Measuring Diesel in Jet Fuel

Applied Analytics Application Note No. AN-017

Application Summary

Analytes: diesel contamination in jet fuel

Detector: OMA-300 Process Analyzer

Process Stream: jet fuel

Introduction

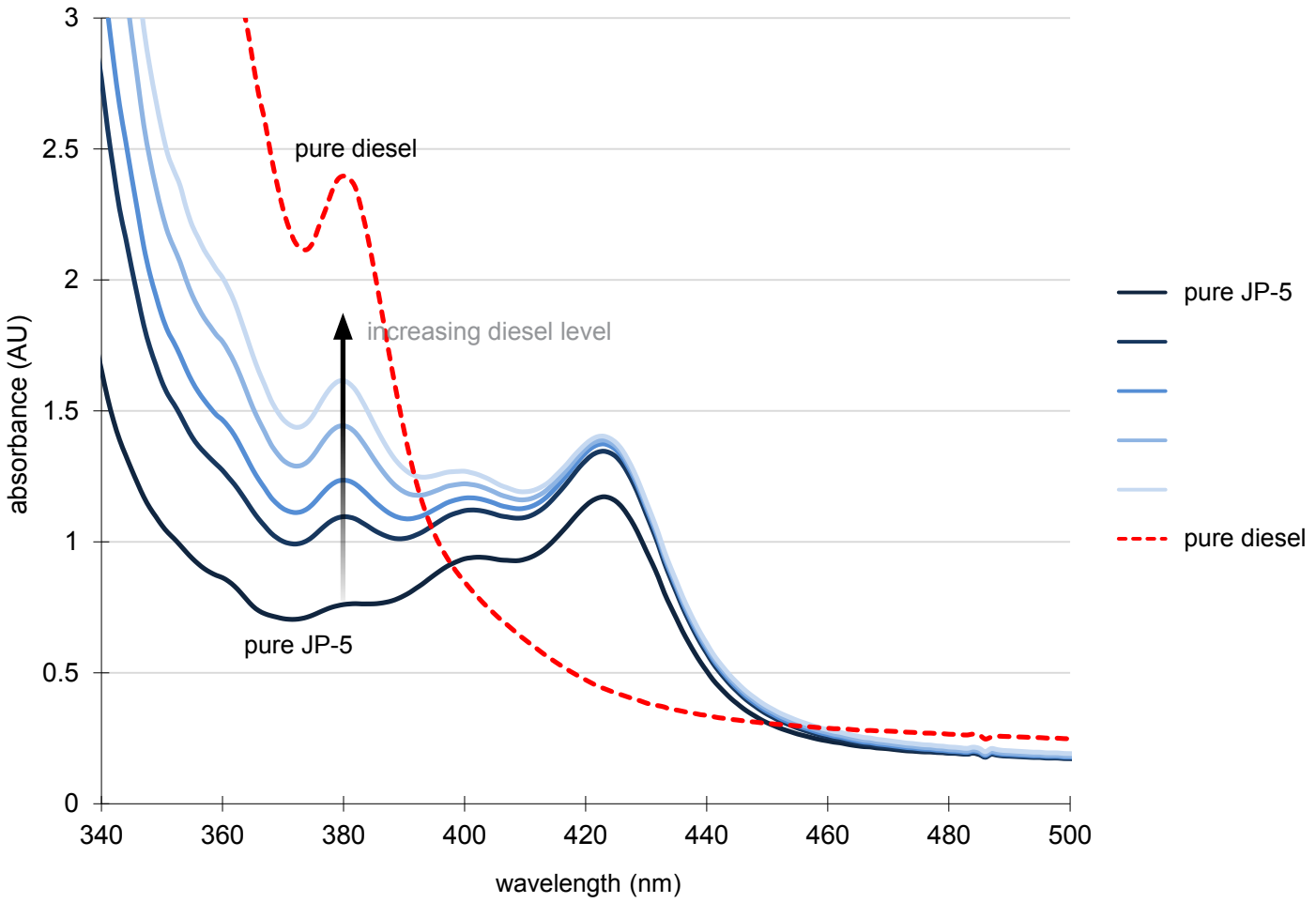
Multiple fuel types are often delivered to vehicles using the same vessels and pipelines. Consider the case of an aircraft carrier, where the jet fuel supplied for aircraft can potentially mix with the diesel supplied for forklifts, trucks, and equipment. This can cause very serious problems, as diesel contamination in jet fuel leads to plugged injectors.

In order to validate the purity of the jet fuel, online analysis of the jet fuel feed stream is required. Measuring the composition of the jet fuel at the site of fueling in real time is the best way to prevent equipment failures due to fuel contamination.

The OMA system is used to analyze a full UV-Vis absorbance spectrum in a continuously drawn jet fuel sample. The analyzer is calibrated on the absorbance curve of pure jet fuel and correlates specific changes in the absorbance to levels of diesel contamination. This method is extremely effective for fast, accurate jet fuel validation.

Absorbance Curves of Jet Fuel with Diesel Contamination

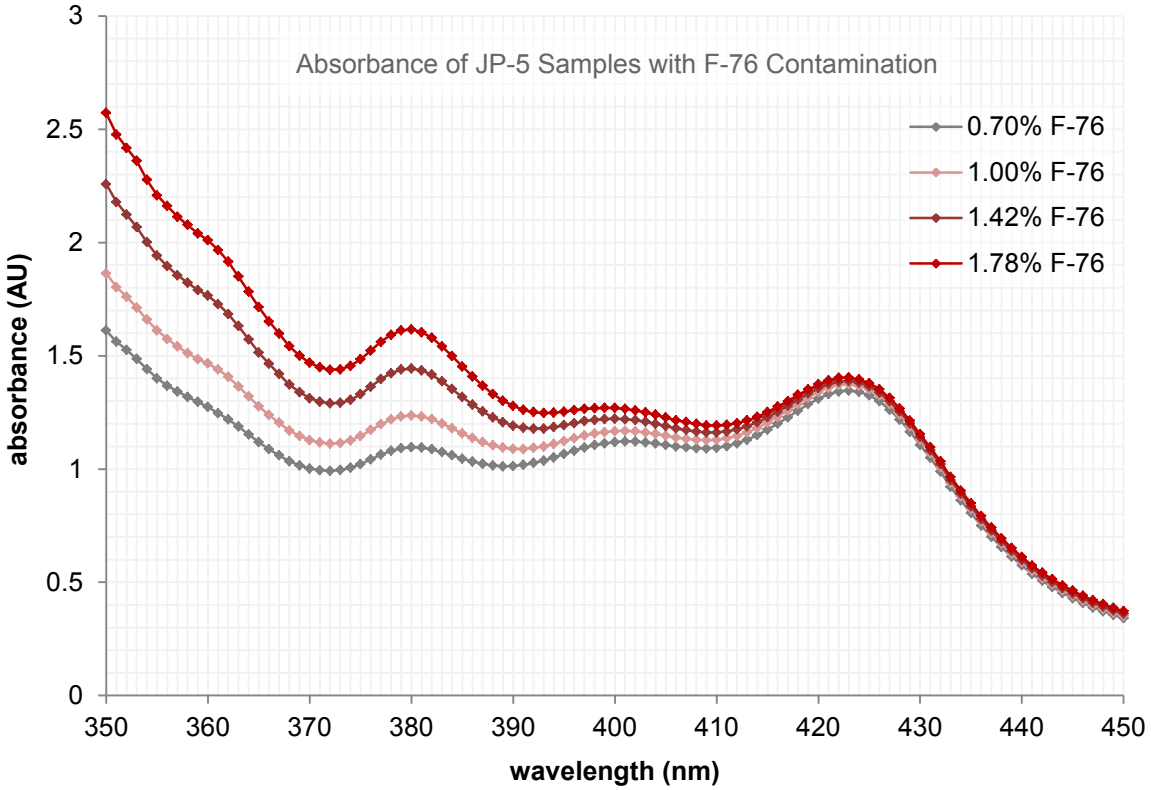
The spectra below demonstrate how the OMA visualizes the pure jet fuel (JP-5) absorbance curve as well as the structural effects of increasing diesel concentration:



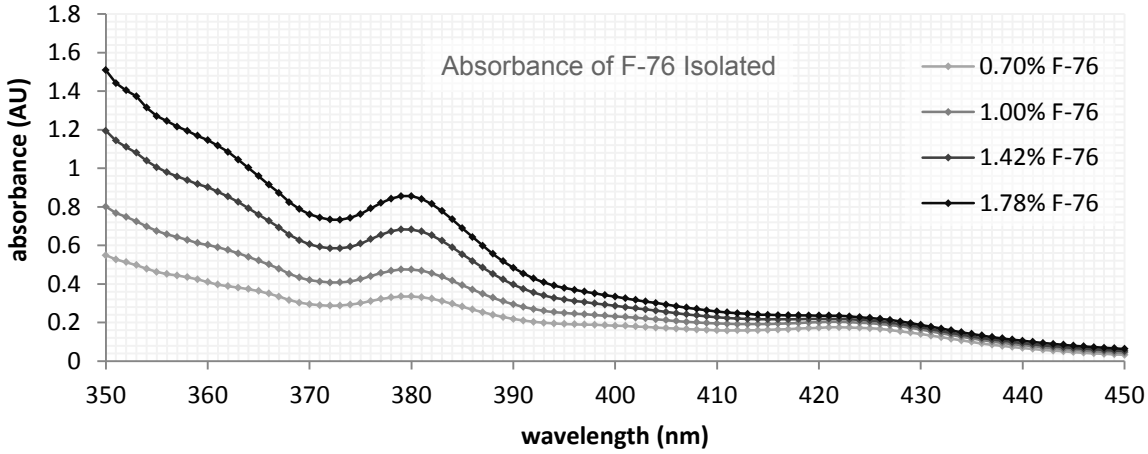
Above, the shades of blue indicate the purity level of the JP-5 sample: lighter blue indicates higher diesel concentration, while the darkest blue indicates pure JP-5. The dashed red curve represents the absorbance of pure diesel.

Correlation of Absorbance Curve to Real-Time Diesel Concentration

The spectra below demonstrate the correlation between absorbance curves and specific concentrations of diesel:



Another way that the OMA can visualize the diesel level is by subtracting the jet fuel absorbance curve. This allows for very easily visual interpretation of the sample absorbance spectrum, since a sample with zero diesel should show zero absorbance with this correction. The spectra below demonstrate the appearance of the curves above with jet fuel background subtracted:



Further Reading

Subject	Location
OMA-300 Process Analyzer Data sheet	http://www.a-a-inc.com/documents/AA_DS001A_OMA300.pdf
Advantage of Collateral Data Technical Note	http://www.a-a-inc.com/documents/AA_TN-202_CollateralData.pdf

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