

Using Optical Technologies to “See The Light” in Brewing Processes

PROZESS
TECHNOLOGIE



REVEAL[™]



As the most widely consumed alcoholic beverage in the U.S., beer production figures have shown an increasing trend during the past decade. As the U.S. is the second leading country in worldwide beer production,¹ even greater marketplace demands are now placed on breweries to produce and deliver consistent, fresh tasting beer.

Product quality is of the utmost importance whether you are one of the smallest breweries in the country or a brewery that produces millions of barrels per year. Whatever the style of beer you make, consumers want to associate your beer with a specific taste each and every time they purchase your product. If not, they have plenty of other alternative beers to choose from today.

This presents a challenge to breweries in determining how to balance the goal of improving and maintaining product quality while meeting production and sales demands. To address this challenge, Prozes Technologie's Reveal™ platform provides an affordable, precise, real-time in-line measurement solution for analyzing sugar and alcohol content, monitoring the fermentation process, and measuring various characteristics of raw materials, such as alpha acids in hops and moisture in grain. The Reveal device also is ideal for monitoring the cleaning process in real-time and determining precisely when your vessels are clean to save you money, time, detergent and water.

Most of these applications are commonly measured today with specific gravity. However, despite the name, this approach is non-specific, and doesn't detect if anything else changes in the brewing process. Our Reveal platform can see specific chemistry and measure every ingredient you want in real-time. Moreover, you can measure more than one application with a Reveal. So measuring turbidity and color throughout the brewing process, along with other key ingredient monitoring, can be accomplished with one device.

Applications

SUGAR AND ALCOHOL CONTENT

Among the most important analyses made on beer are alcohol and sugar content. From these, a brewer can determine the appropriate strength of the beer and if it has fermented properly throughout the process. Additionally, some countries levy excise tax based on the alcohol content, which for cost reasons make it essential to have precision measurement in real-time. The Reveal measures real-time alcohol concentration in pipes, tanks or fillers as well as low alcohol and near-beer applications where density measurement is inaccurate.

FERMENTATION

At the beginning of fermentation, a defined amount of yeast is added to the wort and oxygenated. Afterward, fermentation starts with an optimal temperature for the yeast. Before the beer is stored, the yeast is harvested. Then the young beer is stored for a defined time at a defined temperature.

In fermenting, our Reveal has the unique ability of mounting directly on the fermentation vessel or directly in a bypass line. Properly located, the entire fermentation cycle can be monitored in real-time, allowing for optimization of the process. Tanks can be released automatically rather than waiting hours for lab samples to indicate proper flocculation. Feedback on any recipe influences of yeast cell growth can also be seen. In larger cellars, saving 6-10 hours per fermentation cycle can add up quickly, adding valuable fermentation capacity, without adding a single fermenter.

ALPHA ACIDS

Alpha acids are of primary importance to the production of beer. They are found in the resin glands of the flowers of the hop plant and are the source of hop bitterness. Alpha acids include humulone, adhumulone, cohumulone, posthumulone, and prehumulone. The alpha acid "rating" on hops indicates the amount of alpha acid as a percentage of total weight of the hop. Hops with a higher alpha acid content will contribute

more bitterness than a lower alpha acid hop when using the same amount of hops. High alpha acid varieties of hops are more efficient for producing highly bitter beers. The Reveal will ensure your lagers don't taste like your IPAs.

CLEANING VALIDATION

Our cleaning validation application ensures that you don't overwash or use more solvent than necessary. And, you will conserve water usage at the same time. Vessel cleaning entails the introduction of wash solutions, caustics or solvents into the vessels and piping. Typically, samples of the rinse solution must be removed from the system and taken to the laboratory for analysis of residual ingredients in the rinsate. This greatly slows the cleaning process while adding to the laboratory test burden. The Reveal performs real-time measurements to quantify the concentration of solvent in rinse solutions. The Reveal can measure over a broad range of concentrations covering the gross cleaning step early in the process and the final measurements at trace concentrations.



Our Solution

The new Reveal analytical measurement devices from Prozess Technologie offer a unique, new option for those who prefer a dedicated analyzer for a specific application.

From the ultraviolet through the visible to the near-infrared, the application determines the wavelength region where the attribute can be best measured, which defines the spectral engine.

The application also defines the process interface, including contact and non-contact reflectance probes, dip probes, and flow cells, any of which easily attach to the system body. By preloading the application-specific model into the Reveal, constituents can be tracked without the need for customer expertise in chemometrics. In other words, all the science is built-in!

The base system contains all control electronics and communications, including a host of wired and wireless protocols to allow ready implementation into the process line and control systems. A simple web interface allows ready viewing of the attribute output, as well as stored output from the previous 30 days, to quickly and easily communicate output to the user.

The Reveal offers a number of advantages over competitive systems for tracking product attributes. Reducing components reduces system size without sacrificing the multivariate flexibility provided by a true spectral system. Imbuing application-specific models into each device before it is installed allows drop-in customer use, without the need for in-house expertise. All of these features provide unparalleled ease of use at a significantly reduced cost point to accurately and reliably measure process attributes in real-time.



**ARE YOU READY TO GET STARTED
WITH PROZESS TECHNOLOGIE?**

Please contact us at revealyourapps@prozesstech.com,
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1. Statista 2015. Leading 10 countries in worldwide beer production in 2013. www.statista.com
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