CASE STUDY | FOOD INDUSTRY

Perfecting wine fermentation through real-time monitoring

Precise and automated fermentation monitoring ensures highest quality standards in winemaking

Our customer:
A family-run winery

The company produces high-quality wines and has developed into a large winery with over 100 fermentation tanks during the last decades.
Tasks that had to be carried out manually and laboriously before are now automated using state-of-the-art technology.
The blend of tradition and innovative technology enhances efficiency in winemaking and creates a perfect taste experience.

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The challenge:

Many wineries start as small operations, where manual processes seem cost-effective and easiest to implement. As a winery grows, it may run into challenges where those operational inefficiencies make it difficult to scale up wine production. Thus, investing in modern production facilities and tanks as early as possible is critical. Enhanced process efficiency can save production costs and provide more reliable product quality from batch to batch.

The progression of wine fermentation, where yeast converts the sugars in the grape juice to alcohol, can be determined by measuring the specific density of the liquid. During fermentation, it decreases. The "Brix" value captures the dissolved sugar content left in an aqueous solution, thus indicating the progression of fermentation.

In the past, a winery employee calculated the value manually by pulling a sample from the tank and then entering the Brix readings in a fermentation curve to track the progress of fermentation at specific points in time. However, manual Brix level measurements have disadvantages: There is a risk of entering inaccurate values, the progress between measurement points is not visible, and the sugar content of the juice can vary in different areas of the tank.

The solution – why ifm?

ifm provides an automation solution that scales with the growth of wine production. Two PI17 series pressure sensors measure the density in the tank over a large fluid column. The possibility to install pressure sensors on the pumpover line of a tank eliminates the need for wineries to add new tank penetrations while still receiving accurate Brix level data. By continuously monitoring the density, the specific gravity and degrees Brix can be calculated at any time.

IO-Link masters send the differential pressure and temperature data digitally and without conversion losses to the higher-level **moneo** IIoT platform from ifm. The precise calculation is performed in real time, enabling a more accurate understanding of how fermentation is progressing throughout the tank. In addition, a CR series display controller visualises the Brix curve in real time. Dashboards can be programmed to show the progression of fermentation for multiple tanks. Continuous process data monitoring enables the winemaker to check the fermentation progress at any time and make adjustments to the batch when necessary. Increased access to Brix level data leads to improved process and product quality compared to manual methods.

Automated wine fermentation contributes to the production of a more stable and higher-quality product, with wineries of any size benefiting from the increased accuracy when monitoring the fermentation process. Winemakers can leverage the data generated from the automation processes to fine-tune their operations, increase efficiency, reduce costs and continually improve wine quality.

Results:

- Higher wine quality due to precise Brix value calculations and temperature monitoring
- More accurate than measurements performed with a densitometer, refractometer or hydrometer
- Automation of manual processes
- Real-time visualisation of the fermentation progress
- Easy installation of components on the pumpover line of red wine fermentation tanks

Efficiency increase

More precise measurements and calculations

Real-time visualisation of Brix values

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