

HAFFMANS INPACK TPO/CO₂ METER

NEW GLARUS BREWING COMPANY

CASE STUDY



KEY FACTS

Location

Wisconsin, USA

Application

Brewery

Measurement

O₂ content in filled packages

Start-up

2012

DIFFERENTIATED OXYGEN MEASUREMENT IN FILLED PRODUCT

To better pinpoint any oxygen [O₂] pick-up, New Glarus Brewing Company chose to look into Total Package Oxygen (TPO) values using Pentair Haffmans' Inpack TPO/CO₂ Meter, type c-TPO. The insights provided by the c-TPO allowed New Glarus to significantly improve its filling process.

New Glarus Brewing Company, a Wisconsin, USA based craft brewer, is known for its unique, handcrafted beers. Serving a constantly growing regional customer base, 2012 production at New Glarus will top 125,000 barrels (146,600 hectoliters) with brewing capacity expected to double the next four to five years.

Providing excellent quality product has always been an integral part of New Glarus Brewing's philosophy. This is now more important than ever as the brewery looks to growth and brewing capacity expansion.

Before installing the c-TPO New Glarus Brewing controlled packaged air using the air shakeout method that is not sensitive enough to detect the low O₂ levels achieved in a modern brewery. Also, it does not distinguish between headspace and dissolved gases. Moreover, the caustic in the burette posed a constant threat to the operator.

New Glarus installed a Pentair Haffmans c-TPO at the bottling line for use by the filler operator. The immediate feedback from this simple, fast test helped the brewery lower the average TPO from 150 ppb to less than 60 ppb.

One observant filler operator noticed, that at 400 bottles after a tank change the TPO jumped to over 1,000 ppb for a few moments before returning to normal.

This promoted the brewery to investigate and it was determined that the tank change procedure was flawed. Without the rapid test provided by the c-TPO this "blip" would not have been caught.

Because the c-TPO measures the O₂ content in both liquid and headspace, the O₂ increase in the liquid was immediately discovered by New Glarus. Prior to installing the c-TPO the packaged beer with a higher O₂ content would have passed final product inspection.

Oxygen in headspace and in liquid

At New Glarus the c-TPO's significant advantages over conventional measuring methods were obvious. Pentair Haffmans' c-TPO measures the headspace oxygen (HSO), the dissolved oxygen (DO) and the TPO as well as the carbon dioxide (CO₂) content in the filled packages with a single measurement step.

The O₂ contained in a package comes from the HSO and the DO in the liquid. Using previous methods, an O₂ value was determined, but outside packaging and without separation into HSO and DO. Optical O₂ measurement with the c-TPO meets this challenge directly in the filled product, so that considerably more accurate results can be obtained.

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This makes it possible to identify, for instance, whether the over-foaming works perfectly ahead of the capping machine or whether O₂ content was introduced in the filling process. In the first case, the HSO is increased; in the second case, the O₂ content of the liquid phase is increased. This transparency means that the entire filling area can be optimized quickly and efficiently.

The c-TPO's O₂ measuring range is 0 to 2,000 ppb in liquids and 0 to 4 percent in gases. The total O₂ content is automatically calculated from these two parameters. Furthermore, the c-TPO supports the z-factor method according to Uhlig. Measurement of O₂ starts with a complete nitrogen rinse of the sensor so that a very accurate measurement is guaranteed, even

in ranges below 10 ppb. Overall the optical measuring technique achieves accuracy levels of ± 1 ppb (w/w) plus 2 percent of the measured value. In the case of HSO, accuracy is ± 0.002 percent (v/v) plus 2 percent of the measured value.

Using the c-TPO, New Glarus continues to see TPO values drop dramatically. This is especially true on tank changes.

The advantages of the c-TPO had the brewery convinced. "The c-TPO places powerful control in the hands of the filler operator," said Dan Carey, New Glarus Owner and Brewmaster. "Being able to quickly differentiate between DO and HSO is a huge advantage when diagnosing problems. We will continue to use the c-TPO to maintain our high quality standards."

HAFFMANS BV

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