

## Beverage



# Low Cost Carbonation

*Considering the development of the carbonation process of beer and carbonated beverages, it can be concluded that not only the desired CO<sub>2</sub> content in the end product has increased over the years - up to even 8 g/l dissolved CO<sub>2</sub> is a very customary value nowadays - but that demands on accuracy have increased even more. With Haffmans technology, higher quality and accuracy results even in a lower Total Cost of Ownership.*

With the introduction of the latest generation In-line CO<sub>2</sub> Gehaltemeter, type AGM, Haffmans modernized and simplified their Carbo Controllers. The 'on board' control possibilities of the new AGM make the necessity of a control box superfluous. Therefore investment costs are greatly reduced (up to approx. 25%).

Recently, the Bröckhouse Aps Brewery in Denmark ordered one of these state-of-the-art Carbo Controllers, DN40, to perform the CO<sub>2</sub> injection, dissolving and measurement. A decisive factor for choosing Haffmans was the good reputation as being the partner for CO<sub>2</sub> management in the market. Haffmans was recommended to Bröckhouse by one of the leading consultancy companies in the brewery business.

Bröckhouse Aps was established in 2003 and is located in the city of Hillerød, in the north-eastern part of the island Sjælland. The standard assortment encompasses eight different types of beer and, next to several specialties, two additional seasonal types. One of their best selling and very popular beers is Esrum Kloster, a slightly different beer type developed in cooperation with Esrum Monastery. Its recipe, faithful to the monks tradition, originates from the 15th century. The top-fermented beer, enriched with lemon balm, meadowsweet, lavender, rosemary, juniper and anis, is brewed with malt from wheat, barley and rye together with hop and cane

sugar. The total capacity of the microbrewery adds up to 5.000 Hl/yr.

### Carbonation Process

To achieve a stable carbonation process, three critical issues - accurate dosing of the required amount of CO<sub>2</sub>, quick and bubble-free dissolving of the injected CO<sub>2</sub> and accurate measurement of the dissolved CO<sub>2</sub> in the final product - are decisive.

### Accurate CO<sub>2</sub> Dosing

Experience has shown that carbonation is not simply a matter of 'just adding' CO<sub>2</sub>, as an inaccurate amount might lead to an incomplete dissolving of the CO<sub>2</sub>, which affects the quality of the final product. Consequences would be an inaccurate CO<sub>2</sub> concentration, foaming in the storage tanks or during the filling process, both of which would lead to CO<sub>2</sub> losses, and an inaccurate and unstable extract measurement and control. Therefore, Haffmans Research & Development department developed an 'all in one' CO<sub>2</sub> dosing unit, consisting of a very accurate CO<sub>2</sub> control valve, three integrated pneumatic valves to secure fluid separation during CIP procedure, and integrated 'on board' pneumatics and electronics to simplify the installation and connection to the Haffmans CO<sub>2</sub> analyzer.

### Bubble-free dissolved CO<sub>2</sub>

The purpose of carbonation is the complete, bubble-free dissolution of the required amount of injected CO<sub>2</sub>. In order to achieve

that, the parameters initial and final CO<sub>2</sub> content, temperature, pressure, flow rate and viscosity have to be taken into account.

For the dispersion of the injected CO<sub>2</sub>, Haffmans uses specially designed static mixers. With this robust, reliable and maintenance free method, the contact surface between beverage and CO<sub>2</sub> is increased and the CO<sub>2</sub> dissolving thus accelerated. Haffmans developed its own software to calculate the necessary amount of static mixers to assure a bubble-free dissolving.

### Accurate dissolved CO<sub>2</sub> measurement in the final product

To control the entire carbonation process and to take care of a final product that closely meets the specifications, a very accurate, stable and reliable CO<sub>2</sub> measurement is required. Over the last 25 years, Haffmans CO<sub>2</sub> meas-



urement, based on Henry's law, has been adapted as the standard in many breweries and beverage production sites worldwide. The new generation of the approved in-line CO<sub>2</sub> measuring device, type AGM, or even the revolutionary combined inline CO<sub>2</sub>/O<sub>2</sub> measuring device, type c-AGM, is not only more accurate and reliable than before, but most importantly renders a separate control panel unnecessary.

### Integrated O<sub>2</sub> measurement

Over the last decade, the variety of beverages increased enormous and with that also the number of ingredients. As some of these ingredients are subjected to decay under influence of oxygen and consequently will have a negative effect on the shelf life and the taste stability of the particular beverages, a quality check on the O<sub>2</sub> content in the final products is becoming more and more important.

On many customer requests, Haffmans complemented the in-line CO<sub>2</sub> measurement with an in-line O<sub>2</sub> measurement. A revolutionary optical O<sub>2</sub> measurement has been integrated in the new generation AGM as mentioned previously.

### Haffmans Carbo Controller - the perfect solution for Bröckhouse

It is difficult to achieve a reliable, stable and accurate carbonation solution if not all of the above-mentioned criteria are covered. Haffmans Carbo Controller, equipped with Haffmans CO<sub>2</sub> dosing unit, in-line CO<sub>2</sub> (or even combined CO<sub>2</sub>/O<sub>2</sub>) measuring device and static mixers, is a fully automatic plug & play unit and allows for accurate CO<sub>2</sub> injection, bubble-free CO<sub>2</sub> dissolving and perfect total process control at the most competitive Total Cost of Ownership. Thanks to the new generation of the Haffmans CO<sub>2</sub> measuring device, Bröckhouse was thus able to save up to 25% in comparison to the previous generation.

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### General / Technical Data:

**Bröckhouse Aps**  
Haffmans Carbo Controller – Type CCR DN40  
5000 Hl/yr

### Scope of supply:

- 1 Carbonation tube
- 1 CO<sub>2</sub> Dosing Unit
- 1 Haffmans CO<sub>2</sub> Measuring Device, type AGM
- 1 Beer pressure control loop

# Haffmans new generation Plato Monitor – Type PM9120



The Haffmans Plato Monitor uses ultrasound technology for the rapid and reliable measurement of the original gravity of beer. Whether in the brewhouse, during filtration or in the filling process, the Plato Monitor can be applied for the separation of pre- and post filter runs, for brand separation, optimization of original gravity, blending, product monitoring and quality assurance. In addition to that, the Plato Monitor is also suited to measure Brix in soft drinks.

After its introduction in 1999, the Haffmans Plato Monitor – type PM8100 – was very well received. Recently the electronics of the Plato Monitor were completely renewed to meet the state of the art techniques for operation and communication. The new generation, the Plato Monitor – type PM9120 – was introduced.

Most importantly, the accuracy of the calculation model has been significantly improved. The model is now based on 27 polynomials. Another major improvement is the self-diagnoses function. The cable length between the probe and the control panel, an important factor for the accuracy of the measurement, is now calculated automatically.

Highly innovative is the remote liquid control. This feature allows the operator to remotely switch between product types (e.g. pils, light beer, dark beer or stout) from the control room. Up to 64 different recipes can easily be selected.

The new device enables direct in-line zero point calibration. Before, the sensor probe had to be taken out of the installation in order to calibrate it. Moreover, customers don't have to send in samples of their beer types anymore in order to get a calibrated calculation model. Customers can choose from a broad database with calculation models for all standard beer types. For each beer type, the Haffmans Plato Monitor, type PM9120, can be separately calibrated. The results will be saved with the specific calculation model and won't be lost when switching to a different beer type.

Optically, an up to date touch panel with user-friendly menu navigation replaces the traditional display, thus simplifying the handling. The touch panel will be integrated in the new control cabinet, which is significantly smaller than the previous type.

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### General / Technical Information:

#### Plato Monitor - Type PM9120

- Calculation model based on 27 polynomials
- Self-diagnoses function
- Remote liquid control / up to 64 recipes available
- Direct in-line zero point calibration
- Separate calibration per beer type
- User-friendly menu navigation

