

Eclipse® Guided Wave Radar Cyclone Level Application



In addition to their battle to gain the favor of consumers, attaining operational efficiencies has always been essential for brewers. Beer and yeast separation and recovery is one aspect of the brewing process where brewers using separators with cyclones can realize greater efficiencies.

Yeast, the microorganism responsible for fermentation, also greatly influences a beer's flavor and character. In the latter stages of beer production, brewers separate the spent yeast from fermented beer through the use of separators. The fermented beer is processed downstream and the spent yeast is processed for resale. Spent yeast is marketed as baker's yeast, as bedding for growing mushrooms, and as an ingredient in ethanol fuel. Since spent yeast is very high in protein and B vitamins, it has traditionally been given to livestock as a valuable feeding supplement.

Separators have been essential equipment in beer brewing for decades. They ensure economical operation, a higher quality of beer, and efficient reclamation of beer and spent yeast. Over a period of time, however, a working separator starts to lose its efficiency due to yeast packing, and the bowl of the separator must be discharged of this packed yeast. The bowl discharge of the separator is called a "shoot." The objective of controlling the shoot is to clean the separator bowl of caked yeast and also minimize the amount of beer that is lost when the separator bowl is open.

When the separator bowl shoots, it discharges the beer and yeast mixture into the top of the cyclone, tangentially to the sidewall. The yeast/beer slurry decelerates and collects at the bottom of

the cyclone. The spent yeast is then pumped out of the bottom of the cyclone by means of a positive displacement or peristaltic pump and enters a yeast decanter or yeast thermalizer. Any beer that is unintentionally discharged with the shoot is lost.

The cyclone also acts as a surge vessel between the separator bowl and the spent yeast storage located below the pump. When the bowl shoots, additional beer will be discharged with the yeast into the cyclone.

Our customer, a major U.S. brewer, had controlled the level in 64 cyclones throughout its breweries by using a competitor's point level capacitance probe. The probe measures high level only and indicates when the cyclone is full of yeast/beer slurry. This was not enough information for the brewer!

Magnetrol® worked with one of the company's breweries to prove that continuous level measurements could be made in a cyclone.

The Eclipse® Guided Wave Radar (GWR) probe was bent to measure down the sidewall, down the cone at the bottom of the cyclone, and bent again into the discharge piping below the cyclone. By measuring level down to the outlet, the brewer can determine when there is slurry in the bottom of the cyclone and initiate pumping into the spent yeast decanter. When the level is low, the pump will be stopped. This operation controls the discharge of the cyclone during separator shoots.

The brewer was aware that during normal separation of yeast (clarification of the beer), the separator bowl was to remain closed – not discharging slurry into the cyclone. However, the



Previously-used single-point capacitance probe

ECLIPSE GWR Installed in a Cyclone

bowl of a separator is sealed by an elastomeric gasket. That gasket is prone to leakage, allowing good beer to be discharged at a low rate into the cyclone.

This brewer monitors the cyclone level between shoots of the separator. If the separator bowl seal is leaking, the level in the cyclone will slowly increase. Therefore, by monitoring the level between shoots, the "health" of the separator bowl seal is monitored. Naturally, if beer is wasted by a damaged separator bowl seal, the brewery is sending good beer to waste! If a leak is identified, the separator is scheduled to have the bowl seal replaced.

Following that test, it was determined by the brewer that the payback for continuous level measurements using Eclipse GWR would be less than three months calculated by limiting the amount of beer lost in the separation process.

Magnetrol now has 64 ECLIPSE transmitters installed to provide continuous cyclone measurement throughout the company's breweries.

If this brewer can save one tenth of one percent of the beer by utilizing ECLIPSE GWR, this translates into saving tens of thousands of gallons of beer per year—and that's a whole lot of beer!

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