



APPLICATION NOTE

Fermenter monitoring Champagne

Champagne production

Champagne production uses three grape varieties: Chardonnay, Pinot Noir and Pinot Meunier. This wine-making process is strictly defined as the traditional method: «Méthode Champenoise». A series of key production steps have to be realized in order to achieve the best quality.



1



The first step is the production of the cuvée, which is the base wine used to produce Champagne. After the grapes are harvested and pressed, the resulting grape juice will be subjected to an initial first fermentation. This fermentation is done in a dedicated tank, at low temperature, which will create a still, fruity and dry wine.

2



The second step is also crucial and is a key factor in determining the quality of the Champagne produced. This step is called the cuvee blending and consists of selecting different wines to be blended, using wine produced this year or older wines, from the same variety or not. This blending will provide the unique character and taste to the Champagne.

3



The last step is called the secondary fermentation (or bubble production). Tirage liqueur is inserted into the Champagne bottle before filling it with the blended wine from step two. Finally, yeasts are added to the bottle in order to transform the residual sugar into alcohol and thus creating the dissolved carbon dioxide gas, producing a wine that is sparkling when opened.



DEVIL[®] sensor for yeast fermenter density monitoring

DEVIL[®] sensor is a miniaturized, robust and smart embedded sensor which directly continuously provides density, viscosity and temperature of liquids. Thanks to its 316L stainless steel construction, its small footprint and sanitary design, DEVIL[®] is the ideal solution to continuously monitor the density of liquid in the fermenter for the production of yeast to be added to the bottle in step three of the production process.



Optimize your yeast production

The yeasts used during the secondary fermentation step have an ancient role in Champagne production since that they are the key factor in the transformation of sugar into alcohol to produce the tiny bubbles of carbon dioxide when the bottle is opened. The health of this population has to be directly monitored measuring the density of the broth in the fermenter. Based on the density measurement, the winemaker can make adjustments to the tank control parameters (temperature, mixing, oxygenation) to provide the healthiest yeast added to the bottle.

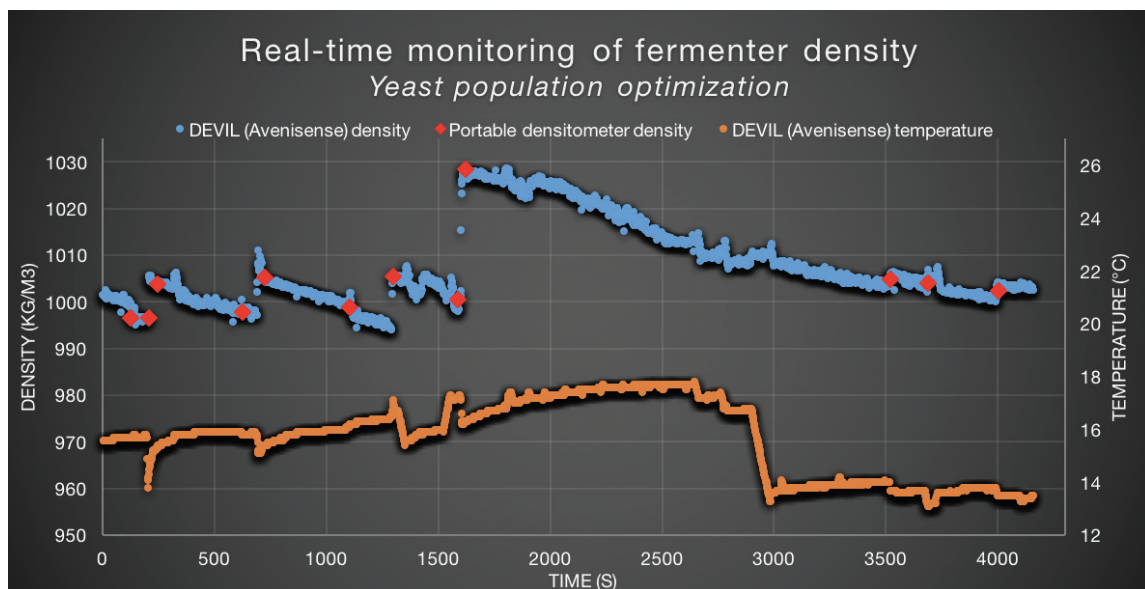


Figure 1: Graph of the density and temperature of liquid in a fermenter that produces critical yeast for champagne production. Density is measured continuously using a DEVIL[®] density sensor and compares favorably to periodic measurements using a portable density meter.

SUMMARY

The DEVIL[®] sensor has been successfully used on a fermenter to continuously monitor the yeast population. The measured density is mainly within the range of 990 to 1050 kg/m³, with the DEVIL measured fermenter temperatures varying from about 10°C to 25°C. The savings to the wine maker are a reduction in labor to make the manual density measurements, in tank digital temperature measurement, a reduction in the risk of outside contamination affecting the yeast population and fast measurement feedback when adjusting the operating conditions in the fermenter.