



Application

In-line hydrogen measurement for process and safety in hydrogenation of oil

Background

Agricultural feed stocks, such as soybean, palm, corn, canola, peanut and sunflower oils, are hydrogenated during the production of edible fats and oils. This hydrogenation provides desirable characteristics such as a harder consistency, a higher melting point and better oxidation stability which improve a product’s resistance to spoilage or rancidity. Hydrogenated coconut oil is used in many different food and consumer products. Coconut oil is often partially or fully hydrogenated to increase the melting point in warmer temperatures, or to make products “shelf stable”.

The disposal of excess hydrogen from the oil hydrogenation process is key to ensure safety of a process plant. The excess Hydrogen in combination with other trace gases is burnt through using an oxidizer. Hydrogen must be monitored within the exit stream to avoid surges or pulses in the burning process, which could cause fires or explosions. The end user’s goal is to keep an on-going steady burn, thus keeping the hydrogen within a specific range. In addition, the process hydrogen needs to be monitored to ensure that the hydrogenation process is efficient prior to the oxidizer.



Figure 1: Partial hydrogenation unit

Advantages

H2scan’s HY-OPTIMA™ Model 720 and Model 740 are currently used by an industry leader for this application. H2scan analyzers, with their capability to operate in air, nitrogen and inert atmospheres provide multiple point measurement in the hydrogenation process.

- Process measurement using Model 740 (0.5-100% hydrogen) in hydrocarbon backgrounds
- Safety measurement using Model 720 (0.4-5% hydrogen/air) prior to burn off at the oxidizer to ensure that the hydrogen levels are lower than the explosive limits (<4% H2) before vent

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H2scan analyzers provide real-time, inline measurements in process streams. The measurement is also simplified to meet the needs of this application as the technology can operate with or without oxygen present and without the requirement of a reference or sample gas.



Model HY-OPTIMA™ 740

