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AUTOMATION OF CYLINDER-CONICAL TANK IN BREWERY

In the modern world one of the most popular alcoholic drinks is a beer. The commonest problem in Ukrainian brewing industry is control and regulation of fermentation and after-fermentation processes. Those processes occurs in CCT (here & forward – cylinder-conical tank) and most of brewing companies in our country are hiring specialists to control and regulate them. That can cause production failures and other accidents.

Our research is dedicated to improving brewery in Ukraine by making the process of fermentation, the most important part of it, reliable and qualitative.

There are two questions which our topic arises: What is the use of CCT automation? How can we improve the process of fermentation?

Answering the first question we consider following advantages:

1. Reliable and accurate options regulation.
2. Simple and fast system control.
3. High safety level.

The only disadvantage is high cost of such system and the main reason why Ukrainian brewers discard it.

Before describing our project we must consider the operation principle of CCT.

Pure wort goes through the pipes to the bottom of CCT. After the wort has been cooled completely, yeast is added to the tank. During the fermentation much heat stands out, so the wort requires constant cooling. Brewers are monitoring the concentration of carbon dioxide in the tanks during the fermentation. After the maximum level is reached, gas is pumped through the special pipes.

The controller that we use to regulate options receives data from pressure meter to control concentration of carbon dioxide in the tank. Data received from the temperature sensor is used to keep the wort and settled yeast cooled.

Ammonia vapor as a coolant circulates through the coil-pipes of cooling jackets of CCT. This type of coolant was chosen because it meets necessary requirements of temperature that it can decrease, and, therefore, the regulation process occurs more fluently.

Data received from the level meter is used to fill the vessel with the necessary wort quantity. All measured values of the options are displayed on the screen for convenient monitoring.

Final step in our research was to calculate economical profit for such expensive system as was mentioned above. Calculations that were made showed us that this kind of expenses will not be reflected in the profitability of production very much because the pay off period is not long.

All the conducted investigations have made us conclude that the designed automatic system is expediential and profitable.