Monitoring Sulfur and Nitrogen in High-Viscous Products

FEATURES

- Real-time access to data reduces the number of required trips to the field
- A highly robust design results in little to no downtime and requires minimal maintenance—which is generally dictated by internal quality requirements, not instrument service issues
- Fast analysis time of 1-5 minutes, real-time results, and integration with the plant DCS translates into a fast response time to irregularities in the product stream
- Correlation to ASTM D4629, D5453, and D6667 means lab accuracy without the time lag of sending samples to a laboratory

APPLICATION

Monitoring of products such as diesel or gasoline is common, and there are many options in the marketplace for measurement of liquid products with low viscosity. However, as the viscosity increases, the number of options for monitoring the product declines. Highly viscous materials, like heavy crude oils or lubricating oils, present unique challenges, such as higher operating pressures, lower flow rates, and susceptibility to solid particles in the stream.

CHALLENGE

Because of the relatively few options for accurate and reliable monitoring of high viscosity products, many refineries, petrochemical plants, and chemical plants simply do not monitor these product streams. This can present problems, as highly viscous oils can be prone to very high levels of nitrogen and/or sulfur. When these elements are present in liquid products, they can lead to stability problems in end-products like gasoline, jet fuel, and diesel fuel.

SOLUTION

The Antek NSure elemental analyzer is ideal for accurate determination of nitrogen and sulfur in higher viscosity liquid streams up to 10 cP at 100°C. Instead of the contamination-prone inject-and-hold method, NSure uses Antek's patented Pyro-chemiluminescence detection process. With Pyro-chemiluminescence detection, the sample does not need to be vaporized in a holding cell. Instead, a 2-5 µL sample is injected directly into the furnace.

Another option designed specifically for high-viscosity applications is NSure's heated valve kit, which helps to reduce the viscosity of the fluid prior to the measurement process. The temperature and the size of the sample loop, which is internal to the valve, can be adjusted as needed to optimize the analysis.

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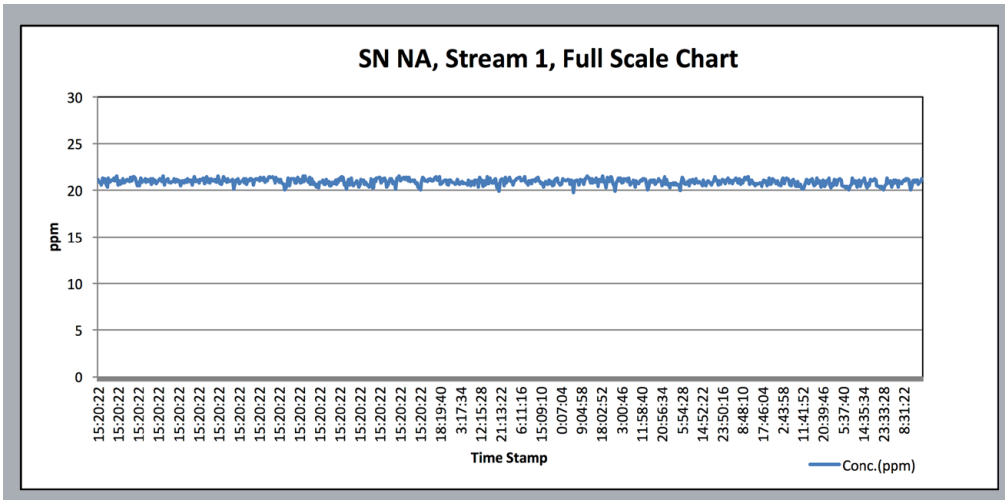
Ideal for Field Installation

The NSure was designed for maximum ease of use and energy efficiency in a field environment. With fewer electronic boards, the instrument is highly stable and very quiet, which leads to less vibration and more accurate results. It has a highly responsive touchscreen interface that maintains functionality even in dusty or damp on-site conditions.

The NSure has the ability to use instrument air as a carrier and combustion source. This is a preferred option when it is a challenge to pipe in oxygen as the combustion source and argon as the carrier gas, and instrument air is readily available at the site. This option reduces the hazards that come with using a highly flammable gas like oxygen, and requires fewer utilities, helping to reduce the ongoing cost of operation.

The NSure analyzer communicates in one of three ways: Modbus via RS-485, Ethernet, or remote PC. It can also use a virtual connection to duplicate the information on the touchscreen directly on a PC. The real-time data can include method, calibration, validation, alarm settings, and digital output controls. The data can be accessed from a PC to view data remotely from anywhere in the world, as long as an Internet connection is available. Data can be downloaded in .CSV format.



Analyzer Stream Information	
Model	NSure
Range (ppm)	0 - 50
Stream	1

Test Sample Data	
Sample Type	Lube oil
Solvent Phase	Liquid
Element	Sulfur
Sample Concentration (ppm)	20

Statistical Test Data	
Mean (ppm)	20.90
Standard Deviation	0.31
% Full Scale	0.63

Illustration 1: In a test conducted over 75 hours in a single-stream refinery process, results demonstrated accurate measurement of sulfur in a 0-50 ppm range.

CONCLUSION

By using proven, laboratory-proven technology to qualify products, the NSure helps meet or exceed regulatory standards in the process environment, while operating close to specification limits to maximize profitability.