

Case Study

Crown Beers India Ltd. - First brewery using High-Gravity Brewing in India!

In recent years, the Indian beer market has grown substantially. The average growth per year had been around 14% . But there are quite some obstacles in the market for the local breweries, on their way to meet the customer demands. For example:

- State regulations regarding the amount of brewing facilities and beer production;
- High taxes on the final product;
- Limitations for expanding the sales activities to neighbouring states, as regional governments protect their local breweries.

But as the market demand is bigger than the available brewing capacity, states tend to allow new players and the introduction of new brewing techniques in their local market.

Crown Beers India Ltd. , a joint venture between Anheuser Busch International Inc. and Crown Beers India, started brewing with a capacity of 200.000 hl/year. Due to the fact that Crown Beers India Ltd. had the opportunity to sell their products not only in the strong growing local market, the state of Andhrapredesh (home of Crown Beers India Ltd.), but also in the states of Maharashtra, Karnataka and Goa, the urgent need for an expansion was present. The goal had been, to reach a final brewing capacity of 500.000 hl/year. Due to the strong growth and the protection of the overall costs, the brewery was interested in expanding their capacity, without the need for costly and time-consuming investments. Next to that two additional factors were applied:

1. Anheuser Busch International Inc. asked for a water deaeration system which was able to reach extreme low residual oxygen levels of < 10 ppb;
2. The tax losses the Indian government was facing as more beer could be sold as the available capacity could reach the market demand.

When it comes to the challenge to produce more beer with the same production system and with a minimum investment, like at Crown Beers India Ltd. Norit Haffmans offers the best solution: High-Gravity Brewing. A process in which a high concentrated wort is produced and the final beer diluted. Due to this process, more products can be processed at a time.

The three steps in High Gravity Brewing are:

1. Water deaeration;
2. Blending of the High Gravity beer with the deaerated water;
3. Carbonation of the blended beer to Sales CO₂ content.

1. Water deaeration

Because Crown Beers India Ltd. asked for a system, which would reach extreme low residual oxygen levels and a low OPEX value, Norit Haffmans chose the membrane deaeration system, type MDS.

The MDS System employs high-efficiency hollow fiber membranes, creating a large contact surface between the water and gas phase. Since the partial pressure of O₂ in the water outside the hollow fibers is higher than on the inside, where a vacuum is applied, the O₂ in the water diffuses through the membrane. Inside the hollow fibers a small amount of sweep gas (CO₂) is applied, to purge any

High-Gravity Brewing

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Case Study

O₂. This results in effective deaeration with an exceptionally low CO₂-consumption.

Due to the applied technology, the deaeration will be performed at ambient temperatures and there will be no need for heavy-duty equipment. Finally, as the Crown Beers India Ltd. requested to control these low oxygen values, Norit Haffmans equipped this MDS with a Norit Haffmans O₂ measurement system, type OGM. This is based on a new innovative optical technology to determine the oxygen values in water and other beverages.

2. Blending

As the tax legislation in India in the state of Andhrapredesh is based on Alcohol content in the final product, Norit Haffmans included this possibility in the scope of supply.

Blending is performed on the basis of water/beer ratio control, with correction on either original gravity or alcohol content through PLC control. The applied method depends mainly on national tax legislation.

3. Carbonation

After blending, carbonation takes place by injecting CO₂ at the inlet of a dissolution tube. CO₂, which will be used for carbonating the diluted beer needs to have the highest possible purity, as it is mandatory that the O₂ intake of the final product is as low as possible.

The total dissolution of the injected CO₂ is necessary, as undissolved CO₂ can lead to:

- Wrong measuring values at CO₂;
- Wrong Plato and Alcohol determination;

- Foam creation in the bright beer tanks;
- And finally extra costs due to wasted CO₂.

To achieve this for the Crown Beer India Ltd., Norit Haffmans offers a Blending and Carbonation device, type CBR. This system works by injecting CO₂ at the inlet of a dissolution tube and then finely disperses and dissolves the CO₂ by using a set of static mixers. These have been especially engineered to suit Crown Beers India Ltd. specific process conditions.

To determine the amount of dissolved CO₂ in the final product an inline CO₂ measurement has to be present. The In-line CO₂ Gehaltmeter, type AGM (or In-line CO₂/O₂ Gehaltmeter, type c-AGM for combined measurement) determines the amount of CO₂ and can immediately adjust the CO₂ dosing rate if necessary via PLC control. Besides being used to control the carbonization process, the CO₂-and the O₂-measurements, that are integrated in the Norit Haffmans measuring device type c-AGM, are available for Crown Beers India Ltd. monitoring of the beer quality.

All these steps are closely linked to each other and therefore Norit Haffmans integrated all of these steps into one unit. As the different steps in modern High Gravity Systems depend on each other, the integration will lead to the possibility to use the deaerated water either directly for the blending process or send it first into a buffer tank, when fluctuating flows are to be expected.



Haffmans BV reserves the right to make changes in the technical specifications at any time.



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