



Moisture in refinery liquids

Summary

Excess moisture in refinery liquid feedstocks can damage catalysts, reduce process yield and product quality and cause corrosion in refinery metal infrastructure for key processes such as Isomerization, Alkylation and Hydrotreating. These processes are central to the operation of any refinery.

Application

Liquid dryers dry the liquid hydrocarbon feedstocks, such as naphtha- and pentane-heavy streams, before entering the process reactor. A moisture measurement on the outlet of the dryer unit ensures the performance to specification, typically to less than 1 PPMw. A moisture measurement is often made on the dryer inlet also, to measure dryer efficiency.

Challenge

Traditional analysis methods use laboratory spot sampling techniques, such as Karl Fischer titrators, to determine the moisture content. When extracting a sample from the process and transporting it to the laboratory for analysis, it is difficult to ensure that moisture is not introduced. As this is an offline method, this does not allow for continuous control of the process. Online technologies such as laser or quartz crystal are only designed for gas phase sampling and cannot measure directly in liquid hydrocarbons. For applications that are liquid phase at atmospheric pressure and ambient temperatures, these technologies may not be used effectively.

Application specifications:

Typical Moisture ranges: 0–2 ppmw, <1 ppmw in normal operation

Benefits:

Online 24/7 measurement directly in the process in liquid phase offers tighter process control and reduced maintenance costs. Multiple moisture measurements on a single electronics platform offer a lower cost per measurement point.

Solution

The Panametrics aluminum oxide moisture sensor can measure the sample directly in liquid phase, giving a readout in PPMw. The sensor is installed in a simple sample conditioning system located at the dryer location, providing 24/7 continuous online moisture measurement. The aluminum oxide sensor is connected to a multichannel moisture.IQ control electronics and offers the perfect solution as the control device, as up to six measurements can be monitored on a single analyzer. The moisture.IQ can be located in the control room or in the field, as site requirements dictate. This solution has been specified by the world's major refinery licensors for decades, to ensure the integrity of their licensed processes.



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