

# Hydraulic Oil Monitoring with MIRS-T

## Summary Information:

- Multi-Channel Mid Infra-Red Transmission Sensor
- Installed into bypass system for real-time data.
- Hydraulic Oil Condition Monitoring
- Accurate monitoring of key parameters
  - Total Acid Number & Water concentration
  - Correlates with ASTM



## Background:

To ensure the hydraulic fluid efficiently transfers force from one point to another it is imperative that the fluid functions properly. Monitoring the condition of the oil protects the equipment from wear, corrosion and excessive friction. With real-time condition data equipment owners can react to any step changes in data, optimise cost of ownership through enhanced drain cycles but importantly be comfortable that their valuable assets are protected.

## Application:

The MIRS-T device is easily installed into an oil bypass system. The device, with an embedded predictor and measurement file for this oil charts the changes from fresh oil through the drain cycle. For this application, the MIRS-T device has 8 discrete filter channels to monitor specific Infra-Red absorption regions that pertain to relevant chemical changes in the oil from ageing and contamination.

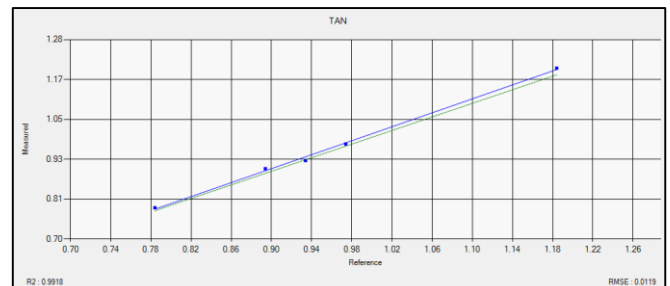
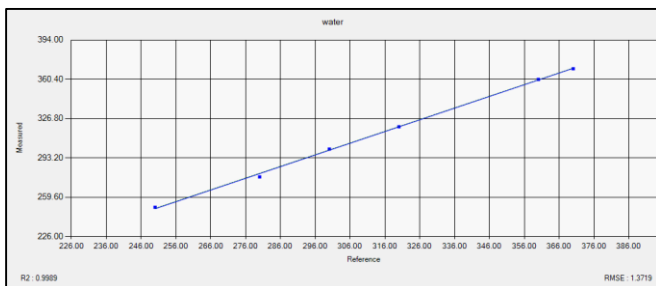
This 'mini-inline-lab' on one sensor allows customers to extract a complete picture of the oil condition. Here we monitor Total Acid Number (mgKOH/g) and water concentration (ppm)

\* For this particular oil the customer wanted to measure these specific parameters only - we can do many more.

## Results & Performance:

The charts below display the relevant oil parameters and the strong correlations achieved from comparing the sensor output to actual laboratory measurements (Titrations, FTIR, ICP, KF).

Using a Multiple Linear Regression (MLR) model for the MIRS-T multi-channel device we are able to achieve  $R^2$  Values  $>0.99$  for all parameters. ( A perfect fitted regression  $R^2=1$ )



**Water Parameter  $R^2 > 0.99$**

**Total Acid Number Parameter  $R^2 > 0.99$**