



CASE STUDY

REAL-TIME DIESEL ENGINE LUBRICANT CONDITION

Gastops has developed a brand-new Oil Condition and Contamination Monitor (OCCM) which uses fluorescence spectroscopy to directly measure oil condition and contamination at the molecular level.

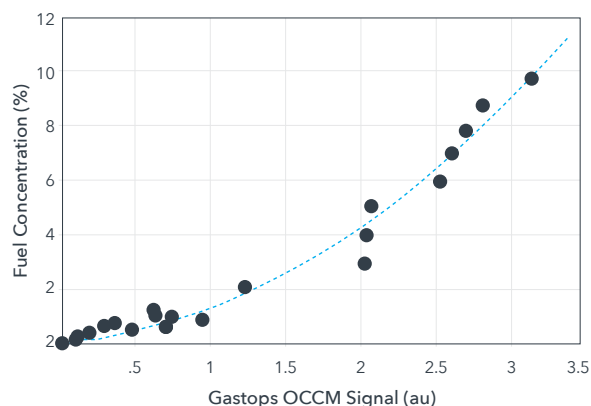
Background

The application of Diesel Engine condition-based maintenance involves specific oil characteristics which are distinct from other applications. The use of Gastops' OCCM in the Diesel application was studied and limits of detection were identified.

Study Parameters

A survey of heavy-duty diesel engine applications and engine operation and maintenance manuals from multiple OEMs identified that a key oil specification relevant to the equipment of interest in this study is the API CK-4 engine oil category. The predominant viscosity grade is SAE 15W-40. In this category two engine oils were selected; Mobil Delvac 1300 Super 15W-40 is a synthetic blend heavy-duty diesel engine oil, and Irving IDO Premium Plus 15W-40 is a mineral heavy-duty diesel oil.

Lubricating oil was degraded in an accelerated-aging apparatus in a laboratory environment, and contaminants were added by weight percentage and were continuously mixed using a stir bar to ensure continuous homogenization. Contaminants included diesel fuel and water.



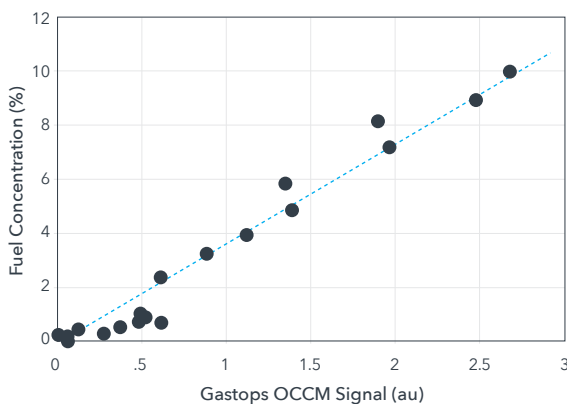
Example Diesel Oil #1

Results of Study

Mobil Delvac 1300 Super 15W-40 and Irving IDO Premium Plus 15W-40 were artificially degraded and fluorescence spectra were collected using the Gastops OCCM prototype and the spectral change was tracked over time. The condition indicator was shown to strongly correlate with the change in certain regions of the FTIR absorbance spectrum associated with ZDDP, Aminic and Phenolic antioxidant content.

Minimum limits of detection for the fuel dilution were established around 1% of fuel by weight for Mobil Delvac 1300 Super 15W-40 oil and between 1.6% and 2.0% for Irving IDO Premium Plus 15W-40 oil. In both cases the limit of detection is significantly lower than the condemning limits of 3.4% to 4% recommended by industry sources.

Minimum limits of detection for the water dilution were established around 2% of water by weight for both Mobil Delvac and Irving IDO oils. The average error during testing was approximately 1% for both explored lubricants.



Example Diesel Oil #2

Conclusion

By advancing this technology, Gastops will create a new sensor which will allow a continuous, real-time measurement of oil condition and contamination to be measured directly.



Head Office

1011 Polytek Street
Ottawa, ON K1J 9J3
Canada

Nova Scotia

10-109 Williams Avenue
Dartmouth, NS B3B 2E3
Canada

Newfoundland

146A Glencoe Drive
Mount Pearl, NL A1N 4S9
Canada

Europe

Info.eu@gastops.com

Asia

Info.ch@gastops.com

gastops.com

sales@gastops.com | +1 613 744 3530

C010263_000