration are dielectric properties of the process media , the temperature and finally a tuning of the zero to the actual process.

Here are some features:

Dielectric Calibration/Linearization

EASZ-1 uses a lookup table to correlate a measured capacitance to water content.

Temperature Compensation

EASZ-1 uses a Temperature Compensation (TC) factor to correct for oil temperature dependency. Capacitance changes slightly over temperature.

Zero Offset

A factory supplied calibration, or one made on site may very well give you a correct reading as soon as you use your instrument. It is however quite possible that the oil in your system slightly differs from any sample taken at a lab, or sent to the factory for calibration. If standard values of common new oils are put into the EASZ-1 the EASZ-1 is then set up to measure used oil, most likely a zero offset error will be introduced.

This does in no way mean that your calibration is off; it simply means you have to provide some more data and the EASZ-1 will automatically offset the tables accordingly.

The EASZ-1 has a built in default calibration table. Normally the default table will give good readings for water content with almost all oils, however, it is likely that accuracy is compromised as water content goes up. In some applications this may be acceptable and putting in any extra work for calibration may not be required.

However, if it is necessary to change the zero offset of the default curve/table to the actual media or system, this can be performed on a bone dry oil. If the application has large temperature variances, then the EASZ-1 Calibration can be improved by determining a factor for temperature compensation.

Full Calibration can also be performed (most likely for higher water content oils) by filling in the calibration table with data from known water content samples and by following the "Capacitance to Water Content Procedure".

For more information, please contact your local EESIFLO representative or log onto www.eesiflo.com

Eesiflo has a growing collection of data for different oils and may be able to supply you the correct values. If not yet in our collection, the factory may perform this service. Contact your EESIFLO regional service representative for details.