2|2023

corosys
beverage technology GmbH & Co.KG

BEVMAG

SUSTAINABILITY
COROSYS TRANSFORMS GAS STATION INTO EV CHARGER

TRADITION & MODERNITY MERGE
AS THE DIGITAL AGE ARRIVES AT ERZQUELL BREWERY

AYINGER BREWERY
WHERE QUALITY & INNOVATION GO HAND IN HAND

TOPSTORY

"CO_2-RECOVERY"
SOLUTIONS FOR
SUSTAINABLE BEER PRODUCTION


beverage technology

Welcome

from STEPHAN DITTRICH

Sustainability in Focus: Our Path to Energy Efficiency and CO_2-Reduction

In an era where sustainability is not just a buzzword but a crucial objective for the future viability of every company, I am pleased to present to you the latest edition of our BEVMAG.

As part of our ongoing efforts to act transparently and responsibly, we analyzed our direct and indirect emissions as a result of corporate production, otherwise known as Corporate Carbon Footprint (CCF). Among other things, we conducted this analysis in the form of an energy audit according to DIN 16247-1. The detailed review of our energy consumption patterns has helped us identify the most effective approaches to energy saving. For us, saving energy and reducing emissions are not separate tasks; they go hand in hand. It is a synchronized and holistic process that not only benefits our environment, it also enhances our operational efficiency.

At the same time, we have realized that our Product Carbon Footprint (PCF) - the sum of all emissions caused by our products from production through their entire life-cycle - is far greater than what we emit directly as a company. This means, conversely, that the ability to reduce emissions here is dramatically greater and with more immediate impacts! In particular, energy-saving new processes and systems that save energy and reduce emissions compared to previous processes and do this over an expected lifecycle of at least 20 years, mean a much greater reduction of CO_2 emissions compared to our Corporate Carbon Footprint (CCF).

For example, by equipping a medium-sized brewery with our newly developed CO_2 recovery systems, we will reduce CO_2 emissions by a multiple of our Corporate Carbon Footprint over many years.

This insight is not just analysis with no words but rather, a call to action!

In the assessment by Ecovadis, a renowned platform for the evaluation of sustainability and social corporate responsibility, we have further solidified and made visible our commitment to these principles. We are proud that our efforts are recognized, and we are considered a trustworthy partner in the field of sustainability.

But what does all this mean concretely for our customers and partners? It means that you can rely on products and technologies from us that are not only state-of-the-art but also make a significant contribution to energy savings and thus the reduction of CO_2 emissions. Our recent successes in this area, such as the development and implementation of energy-efficient processes and systems, confirm that we are on the right track.

In this edition of BEVMAG, we want to show you how our technologies help to increase energy efficiency and minimize CO_2 output. We will give you insights into success stories that show how these innovations are implemented in practice and the difference they make.

Let us walk together on the path to a more sustainable and responsible future in the brewing and beverage industry. I invite you to continue this exciting journey with us.

With best regards and wishes for an informative read,

Yours,

corosys beverage technology GmbH & Co. KG | Hessenstraße 23 | D-65719 Hofheim am Taunus | bbt.corosys.com | Tel.: +49 (0) 61 22 / 70 75 - 0

INDEX

PRODUCTS

From the Gas Station to the Future

corosys retrofits old gas station

10

Tradition & Modernity Combined

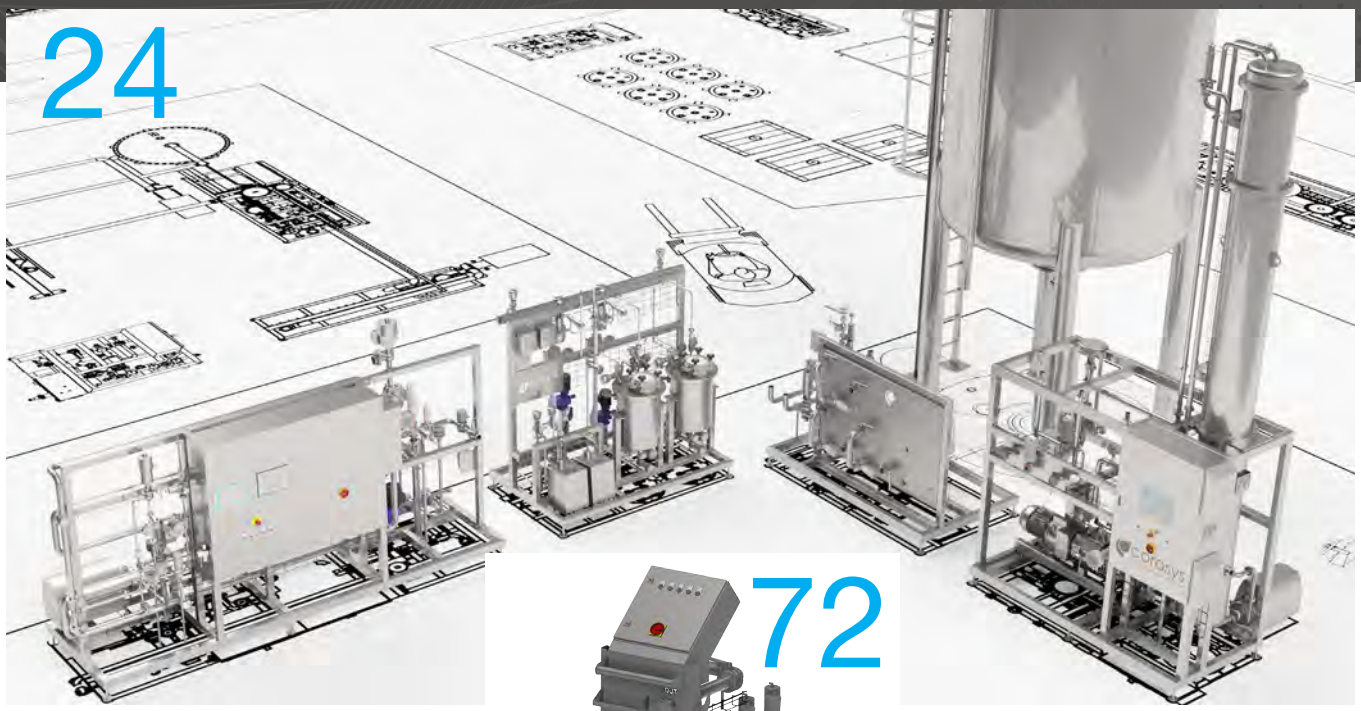
The Arrival of the Digital Era at the Erzquell Brewery

12

Traditional Brewery
Ayinger
16

Where Quality & Innovation Go Hand in Hand

corosys beverage technology GmbH & Co. KG | Hessenstraße 23 | D-65719 Hofheim am Taunus | bbt.corosys.com | Tel.: +49 (0) 61 22 / 70 75 - 0



Cover story

CO_2-Recovery Solutions for Sustainable Beer Production

18

New products

NEW

From the CIP Trolley to the new CO_2 Recovery System

corosys beverage technology GmbH & Co. KG | Hessenstraße 23 | D-65719 Hofheim am Taunus | bbt.corosys.com | Tel.: +49 (0) 61 22 / 70 75 - 0

Short news

corosys achieves BRAUMAT/SISTAR experts

We are pleased to inform you that corosys is now officially operating as a proficient expert in the BRAUMAT/SISTAR domain. This significant development underscores our position as a company delivering advanced automation solutions and services for the brewing and beverage industry. Our expertise in the BRAUMAT/SISTAR field is rooted in our extensive experience in beverage technology and process automation.

Imprint

corosys beverage technology GmbH & Co. KG
Hessenstrasse 23
D-65719 Hofheim am Taunus

Phone: +49 (0) 6122 / 7075-0
E-mail: bbt@corosys.com
Internet: https://bbt.corosys.com

Personally liable partner:
corosys management GmbH
Hessenstrasse 23
D-65719 Hofheim am Taunus

Local court Frankfurt am Main, HRB 114619

Management board:
corosys management GmbH represented by

Dipl.-Ing. Stephan Dittrich

Founding of corosys Southeast Asia

„Sok Sabay“ - this is the Khmer expression for „peace and happiness.“ These are the emotions we aim to convey to all our customers in the Pacific and Southeast Asia region.

For this reason, we have decided to establish a permanent branch, corosys Southeast Asia, in Phnom Penh, Cambodia, to provide fast and professional service and support when and where you need it. Our current Regional Manager, Sebastian Jerebic, hold’s an MSc in Brewing and Beverage Technology from TU Munich and worked as a brewer and brewmaster before joining corosys in 2016.

He brings extensive experience in beverage technology, process automation, and engineering, and has been leading corosys customer support in Asia for over five years. We are

pleased to announce that he will assume the position of Managing Director of corosys Southeast Asia while also becoming the official distributor for KIESELMANN in Cambodia. For further information on the products and services of corosys Southeast Asia, please contact Mr. Jerebic or our corosys information team.

corosys
south east asia

corosys EcoPack

Sustainability plays a significant role in our systems. Therefore, we design our systems to be as energy-efficient and resource-friendly as possible. But at corosys, sustainability goes beyond that. This is why we have reimagined the packaging of our systems and developed the corosys EcoPak concept for short freight routes. Following the motto „Less wood, more forests,“ we have minimized the required packaging materials. The result is a wood-saving alternative to pallets or crates, while providing the same level of security during transportation.

ecopak
Less wood, more forests

corosys is Rockwell OEM Gold Partner

We are pleased to announce that we have achieved the status of Rockwell OEM Gold Partner! This status underscores our outstanding expertise and dedication to delivering top-notch automation solutions for the beverage industry.

As a Rockwell OEM Gold Partner, we have access to Rockwell Automation's comprehensive portfolio, allowing us to develop customized solutions for our customers in the beverage industry. This empowers us to make production processes more efficient while enhancing product quality.

GOLD OEM Partner ROCKWELL AUTOMATION

„We are extremely proud to have achieved the status of Rockwell OEM Gold Partner,"

says Stefan Feider, at corosys Beverage Technology.

„This recognition reflects our commitment to the highest quality and customer satisfaction and will assist us in providing even better solutions to our clients."

corosys Beverage Technology remains committed to developing innovative automation solutions to meet the ever-evolving demands of the beverage industry. The Gold Partner status with Rockwell Automation represents another milestone on our journey and highlights our ongoing dedication to quality and excellence.

CO_2-Free Degassing in Use at Wittmann - 5 Years Later

For the past five years, Brewery Wittmann has proudly owned our system with serial number 1,000. We spoke with Brewmaster Florian Drißl about the brewery's journey since then and the differences that have arisen in beer production:

Florian, wow, time flies. How has it been for you all?
Yes, that's true. I still vividly remember when we agreed on it at the 2018 brewing conference. Since then, a lot has really changed. We managed to weather the COVID-19 crisis relatively well. Currently, we're grappling with the energy crisis, and we're truly grateful that we made the substantial investment to counter the skyrocketing CO_2 costs.

Interesting, why is that? What happened?
Well, most of the CO_2 comes from fertilizer production, which is extremely energy-intensive. At times, due to soaring gas prices, fertilizer production became economically unfeasible. CO_2 became scarce for several months, and when available, it was at unbelievably high prices. We chose the system back then, among other reasons, because we wanted to use CO_2 of natural origin rather than fossil fuels for our beers. Unfortunately, CO_2 of natural origin is now nearly impossible to obtain.

So, would you say that the investment in the system was absolutely the right decision?
Yes, absolutely! The investment has paid off in every aspect for us: We need to purchase less CO_2. We don't lose any CO_2 during the degassing of water. Since we don't perform blending in our brewery, we would lose the CO_2 dissolved in the water through discharges. It never made sense for us to degas with carbon dioxide from the beginning, both from a corporate philosophy perspective and economically. Due to the crisis and the challenging CO_2 market, we recouped the investment much faster than we originally thought.

Thank you for the interview, Florian!

Wittmann ...immer gleich gut! Landshuter Spezialitäten Brauerei

From the group

"corosys food technology GmbH"
Sustainable and Innovative Processes in the Food Industry.

We are delighted to tell the reader that we do more than beverages and we want to introduce to you a subsidiary of corosys technologies that is dedicated to working with liquid food products. corosys food technology GmbH has been a reliable partner for both small and large food manufacturers for 25 years. We are deeply embedded in the heart of the food processing industry; our innovative processes focus on concentrating various products, including milk and dairy products, coffee, juices, plant extracts of all kinds, sugar and starch derivatives, slurries, yeast extracts, seasonings, and more.

Stephan Dittrich & Dr. Felix Wagner in front of the company building of corosys beverage and corosys food technology GmbH.

We're also just cooking with water,

but doing so with highly efficient and product-friendly heat pump processes. The energy-efficient concentration achieved through water evaporation occurs in a vacuum at low temperatures. Unlike traditional evaporation systems, the energy used in our evaporation process is recovered through electrically-driven mechanical vapor compression and doesn't need to be dissipated through a cooling tower. This results in significant primary energy savings and enables the use of emission-free power by electrifying the concentration process. Thus, our solution not only reduce the carbon footprint of our customers' products but also offer economic and ecological benefits.

Different temperature profiles are required depending on the type of food to either prevent the loss of valuable ingredients or maintain the food's microbiological safety. Concentrating the food alters its viscosity and pumping behavior. Increased dry matter content allows for crystallization processes, whether desired or not. In addition to water, desired or unwanted volatile flavor compounds evaporate, which must be separated, recovered, concentrated, and dosed. To efficiently evaporate, we rely on tube falling-film evaporators. The heat exchanger's occupancy behavior and heat transfer vary depending on concentration and viscosity, necessitating product-specific design. Yes, we're just cooking with water, but it's only possible with in-depth knowledge of the specific food and its processing procedures. Our process engineers, with backgrounds in process engineering, food, brewing, and beverage industries, design solutions for our customers' concentration tasks and implement them in customer-specific process plants.

Our Vision: We make a valuable contribution to the food, beverage, pharmaceutical, and chemical industries by developing and implementing resource-efficient thermal separation processes.

We construct our systems directly at the customer‘s site in parts, a practice rooted in the size of the facilities. In 2022, we proudly installed our largest evaporator in Germany, featuring 1 MW of electric drive power on the compressor and a falling-film evaporator with a diameter of 4.3 meters, 3600 falling tubes, and 20 meters of tube length, enabling 50 tons per hour of water evaporation. The largest transported single component, weighing 150 tons, was delivered to the site by road and lifted with a 1200-ton crane. Our project managers, site managers, and assembly teams, work in harmony for such organizationally and technically demanding installation projects, to ensure timely and quality-compliant installation and commissioning.

The systems are then handed over and electrically integrated and automated by colleagues in the automation department of cororsys technologies. According to customer-specific requirements, processes are controlled and monitored using state-of-the-art process control systems. Thanks to remote maintenance systems, we can support our customers in operation, maintenance, and troubleshooting from anywhere in the world!

We don‘t just build new systems. Falling-film evaporator systems, due to their longevity, often undergo a second or third life cycle modernization. Implementing new products, new energy sources, or converting to heat pump processes can often be achieved with existing components. We assist our customers with pre-planning, design, detailed engineering, implementation planning, and execution. For example, in an Allgäu dairy, we performed both the relocation of an existing evaporator from another facility and the modernization of the existing evaporator on-site.

The final touches on the evaporator at our customer Jäckering in Hamm. On the left, the preliminary project realized in 2016.

What makes our work particularly exciting is our collaboration within the corosys group. The merging of expertise, in-depth knowledge, and ideas from various corosys companies in the fields of degassing, rectification, evaporation, thermal substance separation, flavor recovery, blending, carbonation, and pasteurization has led to the creation of a new product, Beer Dealcoholization, in recent years.

The creation of Beer Dealcoholization represents a landmark achievement that transcends traditional brewing boundaries. It demonstrates the transformative potential of collective knowledge and expertise, sparking innovation that not only benefits the brewing industry but also offers a valuable solution for consumers who seek the taste and experience of beer with reduced alcohol content. This is just one example of how our collaborative spirit and cross-disciplinary approach enable us to introduce groundbreaking ideas and products that have a meaningful impact across industries.

Autor: Dr. Felix Wagner Geschäftsführer der corosys food technologie GmbH

From the group

“corosys chemical & pharma technology”
Innovative Process Solutions in Chemistry, Pharma, and Beyond

We are also delighted to introduce another subsidiary of corosys technologies that focuses on the fields of chemistry and pharmaceuticals (pharam). The corosys chemical and pharma technology GmbH & Co KG offers customized solutions tailored to the specific needs of this clientele. What distinguishes the Chemistry and Pharma sector is the high degree of individuality in processes and customer requirements. As a result, we place a strong emphasis on process development and optimization, relying on our expertise in process engineering to create solutions in partnership with our clients.

At the core of our approach is working closely with our client to provide specific engineering know-how for selected process steps, alongside a laboratory and pilot plant for practical development and validation of process stages and complete processes.

We are also keen to develop process solutions for you,

...but the question remains, are we the right and suitable partner for you? To help you answer that question, we‘d like to offer an overview of our process engineering expertise and present a practical example of process development with a client.

Our process engineering expertise covers the following segments:

- Evaporation and concentration of solutions & mixtures.
- Rectification processes, including optimizing hybrid combinations with other process steps like extraction or filtration.
- Extraction, especially liquid-liquid extraction, including the liquid-liquid separation as a sub-process.
- Emission control, particularly with cyclones, exhaust gas washers, and partial exhaust gas condensers, as well as hybrid combinations.
- Various specialized processes.

Laboratory Experiment at the Company‘s Own Test Lab on Werner von Siemens Street in Hofheim am Taunus

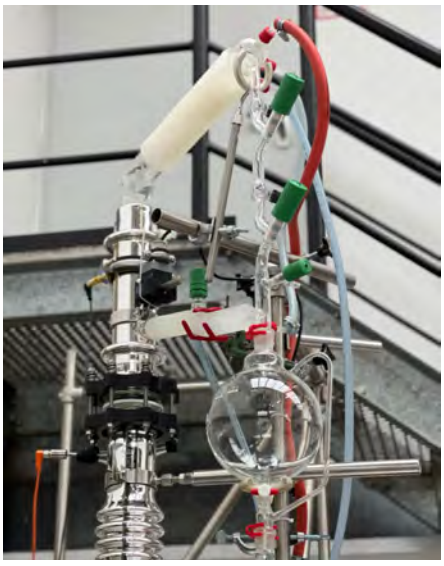
Our strength is twofold. First, we benefit from the synergy within the corosys team, tapping into integrated expertise in areas like vapor compression and Clean-in-Place (CIP) cleaning, while also leveraging additional highly qualified personnel and teams, such as the automation department. Second, our laboratory and pilot plant for process development and optimization are our “Schwerpunkt” and provide a significant advantage when combined with our expertise. We have modular plant components for evaporation, rectification, and extraction, as well as essential data generation capabilities to eliminate gaps and inconsistencies in the literature.

Analysis During a Laboratory Experiment

Through the evaluation software for our laboratory plant modules and the process simulation software in engineering, combined with practical findings such as fouling behavior, we can establish a well-founded process foundation. This not only prevents unnecessary errors but also provides a valid basis for implementing new or optimizing existing process steps.

We look forward to developing our client's processes using our equipment, either at on site or in our laboratory, and creating a solid foundation for project realization. Furthermore, we are prepared to further accompany our clients in all subsequent steps, leading to turnkey projects.

One compelling example of our customer-centric approach is our involvement in the development of a concentration step with a renowned pharmaceutical manufacturer in Germany. During the initial project discussion, the customer raised the question of whether it was technically feasible to recover solvents from a previously considered waste stream while ensuring the waste could be discharged into the existing wastewater treatment plant. With our process engineering expertise in evaporation processes, we conducted targeted initial process simulations and demonstrated the fundamental feasibility of the project (achievable purity requirements, albeit based on partially available data) and feasibility (particularly energy consumption, as well as costs for waste and recovered solvent). However, we also highlighted vulnerabilities, such as the partially incomplete data and the challenges associated with solid handling. This approach and concept were not only tailored but also built trust with our customer. The critical next step was for specific experiments on the parts where computational validation was not possible. Through this targeted approach, the costs for the experiments were manageable, and the duration significantly shorter compared to the more common full-process simulation in the laboratory. More importantly, this method allowed us to address problem areas comprehensively, thereby enhancing the security of the later process implementation. The test operation with original product samples provided the necessary assurance - not only for our customer but also for us as product developers who can now confidently assess and implement the behavior and characteristics of solids, including precipitation behavior and agglomeration behavior in the process, including later in-line cleaning options. The end result is a superior, more replicable, and more personalized process for the customer compared to a purely engineering approach. While this approach may not always be necessary for process development and optimization, the transparency of our process is, from our perspective, is



both a necessary and confidence-building experience for customers.

In the present case, the plant is being constructed as a turnkey project for the customer. We are more than willing to handle the construction of facilities for our customers, especially when such expertise is available. However, it doesn't have to be that way. We are happy to work with our customers in the way that suits them best, which often includes our support for in-house project management or cooperation with other engineering providers.

Over the years, in addition to specific process development and management, we have also accumulated a general expertise in equipment and apparatus in the field of evaporation technology, with a particular focus on falling-film evaporators. Our equipment and apparatus expertise includes:

- Falling-film evaporators, laboratory, and production up to 1,000 m².
- Thin-layer evaporators, laboratory, and production up to 10 m².
- Short-path evaporators, laboratory, and production up to 10 m².
- Other evaporators, hybrid apparatus combinations, and the integration of regenerative energy systems.

This equipment and apparatus expertise serves as a wonderful example of collaboration and mutual development within the corosys companies, all in the best interest of our customers. Our cooperation, driven by the blending of different technological fields and diverse customer bases, often results in surprising approaches and paradigm shifts. In recent years, the amalgamation of corosys companies' expertise in degassing, rectification, evaporation, thermal substance separation, flavor recovery, blending, carbonation, and pasteurization led to the creation of the new product, Beer Dealcoholization. With this contribution, we hope to have earned our place here in BEVMAG.

Shortne

“Electromobility at corosys”

A consistent next step towards the future

A decade ago, corosys embarked on its journey into electromobility with its first fully electric vehicle equipped with two, 22 kW Type 2 charging connectors, drawing a significant portion of its charging power from the initial photovoltaic (solar cell) installation on the roof of the administrative building. This marked only the beginning. In the following years, the electric vehicle fleet was gradually expanded to include 14 purely electric vehicles and 1 hybrid vehicle. The photovoltaic installations were extended nearly quadrupling their capacity. The company premises now house 12 Type 2 charging stations, where corosys’ own vehicles, those from external companies, and employees‘ electric vehicles can be charged. corosys provides each of its employees with a complimentary and tax-free charging allowance of 4,000 kWh/year.

Company vehicles charge at the new „old“ filling station

The final step in expanding the charging

Expanded photovoltaics on the company’s own hall

infrastructure involved transforming a former diesel filling station on the company premises into an E-charging station with 4 „pumps“ or, more accurately, charging points.

We are committed to making our E-charging infrastructure accessible to the community and inspiring other businesses and individuals to take similar steps in promoting electromobility and environmental conservation. Our vision is to effect a sustainable transformation in mobility within our immediate surroundings, thereby making an even greater contribution to environmental protection.

All of these initiatives reflect our deeply ingrained dedication to eco-friendly mobility and sustainability. Our corporate objective to reduce our Corporate Carbon Footprint (CCF) to net zero by 2027 is significantly closer to realization due to the near-complete electrification of our fleet, coupled with our in-house generation of green energy.

However, sustainability extends across all aspects of our operations. As previously mentioned, we have developed the concept of our corosys EcoPak, which operates under the motto „less wood, more forest.“ Our aim was to rethink the packaging of our equipment, while making a positive environmental impact. With EcoPak, we minimized the required packaging materials to ensure short shipping distances and reduced resource consumption while ensuring the same level of protection for products..

STORIES

THEMES

ENTRY INTO THE DIGITAL AGE AT ERZQUELL BREWERY
AYINGER QUALITY & INNOVATION GO HAND IN HAND
CO_2-RECOVERY

Story Erzquell Brewery

"Tradition and Modernity United"

Entry into the Digital Age at Erzquell Brewery

The modernization of the fermentation cellar at Erzquell Brewery Haas & Co. KG in Bielstein, located in the Bergisches Land region, was a long-planned project for the customer. In this project, it was necessary to analyze the existing automation systems and develop a corresponding concept to implement. Additionally, they needed to find a partner who could provide all the necessary solutions under one roof.

On September 5, 1900, the first beer from Adler-Brauerei GmbH, as it was known back then, left the brew-house in Bielstein. In the founding year, 15,000 hectoliters of beer were brewed, and this number had already doubled by 1913. The cooperation with the sister brewery in Siegtal in 1979 led to the retention of the name Erzquell Brewery.

For over 50 years, Erzquell Brewery Bielstein Haas & Co. KG has been brewing its Zunft Kölsch brand as the „highest-altitude Kölsch brewery in the world," adhering to the Kölsch Convention's regulations. Due to the long-standing tradition of brewing Kölsch in Bielstein, the court recognized that the Erzquell Brewery, as the only Kölsch brewery outside of Cologne, is allowed to continue producing Zunft Kölsch at this location. Consequently, it is not possible to relocate the brewery because Kölsch brewing rights are tied to the Bielstein address, which presented challenges during the project implementation.

The Initial Situation:

- The cold block area (from the fermentation tanks to bottling) was partially automated with old Siemens S5 control and contactor technology.
- Only one computer from 1993 was available for process visualization and control of the entire system.
- The heart of the cold block was and still is the diatomaceous earth filter.
- Over the years, many subprocesses around it were modified and expanded.

"Since we need to be more flexible in production in the future, the new control concept had to cover all production areas and be scalable for expansion."

- As a result, the documentation of the electrical installation, automation, and process flows suffered. „The spare parts for the old control system became more expensive and were sometimes only available with long lead times. Coupled with the fact that there are hardly any qualified service personnel for the old controls, we were concerned about the state of parts and equipement.

In recent years, our product range has expanded, and we no longer had the opportunity to filter far in advance to create an ‚emergency buffer.' Consequently, our entire bottling process depended on filtration and the old control system," said Dieter Breit, brewmaster at Erzquell Brewery.

Erzquell Brewery Bielstein

To prepare the Bergisches Land Kölsch brewery for the coming years, the existing control system had to be substantially modernized without interrupting the ongoing production.

Requirements & Objectives:

The project's objective was to automate the entire control system from fermentation tanks to bottling with a single integrated system.

This included the following existing equipment and processes that needed to be newly automated:

- CIP (Clean-In-Place) system
- Unfiltered beer transfer
- Diatomaceous earth (Kieselgur)

station
- Diatomaceous earth filtration
- PVPP (Polyvinylpolypyrrolidone) filtration
- Sheet filters
- Pressure tank storage
- Preliminary and final storage tanks, including their dosage
- Transfer to bottling via KZE

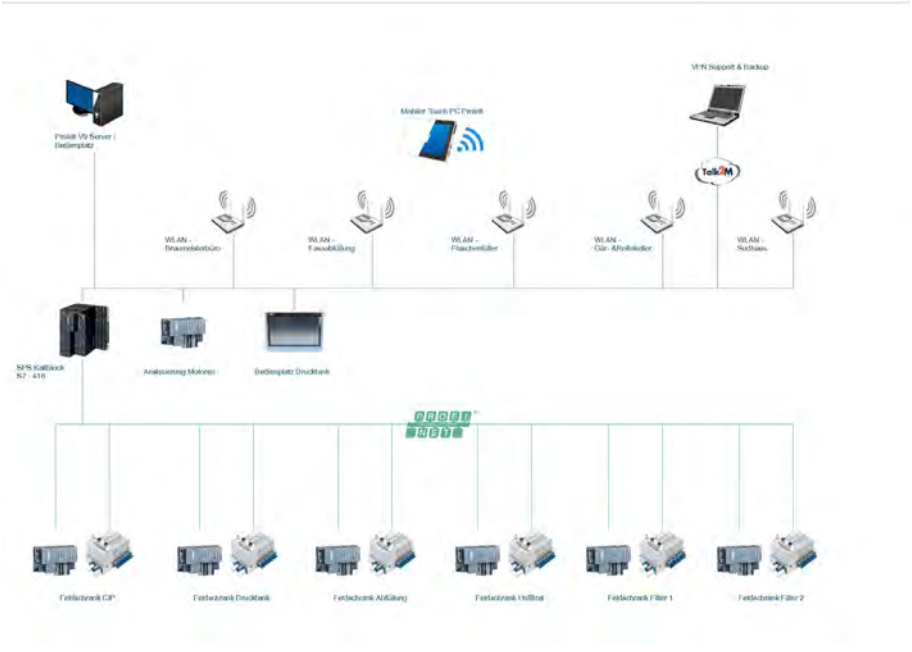
Dieter Breit stated “Since we need to be more flexible in production in the future, the new control concept had to cover all production areas and be scalable for expansion.”

Erzquell Brewery didn‘t want to engage with multiple suppliers for the project but instead sought a partner who could understand and integrate process knowledge and professional process control software. corosys, as a specialist in new installations and modernization projects, took on this task. With years of experience from successfully completed projects in filtration and cold block areas, corosys was tasked with developing and implementing a comprehensive concept.

Collaborating with their Swiss partner company, M&L Consulting, corosys established itself as a complete supplier for new installations and the modernization of existing filter lines in the brewing industry. corosys places great emphasis on having all the relevant technical capabilities, from process technology to mechanical and electrical design to software development, all in-house.

The company also places great importance on expanding its technical development departments in-house. Since 2007, corosys has closely cooperated with ProLeit AG from Herzogenaurach and has implemented numerous projects with Brewmaxx as the process control system in recent years. Thus, the completed project, from the initial design drawings to the finished process control system, was entirely handled by a single provider. “For us, it was important not to hire a software company and explain brewing to them but to partner with someone who understands both brewing and software and can merge them with expertise,” says Dieter Breit.

The Approach:



Scalable network structure based on Siemens S7 with combined ProfiNet/Ethernet.

In the initial discussions, it quickly became apparent that this project presented several challenges. There were no flow diagrams, wiring diagrams, program, or process documentation, to name a few. The project team consisted of technologists, electrical designers, and process control technicians from both Erzquell Brewery and corosys.

The implementation steps were as follows:

- Capture the existing cold block in P&ID flow diagrams and analyze the processes.
- Replace the existing control systems, a mixture of S5 and S7 components, with a new Siemens S7-416 PLC.
- Replace the existing field cabinets with newly designed cabinets based on S7-ET200SP components.
- Install a Profinet-based bus system. Communication between operator computers and the control system takes place via Ethernet. To enable the use of mobile devices, the network throughout the production area was supplemented with high-performance Wi-Fi routers.

The programming and visualization were built on the Brewmaxx Express process control system from ProLeit, based on the robust hardware foundation. The Express version of the leading process control system for breweries can manage up to 2 operator stations.

The system is highly expandable due to its dynamic client-server structure, allow-

ing the entire brewery to be automated on a single system. This is achieved automatically, with no engineering work lost.

A computer in the control room serves as both a combined server and operator station. All recipes and evaluations are centrally managed from here.

To facilitate the operation of bottling and filtration, a fixed operator computer is centrally located in the pressure tank cellar. Additionally, a portable and convenient Siemens touch panel, connected to the system via Wi-Fi, is available.

The mobile 10-inch computer is installed as a full-fledged ProLeit workstation, providing the operator with the flexibility to monitor and control the system throughout the entire production area.

The project started in the spring of 2017 with the goal of gradually adapting various process areas to the new system during the summer break and completing the entire implementation by October 2017.

The phased integration was designed to support the learning curve for the operating personnel transitioning to the new system.

The Implementation:

All processes and existing flow diagrams were captured together with Erzquell's personnel, analyzed, and represented in a new P&ID using AutoCAD. With this foundation, a brewery-wide measurement point concept for the brewery in Wiehl was introduced, allowing, for example, optimization of troubleshooting for maintenance.

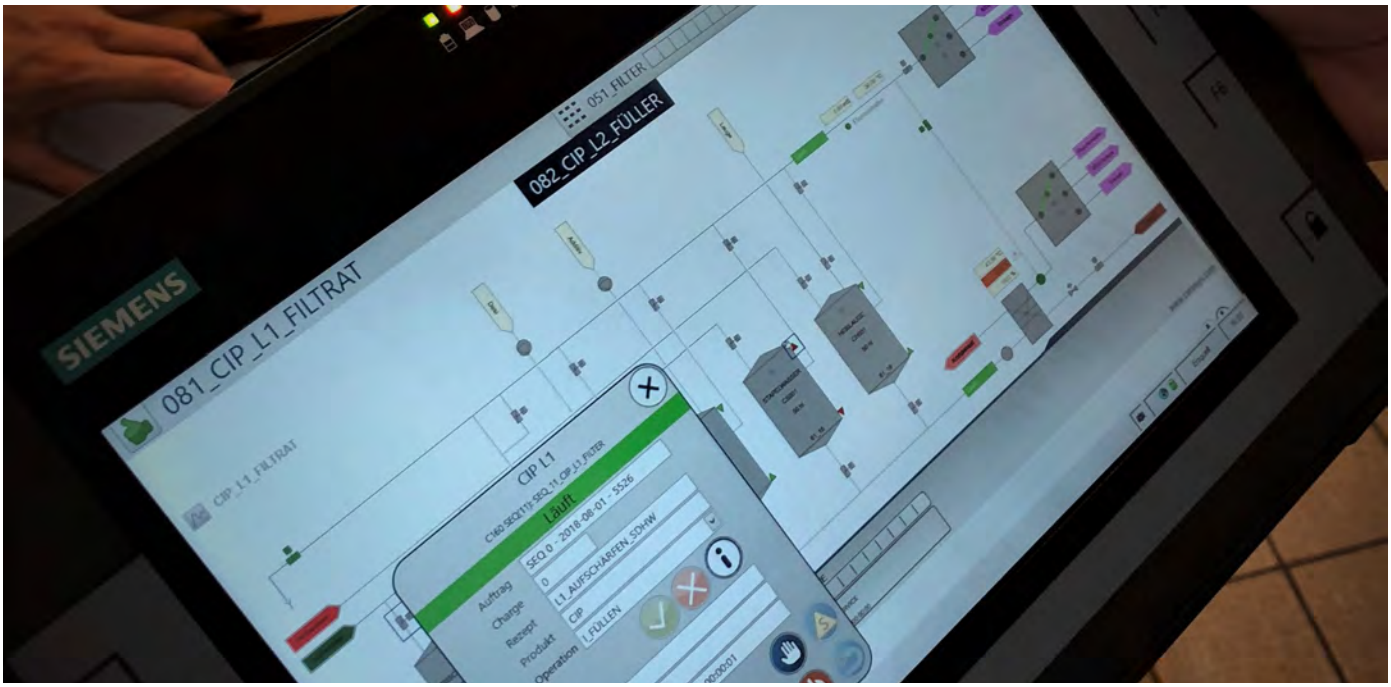
This was followed by a comparison of the existing electrical installation with the plant and flow diagram, enabling the creation of a new ePlan design. The analysis showed that it was more cost-effective to only replace the electrical components in the field cabinets, as the cabinets and wiring were still in good condition. The timeframe for the conversion was already very short, making this method even more appropriate.

The new ProfiNet installation was installed and put into operation in parallel with the existing network in advance, saving time for the conversion.

This laid the foundation for the automation of the existing cleaning system, connection to the storage cellar, the entire filtration process, including PVPP stabilization, diatomaceous earth filtration, sheet filtration, and the pressure tank cellar with automated transfer to bottling.

The team had only 4 days for the conversion. To ensure sufficient time for preparation and integration testing, the implementation was scheduled for early October. Two on-site teams worked in shifts to complete the conversion.

The implementation tasks included:



Thanks to the mobile touch panel, the operating personnel always have the system in view.

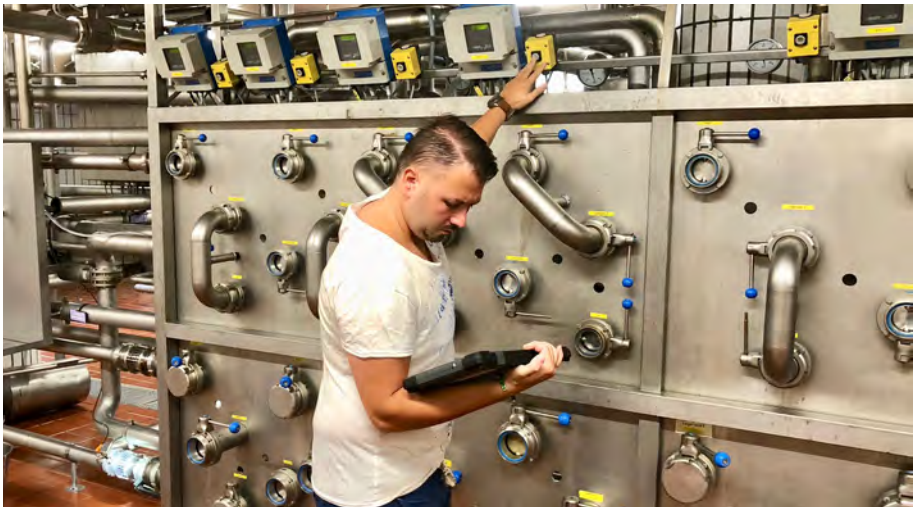
- Replacing the old field cabinets
- Replacing the old control system with a new S7 control
- Modifying the motor cabinet
- Commissioning the new bus system
- Replacing the process control with Brewmaxx control
- Integrating individual sub-controls such as preliminary and final dosage, cleaning, and KG (fermentation) tanks into the plant control

In collaboration with the operation and maintenance personnel of Erzquell Brewery, the existing control system was thoroughly examined and documented in a program description.

Based on this description and an analysis of the old S5 programs, the processes were redesigned in Brewmaxx V9.

During the implementation, individual processes were already optimized and new functions were integrated. In this regard, the corosys team applied its experience from filtration and cold block projects. For instance, an additional original wort measurement was integrated for media separation and quality control, optimizing yields and minimizing beer losses.

All processes and interlock conditions are now graphically represented on the interface, simplifying troubleshooting during integration and providing the operator with continuous control over the system. All parameters are managed through a step-chain-based recipe control. Pre-configured production and batch reports are available as standard. These reports can be exported in various formats. Because the system can be fully run in simulation beforehand, the project team was able to test all processes in detail before the conversion.



The process events can be directly monitored through the nearby operator station.

One production worker was assigned to run a virtual production for a week before the implementation, reducing the risk of disruption and allowing the operator to be trained in advance.

Conclusion:

In retrospect, the pre-planned concept has proven to be effective and flexible in its implementation. Both the customer and the supplier are satisfied with the overall results. Erzquell Brewery has transitioned from an outdated and unsupported hardware and software installation to a modernized, completely reimagined cold block. It is evident that significant improvements in processes can be achieved solely through an optimal and comprehensive control concept, without altering the existing equipment. This is vividly demonstrated by the current filter lifetimes, which have increased from an average of 1000 to 2500 hectoliters per batch to over 3400 hectoliters. As a result, the same filter has seen an improved lifespan of over 30% with an optimized use of filter aids. The new automation has also had a positive impact on the overall flow of processes in the cold block. Peter Voigtländer, department head, states, „The filter runs much more smoothly, and we no longer have pressure surges in the system. Many manual interventions have been replaced by automatic functions. The increased product range and smaller batches can be handled with great flexibility. With the old control system, we wouldn‘t have been able to meet delivery deadlines and cover the diverse product range. Program navigation is very user-friendly, allowing for more flexibility.“

Outlook:

In the near future, the new central process control concept aims to be gradually expanded by Erzquell Brewery to integrate more production areas into the system. The team is currently working on integrating the fermentation tank control and expanding the network structure across the entire production area. „Our goal is to eventually control the entire production with a single system. This will provide new possibilities for better organizing production,“ says Dieter Breit.“

Story Ayinger

"A look into the world of Ayinger beers and their investment"

Ayinger Brewery: Where Quality, Innovation, and Sustainability Go Hand-in-Hand

The Ayinger Brewery has a rich history, deeply rooted in the village of Aying, where a profound appreciation for the highest quality and exacting standards in their craft has always been at the forefront. This commitment to excellence is palpable the moment you set foot on the brewery grounds. Ayinger beers have gained local, regional, national, and global recognition, primarily due to their iconic ‚Celebrator' Bock. The brewery's journey began in 1877 under the name "Brauerei Liebhardt," situated at the southern edge of the Munich district. In 1932, it changed hands to the Inselkammer family, led by the Franz Inselkammer, and remains in their capable stewardship to this day.

The brewery: In 1999, the new brewing facility came into operation and its architecture remains timeless to this day.

In 1999, Ayinger Brewery embarked on a significant transformation, relocating from the village center to a state-of-the-art brewing facility. Since 2021, the production team, spearheaded by Bernhard Neunhoeffer alongside Valentin Kriesel as the head brewmaster, has overseen the brewing operations. Quality is the bedrock of the brewery's ethos, commencing with the utilization of the finest brewing water and extending to the exceptional quality of all other raw materials.


They are delighted with the fantastic projects: Bernhard Neunhoeffer, 1st Brewmaster, and Stefan Meyering, Sales Director at corosys

Remarkably, the brewery still maintains access to four wells within the village, from which they source both brewing and mineral water. To further enhance production capacity and streamline operations, the brewmasters in Aying formulated a comprehensive master plan aimed at refining their entire technological infrastructure. This master plan encompasses water treatment, the overhaul of the water distribution network, and the modernization of the KEG (KeyKeg) system. Every facet of the production and bottling processes has undergone meticulous review and enhancement.

Within the fermentation and storage cellar, the challenge of foaming, a classic brewing issue, prompted the installation of a water degassing system. Bernhard Neunhoeffer explained, "To minimize the need to discharge beer into the drain for line venting, we made the transition to degassed water." Accompanying this change was the establishment of a requisite pipeline layout in the cellar. Notably, the new degassing system operates without strip gas, effectively preventing CO_2 loss. Valentin Kriesel added, "The CO_2 that would otherwise be lost is now thoughtfully utilized for carbonating our mineral water. It's a brilliant innovation that aligns with our environmental goals, where CO_2 is no longer needed for degassing." An existing wheat beer tank underwent re-purposing, to serve as the storage vessel for degassed water. The

Quantity is the utmost demand. From raw materials to equipment, there are no compromises in Aying.

groundwork for a separate degassing line for mineral water production is also prepared.


The CCS carbonation system offers a wide range for CO_2 dosing for both beer and mineral water

The installation of a refurbished diatomaceous earth filter, boasting a capacity of 150 hl/h and full automation in all aspects, presented an increased demand for degassed water. To ensure seamless integration, M&L and corosys worked in close collaboration, meticulously defining requirements that were seamlessly incorporated into the existing Braumat control system. The new diatomaceous earth candle filter not only enhances the efficiency of Ayinger beer filtration but also significantly extends holding times, surpassing expectations. Bernhard Neunhoeffer notes, “We have even left the filter overnight and resumed filtration the next day, a capability we hadn‘t anticipated.” Since the adoption of the new filter, the consumption of diatomaceous earth has decreased substantially, and the workload is incomparable to the traditional diatomaceous earth frame filter.

"It‘s truly clever and feels great to use a technology where CO_2 is no longer required for degassing."

This advancement has elevated filtration availability and overall efficiency in the filter cellar, all while maintaining Ayinger‘s stringent quality standards.

In response to the challenges of achieving precise carbonation levels in their beers, a new in-line carbonation system was procured. This system also facilitates the carbonation of mineral waters using the same process. The Continuous Carbonation System (CCS) features two differently sized control valves for CO_2 injection, providing a versatile solution that accommodates the entire spectrum of carbonation requirements in a single system.

Notably, all the new equipment and systems implemented in this project were seamlessly integrated into a new BRAUMAT control system. This centralizes control, empowering operators to oversee all processes from a dedicated control room in the cellar. This modernization lays a robust foundation for future refinements. Adjustments in process flow and the integration of additional equipment are now easier, further solidifying Ayinger Brewery‘s commitment to delivering beers that consistently meet the highest standards of quality and innovation.

‘CO_2 Recovery in Breweries:’
Solutions for Sustainable Beer Production

Breweries worldwide are renowned for their exceptional products, yet they are less well-known for being significant emitters of carbon dioxide (CO_2).

This CO_2 is released during the beer fermentation process and also through energy-intensive processes in brewing and packaging. In the face of growing global environmental concerns and increasing demand for eco-friendly products, breweries are striving to implement sustainable practices. A promising solution to reduce the carbon footprint of breweries is the recovery of CO_2 generated during fermentation.

The amount of CO_2 produced during the fermentation process can be substantial. In the past, the released CO_2 was often simply released into the atmosphere, leading to the wastage of valuable resources and exacerbating climate change. CO_2 also plays a crucial role in various brewery processes, including tank purging to prevent foaming, cleaning, carbonation, and oxygen degassing.

Other energy-intensive processes such as wort preparation in the brewhouse, cooling, cleaning, and packaging contribute to CO_2 emissions. To act more sustainable manner, breweries must find ways to reduce these emissions and handle CO_2 more efficiently.

CO_2 Recovery Technology:

CO_2 recovery is an advanced process that allows breweries to capture and purify CO_2 released during the beer fermentation process. This process typically involves 7 steps which will be discussed in detail below:

1. Foam Separator:
Some of the foam generated during fermentation can carry CO_2. A foam separator is used to prevent this CO_2 from entering the recovery process. CO_2 is directed into a container with sufficient diameter. The heavier foam settles at the bottom, while the CO_2 is extracted from the top. The formed foam is suppressed by spray nozzles in the foam separator.

2. Gas Balloon:
Since CO_2 is not continuously generated during fermentation, a gas balloon is used as a buffer before the compressor. This balloon is made of fabric with high CO_2 diffusion resistance. Overpressure protection is ensured through a water seal and burst disks. A level measurement controls the compressor and, consequently, the CO_2 recovery system.

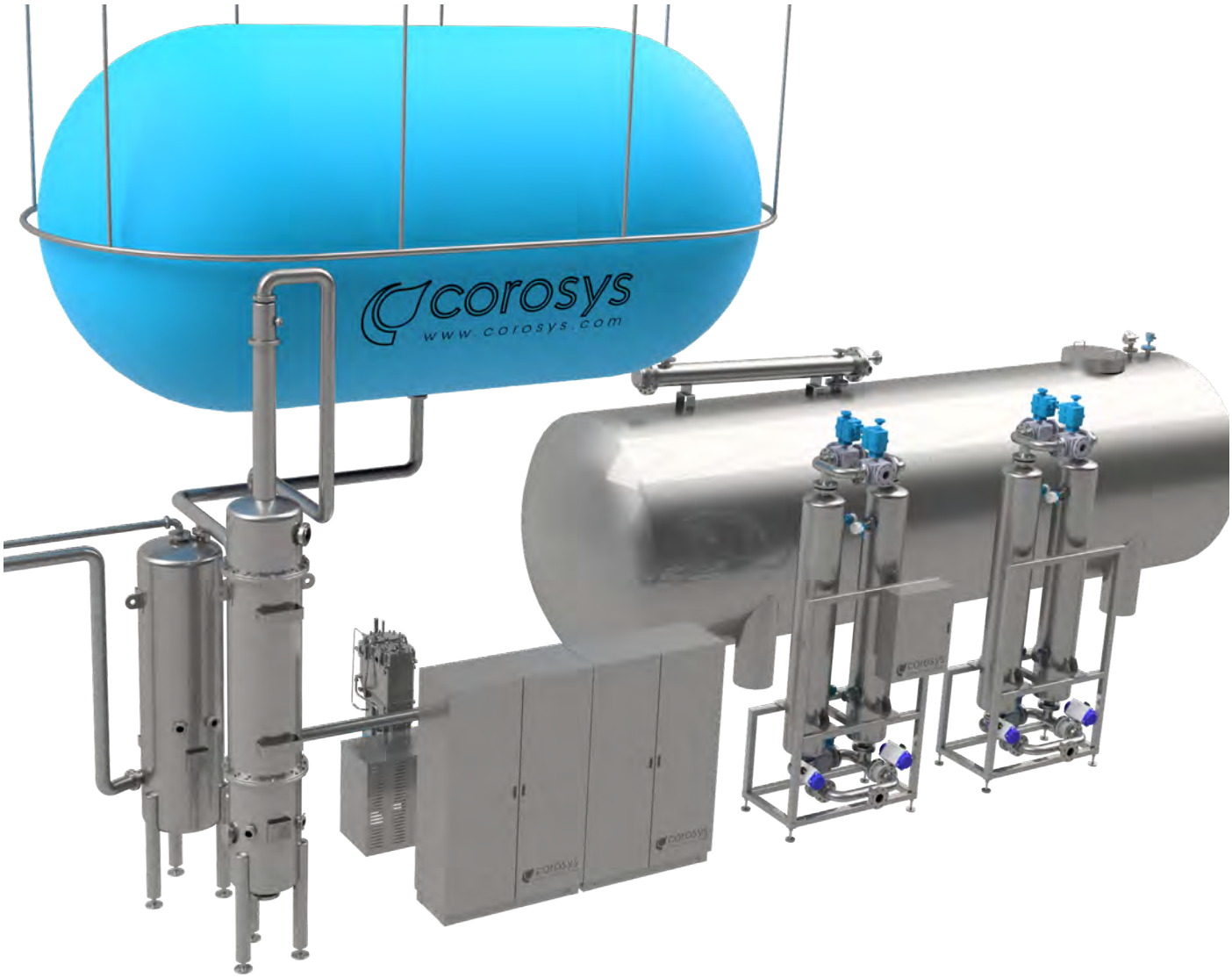
3. Gas Washer:
The CO_2 from the gas balloon is passed through a gas washer before reaching the compressors. This washer removes water-soluble impurities such as alcohols and fermentation by-products. CO_2 is led through a column with structured packing from bottom to top. Water flows down in counter-current, washing the CO_2. This arrangement is similar to the columns

1. Emission Reduction & Sustainability:
By recovering CO_2, breweries can economically reduce greenhouse gas emissions, taking a significant step toward reducing the industry‘s environmental footprint.

2. Cost Savings:
The use of recovered CO_2 lowers operating costs since breweries need to purchase less CO_2 from external suppliers.

3. Independence:
Production security can be ensured even in situations of limited CO_2 availability in the market.

corosys beverage technology GmbH & Co. KG | Hessenstraße 23 | D-65719 Hofheim am Taunus | bbt.corosys.com | Tel.: +49 (0) 61 22 / 70 75 - 0



The illustration shows a corosys CO2 recovery system with foam trap, gas scrubber, gas balloon, compressor, filter, dryer, condenser and storage tank.

used in water degassing, and in an efficient design, two-stage columns are used. In the lower part, water circulates, allowing for a high water flow rate. In the upper part, gas is washed with fresh water to achieve high purity. Excess water is directed back to the foam separator for reuse.

4. Compressor:

A pressure of 16 bar is aimed for liquefaction and storage. Typically, a two-stage compressor is used to reach this pressure. CO_2 is cooled after each stage to remove water from the gas.

5. Dryer and Filter:

The compressed and still moist CO_2 is dried to a dew point of at least -50°C using molecular sieves. An activated carbon filter module separates organic impurities.

6. Liquefaction and Rectification:

The purified and dried CO_2 is cooled below its vapor pressure temperature and thus liquefied in a heat exchanger. In addition to the significantly reduced storage volume, foreign gases can be removed, as they have different vapor pressures. To enhance this effect, CO_2 rectification is possible. In this process, the liquefied CO_2 is fed into a rectification column and purified by rising gaseous CO_2. Foreign gases accumulate at the top and can be discharged.

7. Storage Tank and Evaporation:

The liquid CO_2 is directed into a CO_2 storage tank. Since it is significantly cooled, the tank needs to be insulated, preferably with vacuum insulation. A vaporizer device is used to convert the liquid CO_2 back into its gaseous state. After a pressure reduction, it is once again usable for production. Evaporation can occur either through ambient heat or, particularly energy-efficiently, using glycol from

$C_6H_{12}O_6$ → $2\ C_2H_5OH + 2\ CO_2$

1 kg sugar → 484 g Ethanol + 463 g CO_2 + 53g yeast

the return. This cools the glycol and thus reduces the need for the cooling system.

Overall Design

The overarching goal of CO_2 recovery in brewing is to meticulously match the amount of CO_2 generated during the fermentation process with its consumption throughout various brewery operations. To achieve this precision, several key factors play a pivotal role in the design process. These factors revolve around the dynamics of the brewery's production and fermentation processes and include:

- Annual wort and beer production
- Batch volume
- Number of batches per day and per week
- Original wort gravity
- Fermentation tank volume
- Duration of primary fermentation

The minimum purity level required for the recovered CO_2 is a critical consideration. Lower purity requirements necessitate an earlier switch to CO_2 recovery during fermentation, as a greater percentage of the produced CO_2 can be captured. This decision directly affects the overall efficiency of the recovery process.

In the second phase of the design process, the brewery identifies the various consumers of CO_2 within its operations. The primary CO_2 consumers in a brewery include:

- Carbonation of beer and beverages
- Tank purging for oxygen removal
- Cleaning of bottles and cans during filling
- Water degassing

Once the CO_2 generation and consumption values are determined, the brewery can make adjustments to various components of the CO_2 recovery system, including:

- Hourly capacity of the actual CO_2 recovery, particularly of the gas washer, compressor, filter, dryer, and liquefaction
- Size of the gas balloon
- Size of the storage tank

CO_2 Recovery in the Context of Energy Management:

CO_2 recovery within the framework of energy management is a pivotal component in the overarching strategy for optimizing the environmental impact and operational efficiency across various industries. It's imperative to recognize that CO_2 recovery doesn't operate in isolation; it's intrinsically tied to the broader energy requirements of a production facility. An aspect of particular interest is the symbiotic relationship between CO_2 recovery and the refrigeration system.

In many instances, businesses can seamlessly integrate the generation of cooling for CO_2 liquefaction into their existing process cooling systems. This holistic approach offers substantial benefits by enhancing energy utilization while concurrently reducing the ecological footprint. One noteworthy example of the advantages derived from this integration is the recovery of cooling during the transformation of liquid CO_2 into its gaseous state. This not only bolsters energy efficiency but also has a direct impact on minimizing operating costs, making it a win-win scenario.

In Conclusion, A Win-Win Solution:

In summary, the adoption of CO_2 recovery technology in various industries, including breweries, represents a significant step towards environmental responsibility and economic benefits. This innovative approach empowers businesses to substantially reduce their environmental footprint while simultaneously achieving significant cost savings, while maintaining a high quality product. It signifies a remarkable advancement in the promotion of sustainable production practices and makes a meaningful contribution to the global fight against climate change.
The brewery industry serves as a noteworthy example of how businesses can proactively enhance their environmental performance and work steadfastly towards achieving their sustainability objectives. By embracing CO_2 recovery within their energy management strategies, companies not only demonstrate their commitment to a greener future but also position themselves as leaders in responsible and economically viable industrial practices.

corosys beverage technology GmbH & Co. KG | Hessenstraße 23 | D-65719 Hofheim am Taunus | bbt.corosys.com | Tel.: +49 (0) 61 22 / 70 75 - 0

PRODUCTS

corosys
beverage technology

DEALCOHOLIZATION SYSTEM FROM A TO Z

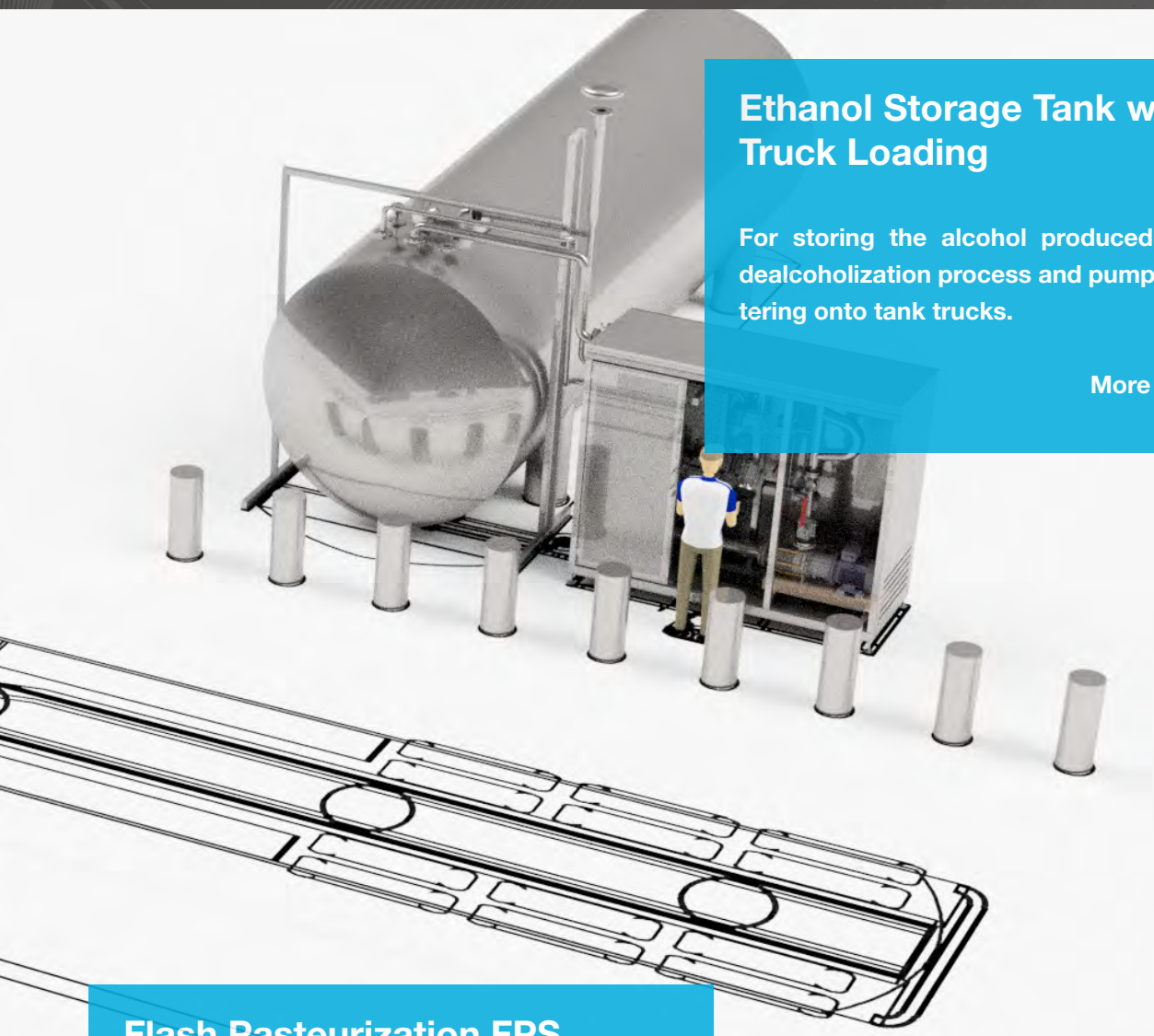
The core of the production of non-alcoholic products is the dealcoholization process. Our dealcoholization System (DAS) not only removes alcohol from the product, a desired flavor can be maintained by adding the desired dosages for “mother beer”, degassed water, as well as other additives, and CO_2.

Our complete offering supplements the dealcoholization with further plants and facilities. The non-alcoholic product can be pasteurized in-line directly after dealcoholization. The resulting alcohol is recorded in an officially approved ethanol measuring meter and stored in a tank, and it can be loaded onto a tank truck. A certified loading system assists in the recording and tracking of the ethanol.

De-alcoholization System DAS

For the production of non-alcoholic beer, wine, sparkling wine, or other beverages. Including a finisher for blending the dealcoholized product with the base product, water, flavored water, syrup, base substance, or other additives and subsequent carbonation.

More on Page: 40



Ethanol Storage Tank with Tank Truck Loading

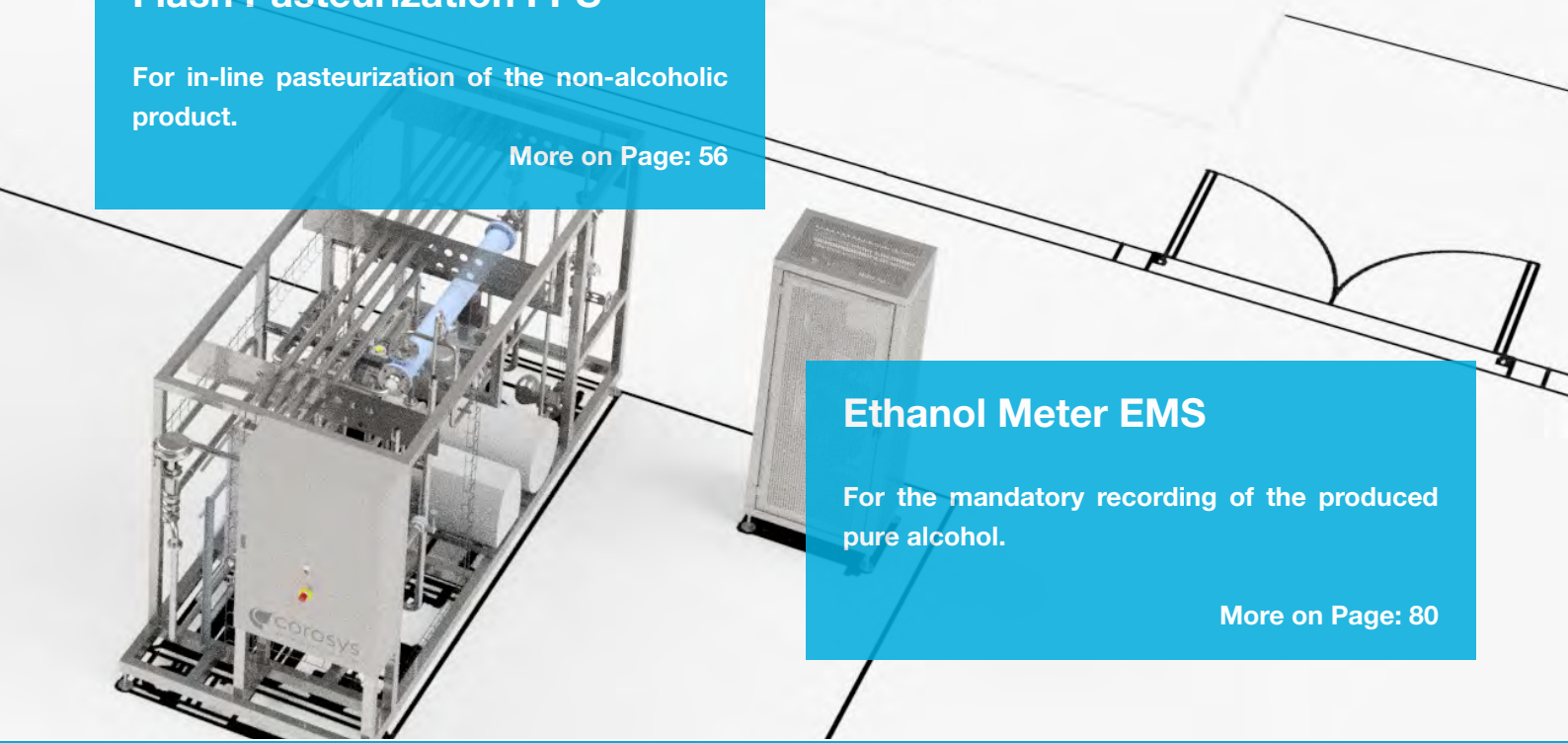
For storing the alcohol produced during the dealcoholization process and pumping and metering onto tank trucks.

More on Page: 64

Flash Pasteurization FPS

For in-line pasteurization of the non-alcoholic product.

More on Page: 56



Ethanol Meter EMS

For the mandatory recording of the produced pure alcohol.

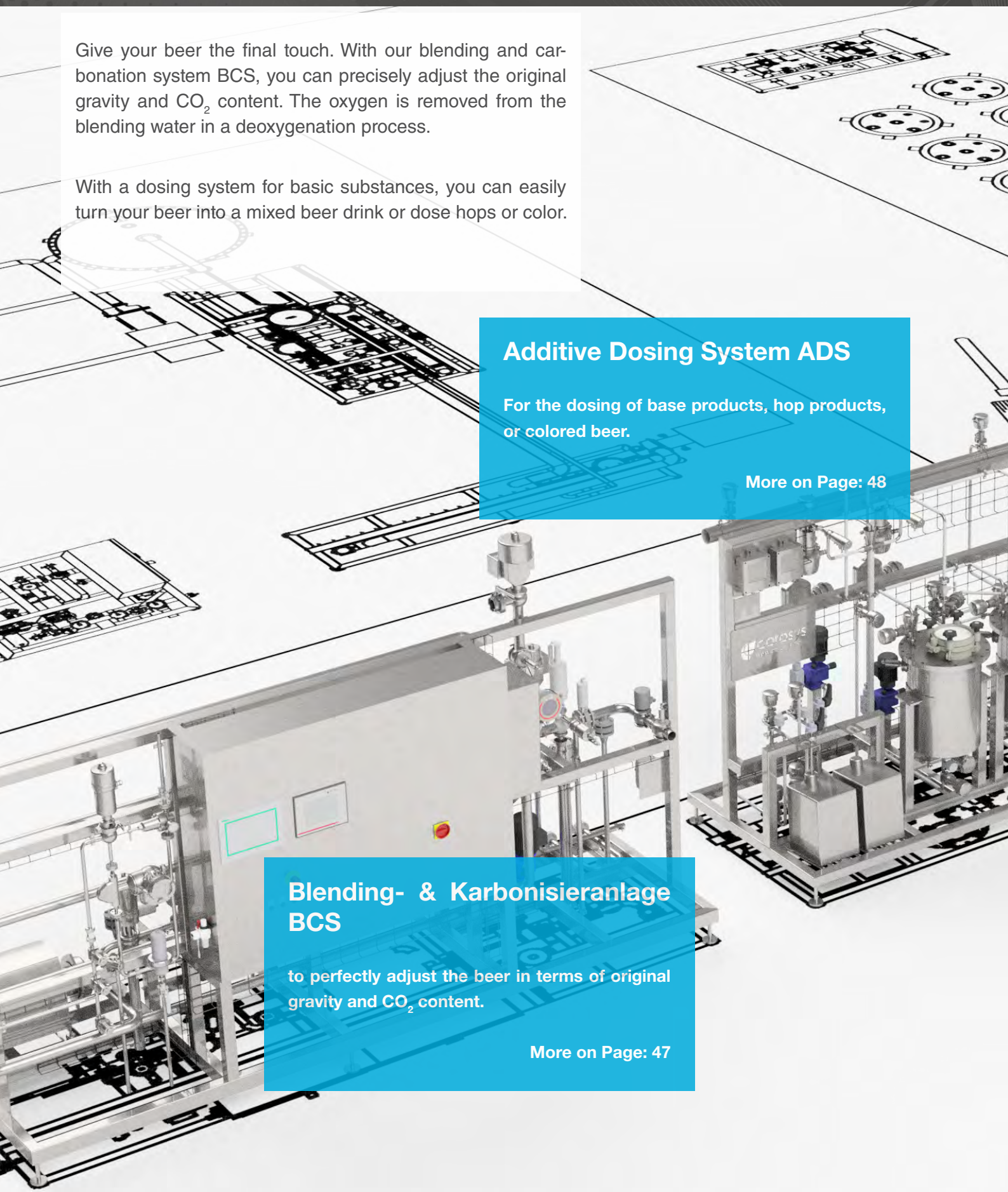
More on Page: 80

corosys
beverage technology

PERFECT BEER IS A MATTER OF THE RIGHT SETTINGS

Give your beer the final touch. With our blending and carbonation system BCS, you can precisely adjust the original gravity and CO_2 content. The oxygen is removed from the blending water in a deoxygenation process.

With a dosing system for basic substances, you can easily turn your beer into a mixed beer drink or dose hops or color.



Additive Dosing System ADS

For the dosing of base products, hop products, or colored beer.

More on Page: 48

Blending- & Karbonisieranlage BCS

to perfectly adjust the beer in terms of original gravity and CO_2 content.

More on Page: 47

Buffer Tank with EG Water Supply Station

for intermediate storage of degassed water and provision for operation via pressure-regulated pumps.

More on Page: 62

Water Degassing

for the removal of oxygen from the water.

More on Page: 30

corosys
beverage technology

THE COROBEV CONCEPT

Every blending is individual. With our corobev concept, we design your custom-tailored blending line, consisting of various dosing stations. The type and number of dosing points can vary as needed. Also, multiple production lines can be operated in parallel.

Storage and dosing tanks

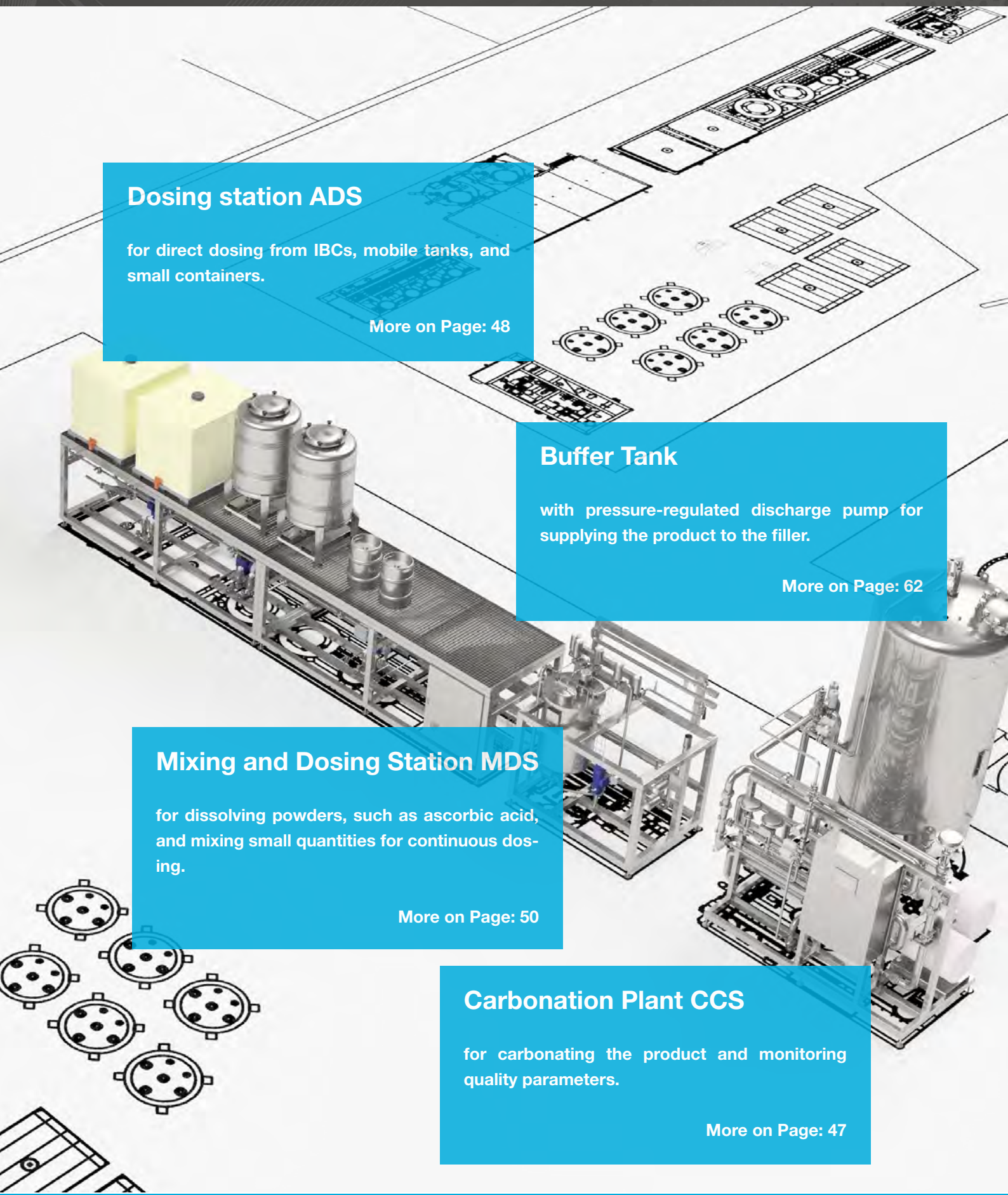
including receiving station for concentrate, syrup, or base product from a tanker truck.

More on Page: 60

Sugar Dissolver

for batch-wise or continuous production of sugar syrup from granulated sugar from bags, big bags, or a silo.

More on Page: 53



Dosing station ADS

for direct dosing from IBCs, mobile tanks, and small containers.

More on Page: 48

Buffer Tank

with pressure-regulated discharge pump for supplying the product to the filler.

More on Page: 62

Mixing and Dosing Station MDS

for dissolving powders, such as ascorbic acid, and mixing small quantities for continuous dosing.

More on Page: 50

Carbonation Plant CCS

for carbonating the product and monitoring quality parameters.

More on Page: 47

PRODUCT OVERVIEW

At corosys you will find solutions for the production of beer and beverages. Our process technology meets the highest requirements for flexibility, usability, and hygiene. Product quality is our top priority. This is achieved by individually planned plants and concepts both in design and dimensioning as well as in construction. Because corosys plants do not come off the shelf, a comprehensive and holistic view of the production process allows for a tailor-made integration into existing plants and structures.

Brewery Technology

#customcoldblock is our motto and at the same time describes where our technology can be found. Starting with wort aeration, we supply the entire process technology for the cold area of a brewery.

#customcoldblock Advertising Campaign: we try not to boast, but customcoldblock is the coolest thing in your brewery.

This includes blenders and carbonators, flash pasteurizers, water deaeration and Clean in Place (CIP) systems up to complete filter lines and dealcoholization systems.

Beverage technology

Every product is different and no one can say today what the future will bring. Therefore, flexibility and expandability are the top priorities for the production of beverage systems such as lemonades, mixed beer beverages, cocktails made from wine or spirits. In addition to components for in-line production, such as dosing systems and carbonators, we also supply peripherals such as sugar and powder dissolvers, CIP systems, water degassing systems and storage tanks for syrups, as well as other components, including bulk tanker reception.

Automation

Automation is also an integral part of a plant. We deliver this from our own house. Either with our own control software or seamlessly integrated into an existing process control system. This guarantees

corosys touch panel with Dashboard

smooth commissioning and functioning of the systems. For data acquisition and evaluation, the connection to our cloud solution “smartmachine“ is always included. But we do not only automate our plants. We are happy to supply new hardware and software for existing systems or integrate them into process control systems. Our automation technicians and technologists support the planning of the new automation structure and the implementation of the move during operation.

Engineering and Planning all in one place

Engineering

As a reliable and experienced engineering partner, you can plan your next rebuild or new investment together with us. We merge your ideas and knowledge with our know-how and experience. Benefit from our worldwide activities, because they give us an insight into diverse processes as well as different as well as extraordinary approaches to solutions. We support from survey to detail engineering with flow diagrams, process descriptions and construction drawings up to manufacturing, assembly and commissioning.

Service

Service and quick and easy, our service staff is quickly at your disposal for everything necessary for the operation of corosys process plants.

We can provide particularly fast help from a distance thanks to the use of our remote service. A message to us and a short time later one of our service technicians accesses your control system via the Internet to start to problem solve.

DEAERATION

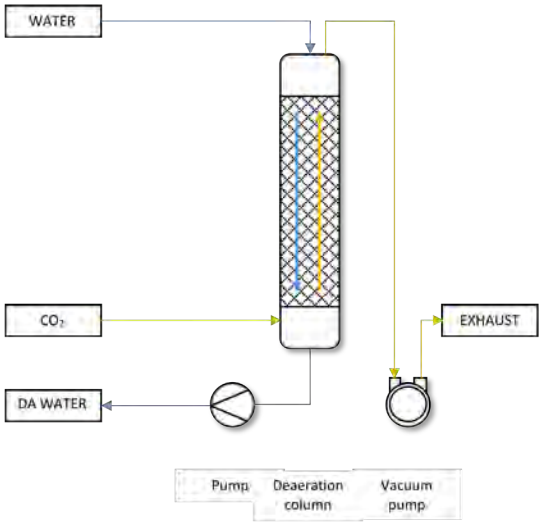
PRODUCT CATEGORIES

HIGH VACUUM WATER DEAERATION
VACUUM WATER DEAERATION
HOT WATER DEAERATION
COLD WATER DEAERATION
MEMBRANE WATER DEAERATION
PRODUCT DEAERATION

DEGASSING OF LIQUIDS

The Challenge of Oxygen Removal and Product Degassing

Oxygen is widely recognized in breweries as the beer's greatest enemy. It leads to oxidation, negatively alters the beer's flavor profile, and impacts its shelf life. Therefore, it is crucial to prevent oxygen from entering the finished beer during every stage of production. However, this is only possible if the water that comes into contact with the beer or is used for blending is oxygen-free. This is why the water used must always be reliably degassed.

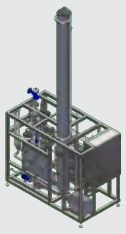


In the water used by breweries and beverage manufacturers, various gases, including oxygen, are always dissolved, and their concentration depends on the specific environmental conditions. At 10 to 15 °C and atmospheric pressure, the oxygen content in water typically ranges from 8 to 10 ppm (parts per million). To remove oxygen from water, various process and procedural measures are employed individually or in combination:

- Reducing operating pressure (vacuum)
- Increasing water temperature
- Reducing partial pressure by using a stripping gas, preferably in countercurrent flow
- Creating a large contact or exchange surface between liquid and gas phases in the degassing apparatus
- Ensuring a long contact time between liquid and gas phases

The degassing itself occurs in a device known as a contact apparatus. For our water degassing, columns with high efficiency structured packing are used. In accordance with the chosen method, the water is either preheated or the column operates under a vacuum. The water is evenly distributed over the packing at the top of the column and trickles downward. When a stripping gas is used, it is introduced at the bottom of the column below the packing and rises upward. The large surface area ensures intensive contact and exchange of substances between the stripping gas and water.





	HIGH VACUUM DEAERATION	VACUUM DEAERATION	HOT WATER DEAERATION
Performance:	25 to 1,000 hl/h / 2.5 to 100 m^3/h	25 to 1.000 hl/h / 2.5 to 100 m^3/h	25 to 1,000 hl/h / 2.5 to 100 m^3/h
Oxygen level:	< 10 ppb / 0.01 ppm	< 10 ppb / 0.01 ppm	< 10 ppb / 0.01 ppm
CO_2-Consumption:	0.0 g/l	0.4 g/l	0.8 g/l
CO_2-Dissolved:	0.0 g/l	0.2 g/l	0.6 g/l
CIP-Ready:	Yes	Yes	Yes
More on page:	32	33	34

Efficient degassing options: Comparison of membranes and innovative column technology

Alternatively, membranes can be used, allowing for a more compact system design. However, membranes incur high maintenance costs due to regular membrane replacement, unlike maintenance-free columns.

While degassing with stripping gas has become established, corosys also offers a new method that requires no stripping gas or steam and does not require water heating. The foundation of this technology is a two-stage column that creates a high vacuum. This technology allows for achieving the lowest residual oxygen values of less than 10 ppb while being completely independent of CO_2.

When deciding on the most suitable process, the factors discussed in the table below should also be considered.

Product Degassing

The degassing of beverages or beverage components follows the same physical laws and procedures as water. However, the specific properties of the respective product must be taken into account. Foamy media, such as beer, require a special design of the contact apparatus and distribution. The same applies to highly viscous or particle- and fiber-containing substances. The corosys product degassing system is always individually tailored to your product. It can be complemented with aroma recovery and, upon request, temperature control before or after the process. Product degassing can also be integrated into a flash pasteurization, utilizing regenerative product preheating for more efficient degassing.

COLD WATER DEAERATION	MEMBRANE DEAERATION	PRODUCT DEAERATION
25 to 1,000 hl/h / 2.5 to 100 m^3/h	25 to 1,000 hl/h / 2.5 to 100 m^3/h	5 to 1,000 hl/h / 0.5 to 100 m^3/h
< 50 ppb / 0.05 ppm	< 10 ppb / 0.01 ppm	N/A
1.9 - 2.4 g/l	0.6 g/l	N/A
1.5 - 2.4 g/l	0.2 g/l	N/A
Yes	Partial	Yes
35	36	37

DEAERATION

HIGH VACCUM DEAERATION V2WD

Highest Quality with Zero CO_2 Consumption

Our V2WD water degassing system sets new standards in the beverage industry. With a focus on efficiency and environmental protection, we have a solution that enhances the quality of your beverages while eliminating CO_2 consumption. Our patented vacuum technology eliminates the need for stripping gas.

How does the V2WD work?

In this process, the even distribution of water at the top of the column plays a crucial role. The water is passed through special structured packing optimized for effective degassing. As it gently trickles down through these packing materials, a substantial surface area is created, which efficiently removes oxygen from the water.

This method is particularly powerful due to the combination of two degassing stages with different pressure, which efficiently removes oxygen from the water without the need for stripping gas, commonly used in conventional processes. This dual-stage degassing achieves extremely low oxygen levels in the water without the need for stripping gas, which is often required in conventional processes.

This efficient degassing solution ensures that the water is practically free of oxygen and is ideal for various applications, e.g. production of non-carbonated drinks.

Why should you choose the V2WD?

- **Lowest oxygen values:** corosys guarantees oxygen levels of less than 10 ppb to ensure top product quality.
- **Zero CO_2 consumption:** Even at cold water temperatures, no stripping gas or steam is required for the degassing process.
- **Complete Clean Concept:** Our system is designed for comprehensive and effective cleaning.
- **Energy efficiency:** Thanks to the FLOW ADAPT algorithm, degassing performance adapts to the buffer tank‘s fill level, saving energy.
- **Easy integration:** The system is pre-assembled, pre-wired, and tested.
- **Fully automatic operation:** Intuitive control with the corosys compass allows for effortless operation, or the system can be fully integrated into your process control system.
- **Everywhere in view:** With our Smart Machine operational data acquisition, you have access to operational data and reports from anywhere.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

Performance ranging from 25 to 1,000 hl/h to meet your production needs

Adaptation to water temperature and desired residual oxygen content

Use of custom components and materials

Individual design and sizing to match your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Oxygen measuring	Trap filter
UV-Unit	Carbonation
Chiller	

PERFECT COMBINATION WITH OUR SOLUTIONS

The corosys DAW tank, including distribution, ensures a continuous supply of degassed water to your production. (Page 63)

Utilize degassed water in the blending system BCS for an optimal production chain. Case study on (Page 47)

IN USE WITH THE FOLLOWING CUSTOMERS

Wittmann
Landshuter Spezialitäten Brauerei

Störtebeker
BRAUMANUFAKTUR

DEAERATION

VACCUM DEAERATION VWD

Top Performance with Minimal Environmental Impact

Our water deaeration system VWD combines highest product quality with a resource-saving process. Due to the vacuum, lowest residual oxygen values can be achieved with reduced CO_2 requirements.

How does the VWD work?

At the top of the column, water is evenly distributed over the structured packing of the water degassing system. Here, the process begins, with the water slowly trickling down through the packing materials - counter to the upward flow of CO_2 added at the column sump allowing for efficient oxygen removal.

The special structure of the high-performance packing allows for intensive contact between water and stripping gas, effectively removing oxygen from the water. Operating the column under a vacuum at approximately 80 mbar reduces gas partial pressures, resulting in minimal oxygen levels and CO_2 consumption. Nitrogen can also be used as a stripping gas if needed. The degassed water is pumped out from the column sump and can be supplied to a consumer or stored in a buffer tank.

Why should you choose the VWD?

- **Lowest oxygen levels:** With oxygen levels of less than 10 ppb, corosys ensures exceptional product quality.
- **Low CO_2 consumption:** Our system consumes less than 0.4 g/l CO_2, saving costs and minimizing environmental impact.
- **Efficient vacuum system:** The corovac vacuum system saves water and contributes to sustainability.
- **Complete Clean Concept:** Our system is designed for comprehensive and effective cleaning, including the vacuum system and CO_2 lines.
- **Energy efficiency:** Thanks to the FLOW ADAPT algorithm, degassing performance adapts to the buffer tank‘s fill level, saving energy and CO_2.
- **Easy integration:** The system is pre-assembled, pre-wired, and tested.
- **Fully automatic operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Everywhere in view:** With our Smart Machine operational data acquisition, you have access to operational data and reports from anywhere.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

Performance ranging from 25 to 1,000 hl/h to meet your production needs

Adaptation to water temperature and desired residual oxygen content

Use of custom components and materials

Individual design and sizing to match your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Oxygen measuring	Trap filter
UV-Unit	Carbonation
Chiller	

PERFECT COMBINATION WITH OUR SOLUTIONS

The corosys DAW tank, including distribution, ensures a continuous supply of degassed water to your production. (Page 63)

Utilize degassed water in the blending system BCS for an optimal production chain. Case study on (Page 47)

IN USE WITH THE FOLLOWING CUSTOMERS

Weihenstephan

STONE & WOOD

DEAERATION

HOT WATER DEAERATION HWD

Efficient water degassing with integrated pasteurization

With our hot water degassing system (HWD), the water is additionally pasteurized during the degassing process. This ensures both excellent residual oxygen values and a high level of microbiological safety. Furthermore, the robust hot degassing process consumes less CO_2.

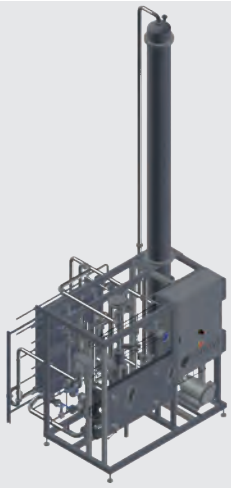
How does the HWD work?

The incoming water is first preheated in a heat exchanger by coming into contact with already degassed hot water. It is then brought to the desired degassing temperature using steam or hot water and evenly distributed over the structured packing at the column head. Here, the process begins where the water slowly flows down through the packing while CO_2 is introduced in countercurrent from below.

The special structure of the packing allows for efficient contact between water and stripping gas to optimally remove oxygen. The increased temperature helps reduce the solubility of oxygen, supporting the efficient removal of oxygen from the water.. Nitrogen can also be used as stripping gas if needed. The degassed water is pumped out of the column sump, cooled through a heat exchanger, and can then be supplied to a consumer or stored in a buffer tank.

Why should you choose the HWD?

- **Best oxygen values:** With oxygen values of less than 10 ppb, we ensure outstanding product quality.
- **High heat recovery:** Regenerative heating allows for the recovery of up to 96% of heat, saving both heating and cooling energy.
- **Low CO_2 consumption:** Our system consumes less than 0.8 g/l CO_2, which not only saves costs but also minimizes environmental impact.
- **Complete Clean Concept:** Our system is designed for comprehensive and effective cleaning, including CO_2 lines.
- **Energy efficiency:** Thanks to the FLOW ADAPT algorithm, degassing performance adapts to the buffer tank fill level, saving energy and CO_2.
- **Easy integration:** The system is pre-assembled, pre-wired, and tested.
- **Fully automatic operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Everywhere in view:** With our Smart Machine operational data acquisition, you have access to operational data and reports from anywhere.



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Performance ranging from 25 to 1,000 hl/h to meet your production needs

Adaptation to water temperature and desired residual oxygen content

Use of custom components and brands

Individual design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Oxygen measuring	Trap filter
UV-Unit	Carbonation
Chiller	

PERFECT COMBINATION WITH OUR SOLUTIONS

The corosys DAW tank, including distribution, ensures a continuous supply of degassed water to your production. (Page 63)

Utilize degassed water in the blending system BCS for an optimal production chain. Case study on (Page 47)

IN USE WITH THE FOLLOWING CUSTOMERS

DEAERATION

COLD WATER DEAERATION CWD

Simple and efficient

Our cold water degassing (CWD) system combines simplicity, process reliability, and efficiency to achieve the highest product quality while minimizing environmental impact. The stripping process results in low oxygen levels, and since a significant portion of the CO_2 binds to the water, there is minimal loss.

How does the CWD work?

At the top of the column, incoming water is precisely distributed to the structured packing of the water degassing system. At this point, the deaeration process begins where the water gently trickles down through the packing, counter to the upward movement of the supplied CO_2 at the column sump.

The secret behind this process lies in the special structure of our high-performance packing, which ensures an extremely intense contact between the water and the stripping gas, effectively saturating the water with CO_2 while efficiently removing oxygen from it. If necessary, nitrogen can even be used as the stripping gas to adjust the process.

The degassed water is then pumped out of the column sump and can be cooled through a heat exchanger. It can then either be directly supplied to a consumer or stored in a buffer tank for immediate use. This efficient system ensures that we can deliver the highest-quality water in a way that combines simplicity, safety, and efficiency.

Why should you choose the CWD?

- **Best oxygen values:** Our system ensure a good product quality with oxygen values of less than 50 ppb, and values as low as <10 ppb possible depending on the configuration.
- **Low CO_2 consumption:** Since a significant portion of the CO_2 used dissolves in the water, the loss is minimal, at approximately 0.4 g/l CO_2.
- **Complete Clean Concept:** Our system is designed for comprehensive and effective cleaning, including CO_2 lines.
- **Energy efficiency:** Thanks to the FLOW ADAPT algorithm, degassing performance adapts to the fill level in the buffer tank, saving energy and CO_2.
- **Easy integration:** The system is pre-assembled, pre-wired, and tested.
- **Fully automatic operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Everywhere in view:** With our Smart Machine operational data acquisition, you have access to operational data and reports from anywhere.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

Performance ranging from 25 to 1,000 hl/h to meet your production needs

Adaptation to water temperature and desired residual oxygen content

Use of custom components and brands

Individual design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Oxygen measuring	UV-Unit
Trap filter	Carbonation
Chiller	

PERFECT COMBINATION WITH OUR SOLUTIONS

The corosys DAW tank, including distribution, ensures a continuous supply of degassed water to your production. (Page 63)

Utilize degassed water in the blending system BCS for an optimal production chain. Case study on (Page 47)

IN USE WITH THE FOLLOWING CUSTOMERS

Gold Ochsen SEIT 1597 ULMS FLÜSSIGES GOLD

ALLGÄUER BRAUHAUS

DEAERATION

MEMBRANE WATER DEAERATION MWD

Compact deaeration with membranes

The Membrane Degassing System (MWD) degasses water using highly efficient hollow fiber membrane modules to achieve residual oxygen levels below 10 ppb. Thanks to its compact design, the system can be installed even in spaces with low ceilings. For efficient results, we recommend regular replacement of the membrane modules.

How does the MWD work?

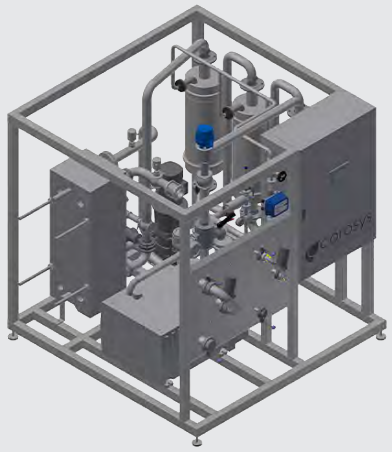
In the modules, water flows around the hydrophobic hollow fibers on the outside, while inside, the stripping gas flows in the opposite direction. The hollow fibers create an extremely large contact surface between the water to be degassed and the stripping gas, allowing gases to pass through but not water.

The vacuum created on the gas side, approximately 65 mbar, removes the gas mixture from the modules. Simultaneously, the vacuum and stripping gas create a significant partial pressure difference, causing oxygen molecules to diffuse from the water into the vacuum. Carbon dioxide or nitrogen can be used as the stripping gas.

By arranging the membrane modules in parallel and in series, nearly any capacity and residual oxygen levels can be achieved.

Why should you choose the MWD?

- **Low oxygen levels:** Our product ensure outstanding quality with oxygen levels of less than 10 ppb.
- **Low CO_2 consumption:** Our system consumes less than 0.6 g/l of CO_2, not only saving costs but also minimizing environmental impact.
- **Efficient vacuum system:** The corovac vacuum system saves water and contributes to sustainability.
- **Energy efficiency:** Thanks to the FLOW ADAPT algorithm, degassing performance adapts to the buffer tank‘s fill level, saving energy and reducing CO_2 emissions.
- **Easy integration:** The system is pre-assembled, pre-wired, and tested.
- **Fully automated operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Everywhere in view:** With our Smart Machine operational data acquisition, you have access to operational data and reports from anywhere.



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Performance ranging from 25 to 1,000 hl/h to meet your production needs

Adaptation to water temperature and desired residual oxygen content

Use of custom components and brands

Individual design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Oxygen measuring	Trap filter
UV-Unit	Carbonation
Chiller	

PERFECT COMBINATION WITH OUR SOLUTIONS

The corosys DAW tank, including distribution, ensures a continuous supply of degassed water to your production. (Page 63)

Utilize degassed water in the blending system BCS for an optimal production chain. Case study on (Page 47)

IN USE WITH THE FOLLOWING CUSTOMERS

Braustolz SIEMENS

DEAERATION

PRODUCT DEAERATION PDS

Customized product deaeration

The removal of oxygen and other gases from products is as unique as the product itself. Our Product Degassing System (PDS) is tailored to your individual requirements.

How does the PDS work?

The process begins with the beverage, if necessary, being preheated and then conveyed to a degassing tank through a feed pump. At the top of the tank, a special nozzle sprays the liquid in a ring shape against the tank wall, allowing it to flow downward along the wall. Since the tank operates under a vacuum, dissolved gases release and enter the tank atmosphere before being extracted via a vacuum pump. Prior to the vacuum pump, there is separation of volatile aroma components that might be carried along by the gas stream. These aromatic components are reintroduced to the beverage after degassing. The degassed beverage collects at the bottom of the tank and is pumped out by a fill-level-controlled discharge pump.

Our PDS solution is designed to ensure that your product meets your exact requirements, whether it‘s related to oxygen reduction, flavor preservation, or other specific needs. We offer customized configurations and settings to ensure that your product maintains the highest quality and flavor fidelity.

Why should you choose the PDS?

- **Lowest oxygen values:** With the lowest oxygen values, we guarantee outstanding product quality.
- **Full aroma:** With our aroma recovery, you can return volatile substances back into your product.
- **Maintenance-free distribution:** Our nozzle, which is customized to your product for distribution in the degassing tank contains no moving parts and is maintenance-free.
- **Efficient vacuum system:** The corovac vacuum system saves water and contributes to sustainability.
- **Complete Clean Concept:** Our system is designed for comprehensive and effective cleaning, including CO_2 lines.
- **Easy integration:** The system is pre-assembled, pre-wired, and tested.
- **Fully automatic operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Everywhere in view:** With our Smart Machine operational data acquisition, you have access to operational data and reports from anywhere.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

Performance ranging from 25 to 1,000 hl/h to meet your production needs

Adaptation to water temperature and desired residual oxygen content

Use of custom components and brands

Individual design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Oxygen measuring

Aroma recovery

PERFECT COMBINATION WITH OUR SOLUTIONS

Product degassing is part of a de-alcoholization process for carbonated beverages (Page 40).

Seamlessly integrated into a flash pasteurization system FPS (Page 56), you can, for example, degas juices while utilizing regenerative preheating.

IN USE WITH THE FOLLOWING CUSTOMERS

Störtebeker BRAUMANUFAKTUR

SPEZIALBIER BRAUEREI FORST BIRRA · BIÈRE · BEER · BIER

SEPARATION

PRODUCT CATEGORIES

DEALCOHOLIZATION

CO_2 RECOVERY

WORT STRIPPER

SEPARATION

Separation of Media - Thermal Separation Techniques

In the process of beverage production, the mixing of different components is a common practice. However, this process is only one side of the coin. The reverse process, the separation of media, plays an equally important role in the beverage industry. For example, during de-alcoholization, alcohol is separated from beer or wine. During CO_2 recovery, the released CO_2 is not only compressed to the desired pressure but impurities are also removed through the use of different purification stages. Finally, rectification is carried out to separate foreign gases from the desired gases.
In the brewhouse, DMS (dimethyl sulfide) is stripped from the wort just before cooling using stripping devices, which not only enhances the quality of the final product but also enables energy savings.

Many of these separation processes are based on thermal separation techniques. corosys has extensive experience and a broad spectrum of knowledge in the areas of evaporation, rectification, and stripping. We offer customized plants that are specifically tailored to your individual requirements. The focus is on preserving the products, as this is crucial for the quality and taste of the final products. There are few substances that have not yet been treated by our specialists at corosys Food Technology, corosys Beverage Technology, or corosys Chemical and Pharma Technology.

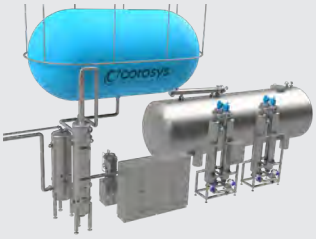
In addition to the process engineering design of the separation task, great emphasis is also placed on hygienic design and cleanability. This is essential in the food and beverage sector, as many products become extremely sensitive due to the separation. A good example of this is the de-alcoholization of beer, where not only the protective alcohol is removed but also the CO_2.

Therefore, we have developed special cleaning mechanisms to ensure the highest safety while maintaining the highest quality. This commitment to safety and quality is a cornerstone of corosys's philosophy.

DEALCOHOLIZATION

More on page 40

CO_2 RECOVERY



More on page 42

WORT STRIPPER

More on page 44

SEPARATION

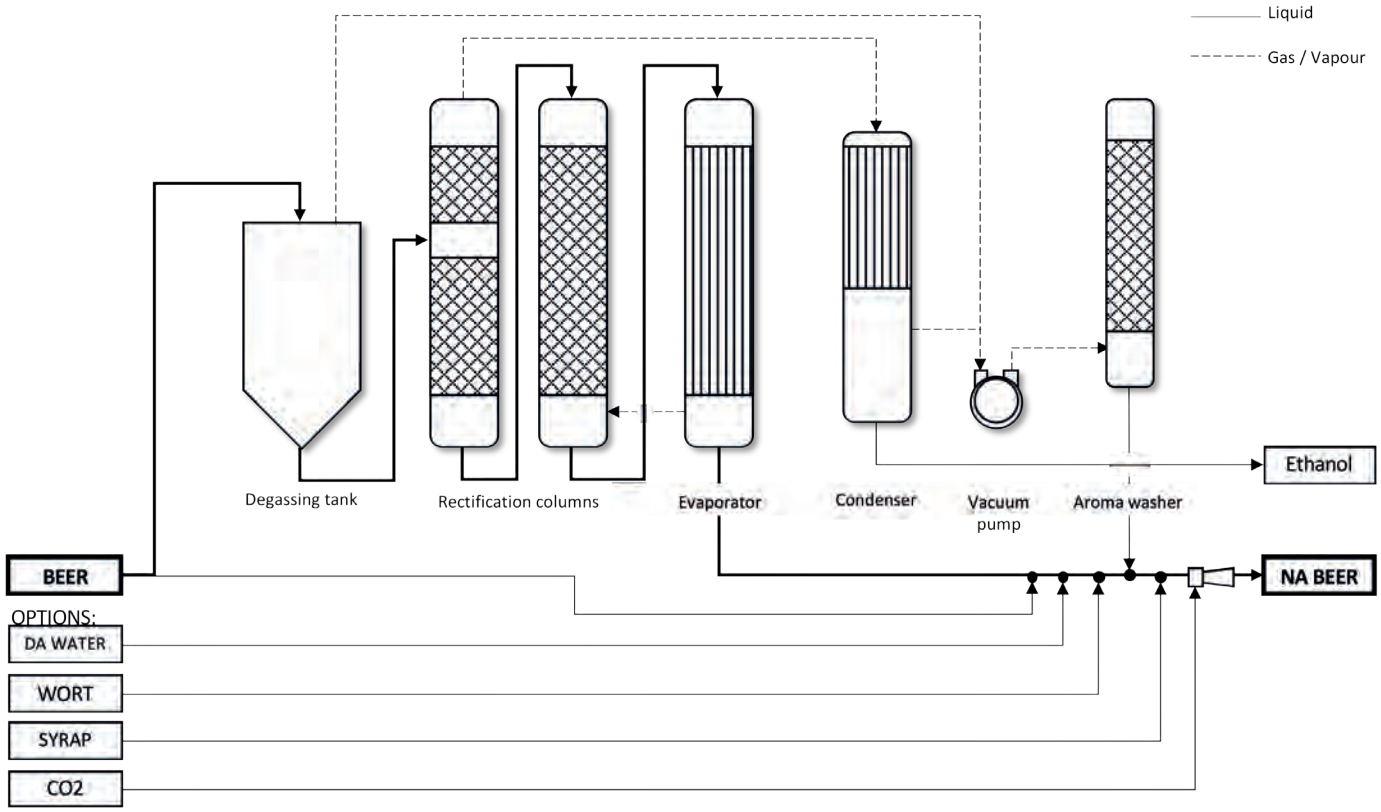
DEALCOHOLIZATION DAS

The DAS: Dealcoholization and production solution

Our state-of-the-art de-alcoholization system, DAS, offers you the opportunity to de-alcoholize a wide range of alcoholic beverages, including top-fermented and bottom-fermented beer, wine, sparkling wine, and more, to an impressively low residual alcohol content of under 0.04% Vol. This remarkable effect is achieved by applying a low-temperature, vacuum-based process, ensuring an extremely gentle treatment of the product with no compromise on quality.

What truly sets our system apart is the seamless integration of various dosing and carbonation options, allowing you to obtain not only a de-alcoholized base but also a ready-to-fill product in a single production step. This translates to a significant increase in your production efficiency and output.

Furthermore, our system offers the additional benefit of ethanol recovery. The removed ethanol boasts an exceptionally high concentration of over 70% Vol and can be even higher upon request. This not only contributes to resource efficiency but also enables you to reuse the recovered ethanol, resulting in substantial cost savings. In summary, our DAS de-alcoholization system offers a comprehensive solution for your production needs, harmonizing quality, efficiency, and sustainability.



How Does the DAS Work?

Our de-alcoholization system employs an innovative process to remove alcohol from carbonated products, producing high-quality alcohol-free beverages. The process begins with degassing the carbonated products in a specialized step to remove excess gases. Subsequently, the actual de-alcoholization takes place in a rectification column operating in counterflow to the rising vapors. The majority of alcohol is transferred from the trickling product into the vapor phase. This step is carried out extremely gently and efficiently, as it is performed at low temperatures under vacuum conditions.

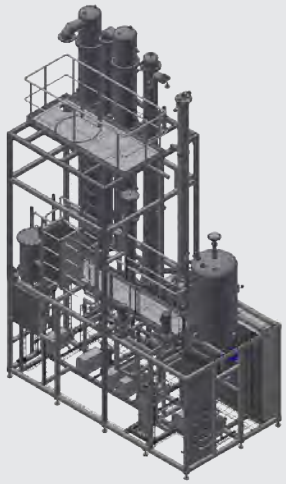
To preserve the taste and aroma of the product, we employ advanced aroma recovery technology. This process allows the extraction of aroma components from the gas phase, which are then selectively reintroduced into the product. This contributes to maintaining the quality of the de-alcoholized beverage at the highest level.

The de-alcoholized product, extracted from the falling film evaporator, is then cooled by the incoming product still to be de-alcoholized. In a subsequent step, it is blended with various components such as mother beer, water, recovered aroma, wort, or base material. Finally, the product is carbonated and subjected to short-term heating if required. The result is the complete production of alcohol-free beers and mixed beverages, all within a single, highly efficient system.

Therefore, our de-alcoholization system offers a comprehensive solution that not only enables alcohol removal but also preserves the taste and aroma of your product, while ensuring efficiency and quality.

Why Choose the DAS?

- **Future-Proof:** Produce future-proof 0.0% products.
- **Gentle:** The vacuum-based process enables low temperatures and a low heating medium temperature, ensuring gentle de-alcoholization.
- **Usable Byproduct:** Ethanol is concentrated to over 70% vol and can be even higher upon request, making it usable.
- **Energy-Efficient:** The system operates highly efficiently with heat recovery, helping reduce energy consumption.
- **Easy Integration:** The system comes pre-assembled, pre-wired, and tested.
- **Fully Automated Operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Accessible Everywhere:** With our Smart Machine operational data acquisition, you have access to operational data and reports from anywhere.



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Capacities from 5 to 200 hl/h

Adaptation to the product to be de-alcoholized

Use of customer-specific components and makes

Individual design and dimensioning according to your specific needs.

OPTIONS FOR YOUR REQUIREMENTS

Degassing Dosage

Carbonation

PERFECT COMBINATION WITH OUR SOLUTIONS

Flash pasteurization for the de-alcoholized product (Page 56)

Ethanol meter for customs recording of ethanol (Page 80)

Ethanol tank with truck loading (Page 64)

IN USE WITH THE FOLLOWING CUSTOMERS

Störtebeker BRAUMANUFAKTUR

Weihenstephan

SEPARATION

CO_2 RECOVERY CRS

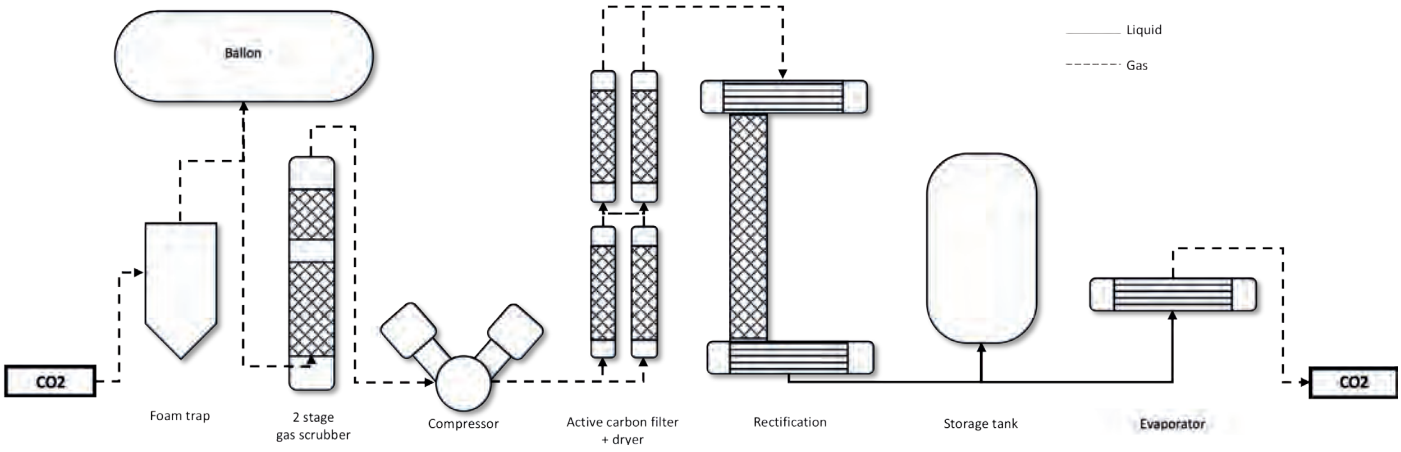
The CRS: Decarbonization and Production Solution

With our advanced CO_2 recovery system, CRS, we offer you the opportunity to efficiently recover carbon dioxide generated during the fermentation process and reuse it in subsequent production steps. This innovative technology not only enables sustainable CO_2 utilization but also provides numerous benefits for your business.

By recovering CO_2 from fermentation, you can significantly reduce the need for additional CO_2 purchases while simultaneously drastically lowering the emissions of CO_2 generated during the brewing process. This not only contributes to reducing your environmental impact but also leads to cost savings since you will be less reliant on external suppliers with fluctuating market prices.

Another crucial aspect is that our CRS CO_2 recovery system is economically viable even for smaller-scale operations. This opens doors for medium-sized breweries to harness the advantages of this technology. Our goal is to make sustainable solutions more accessible in the brewing industry while enhancing the cost-effectiveness of your production.

With the CRS system, you‘re not only making a statement for environmental protection and sustainability but also for the efficiency and profitability of your brewery. You‘re not just recovering CO_2; you‘re gaining a competitive edge in an ever-evolving industry.



How Does the CRS Work?

During fermentation, CO_2 is produced. The foam carried along with the CO_2 is effectively separated by a foam separator. For this purpose, the CO_2 is transferred into a container where the foam is knocked down by spray nozzles. The separated, heavier foam sinks to the bottom, while the CO_2 is directed upwards.

To compensate for the irregularly produced CO_2 during fermentation, a gas balloon serves as a buffer before the compressor. The gas balloon is made of a CO_2 diffusion-resistant fabric and is equipped with overpressure protections. The level measurement controls the operation of the compressor for CO_2 recovery.

Before compression, the CO_2 from the balloon passes through a gas scrubber, which removes water-soluble impurities. The CO_2 is purified through a column with structured packing and counter-flow principle. Excess water is channeled into a foam separator

NEW

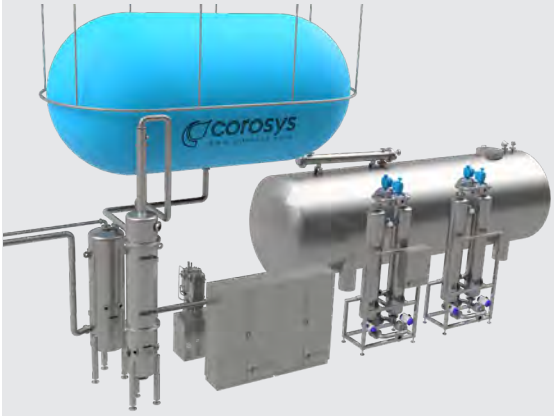
and reused. For the liquefaction and storage, a pressure of 16 bar is targeted. Typically, a two-stage compressor is used to achieve this pressure. After each stage, the CO_2 is cooled to remove water from the gas. The compressed and still moist CO_2 is dried to a dew point pressure of at least -50 °C using molecular sieves and is freed from organic impurities in an activated carbon filter module. The purified and dried CO_2 is liquefied by cooling, which removes foreign gases. The possibility of CO_2 rectification further improves the purity. Here, the liquefied CO_2 is added to a rectification column and purified by rising gaseous CO_2. The foreign gases accumulate at the top and can be discharged.

The liquefied CO_2 is channeled into an insulated storage tank. Through an evaporator, it is then converted back into the gaseous state and, after pressure reduction, is again usable for production. The evaporation occurs either through ambient heat or particularly energy-efficiently through glycol from the return flow.

Our holistic approach, however, goes beyond CO_2 recovery. We also consider your energy needs and the refrigeration system of your operation to determine together how the CRS can optimize your entire production processes. This not only allows for sustainable use of CO_2 but also significant cost savings and an overall improved operational efficiency.

Why Choose the CRS?

- **Energy-Efficient:** The system operates highly efficiently thanks to various energy recovery systems, helping reduce energy consumption.
- **Water-Saving:** Water used for recovery in various stages is reused wherever possible in other steps, reducing water demand.
- **Easy Integration:** The system comes pre-assembled, pre-wired, and tested for easy integration.
- **Fully Automated Operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Anywhere Access:** With our Smart Machine operational data acquisition, you have access to operational data and reports from anywhere.



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Capacities ranging from 100 to 2,000 kg/h

Adaptation to desired CO_2 purity

Use of customer-specific components and makes

Individual design and dimensioning according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Oxygen measurement Cold recovery

Liquid CO_2 storage tank

PERFECT COMBINATION WITH OUR SOLUTIONS

CO_2 recovery complements your fermentation and storage cellar (Page 61)

Recover CO_2 removed in de-alcoholization (Page 40).

Use CO_2 to carbonate your beers with your own CO_2 in the carbonation system CCS (Page 47).

SEPARATION
WORT STRIPPER WSS | WORT EVAPORATOR WES

Effective Wort Conditioning in the Brewery

To condition the wort after the brewhouse, we offer a range of state-of-the-art equipment designed to fulfill a wide range of functions. From simple air-operated wort strippers to powerful evaporators for increasing original extract, we provide solutions tailored to meet the needs of your brewery.

How does WSS/WES work?

The process begins by directing the wort from the whirlpool into the head of a falling-film evaporator. Here, it flows down the tubes as a thin film, passing through the specially designed apparatus. WSS/WES systems are highly versatile, offering multiple ways to interact with the wort.

One method involves introducing air into the falling-film tubes. This air creates a stripping effect, efficiently removing DMS (Dimethylsulfide) from the wort. An alternative or complementary approach is to use a vacuum pump to achieve the same effect. This method generates a vacuum within the tubes, extracting DMS from the wort. Another option to enhance process efficiency is to heat the apparatus through brine compression. This allows for high evaporation rates with minimal energy input, offering both economic and ecological advantages.

Why Choose WSS/WES?

- **High Quality**: Reduce DMS levels, thereby enhancing wort quality.
- **Capacity Enhancement:** Energy-efficient evaporation leads to an increase in original extract, maximizing your fermentation and storage capacities.
- **Energy Efficiency:** The vacuum process in the evaporative stage is particularly energy-saving. Additionally, energy savings can be achieved during wort boiling.
- **Easy Integration:** The system comes pre-assembled, pre-wired, and tested for easy integration.
- **Fully Automated Operation:** Intuitive control with corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Accessible Anywhere:** With our Smart Machine operational data acquisition, you have access to operational data and reports from anywhere.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

Capacities ranging from 5 to 1,000 hl/h

Customizable to achieve desired original extract increase

Use of customer-specific components and makes

Individual design and dimensioning according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Vacuum evaporation Vapor compression

PERFECT COMBINATION WITH OUR SOLUTIONS

Then aerate the wort with our CWA (Page 69).

We are also happy to offer you a suitable wort cooler and yeast dispenser.

corosys beverage technology GmbH & Co. KG | Hessenstraße 23 | D-65719 Hofheim am Taunus | bbt.corosys.com | Tel.: +49 (0) 61 22 / 70 75 - 0

MXING & DISSOLVING

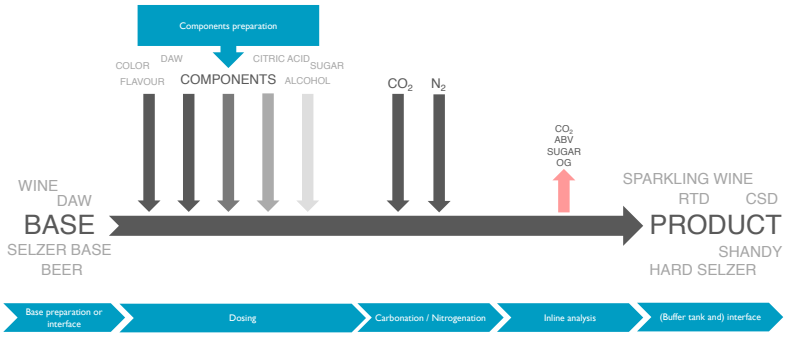
PRODUCT CATEGORIES

BLENDING & CARBONATION
ADDITIVE DOSING SYSTEM
DISSOLVING, MIXING TANKS
COROBEV COMPACT
SUGAR DISSOLVER

MIXING & DESOLVING

Optimal Beverage Production with Corobev Technology

The key elements in beer and beverage production are mixing, dosing, and dissolution. Whether it's carbonating beer or soft drinks, controlling the original wort by adding degassed water, or incorporating flavors and additives - precise measurement technology, intelligent control algorithms, and reliable inline analysis are crucial for success.



Concepts

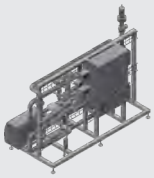
corosys offers its production lines for soft drinks, beer mixtures, RTD cocktails, hard seltzers, and more under the name Corobev. A Corobev production line includes various products such as the Additive Dosage System (ADS) and the Carbonation Control System (CCS). These can be customized and coordinated to create tailor-made systems with flexibility and expandability. Inline production with Corobev allows for a reduction in storage capacity, setup times, and cleaning efforts while increasing flexibility.

Corobev is supported by complementary equipment such as sugar dissolvers, CIP (Clean-in-Place) systems, water degassing systems, and solutions for media storage, such as sugar syrup and citric acid in tanks, including tank truck acceptance.

We also offer suitable automation solutions to ensure that the product consistently leaves the system according to recipe specifications. If you already have an automated system in place, we provide our control modules for integration.

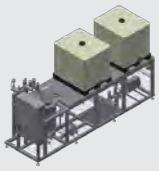
These systems are also applied in other applications. Carbonators, blenders, and dosing systems, for instance, are vital components of beer filtration lines (further information on beer filtration on page 67).

BLENDING & CARBONATION BCS



More on page 47

ADDITIVE DOSAGE SYSTEM ADS

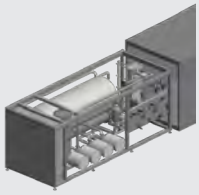


More on page 48

DISSOLVING, MIXING AND DOSING TANKS MDS

More on page 50

COROBEV COMPACT



More on page 52

SUGAR DISSOLVER SDS

More on page 53

BLENDING & CARBONATION BCS

Continuous Blending and Carbonation

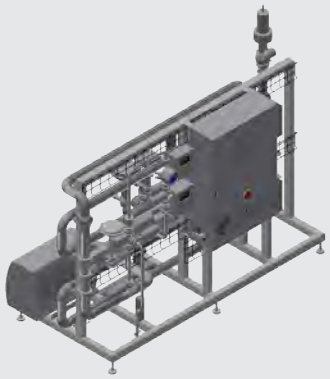
BCS, or Blending and Carbonation System, continuously and precisely controls the wort, alcohol, and CO_2 content of beer through the precise dosing of degassed water and CO_2. This system stands out for its highly accurate and reliable analysis technology and precise control algorithms. The corosys Gas Injector GDI ensures that the dosed CO_2 is finely dispersed into tiny bubbles during carbonation, ensuring reliable dissolution.

How does the BCS work?

The flow rates of beer and water are measured by inductive flow meters at the system‘s inlet. Two parallel control valves of different sizes adjust the flow of degassed water proportionally to the beer flow rate. Additional components such as flavor or syrup can be dosed immediately after. The centrifugal pump then transports the beer or beer-based beverage through the dissolution section to the pressure tank, ensuring thorough mixing. The corosys developed Gas Injector GDI introduces CO_2 to the beer, breaking it into tiny bubbles and ensuring rapid and complete dissolution within the carbonation hold section. This can be monitored through a sight glass at the end of the dissolution section. The beer monitor positioned at the system‘s outlet continuously measures in-line wort, alcohol, and CO_2. A control algorithm continuously adjusts the blending and carbonation ratio.

Why Choose BCS?

- **High Precision:** Achieve perfect wort, alcohol, and CO_2 content through the finely tuned interplay of control valves, precise inline measurement technology, and our control algorithms.
- **Wide Range:** Specially designed control valves and our Dual-Dose control algorithm enable exceptionally large dosing ranges.
- **Gas Injector:** Our highly efficient CO_2 injector, GDI, minimizes pressure loss and guarantees complete CO_2 dissolution without static mixers.
- **Energy Efficiency:** The FLOW ADAPT algorithm adjusts production flow to the buffer tank level, saving energy and reducing CO_2 consumption.
- **Easy Integration:** The system comes pre-assembled, pre-wired, and tested. It offers intuitive control with the corosys compass, or it can be fully integrated into your process control system.
- **Remote Access:** With our Smart Machine data acquisition system, you can access operational data and reports from anywhere.



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Capacities from 25 to 1,750 hl/h to match your production needs

CO_2 and water dosing tailored to your recipes

Use of custom components and brands

Individual design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

With or without Blending	Nitrogen dosing
Oxygen measurement	UV system

PERFECT COMBINATION WITH OUR SOLUTIONS

Integrate our Additive Dosage System (Page 48) to dose additives such as colored beer or hop extract directly into the BCS.

IN USE WITH THE FOLLOWING CUSTOMERS

Einsiedler®

BREWING CO. TWO ROADS COMPANY

corosys beverage technology GmbH & Co. KG | Hessenstraße 23 | D-65719 Hofheim am Taunus | bbt.corosys.com | Tel.: +49 (0) 61 22 / 70 75 - 0

MIXING & DESOLVING

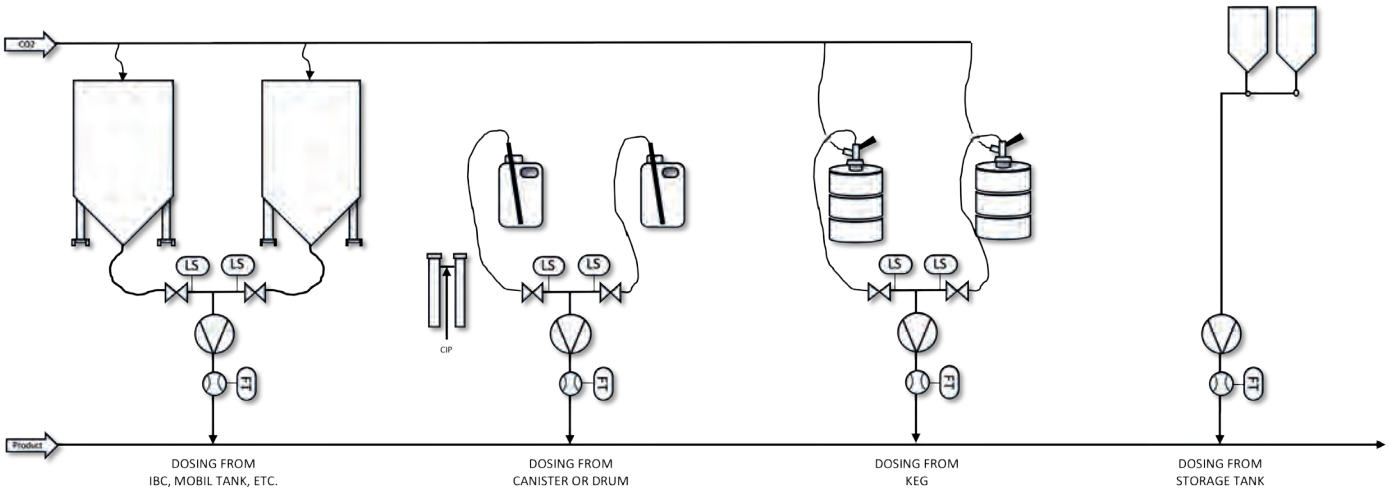
ADDITIVE DOSING SYSTEM ADS

Customized and Inline Dosing

The dosing system, known as the ADS (Additive Dosing System), ensures continuous and precise addition of basic ingredients such as syrup, roasted malt beer, hop products, flavors, enzymes, and other additives to beer, wort, and various beverages. The respective additive can be taken from various containers such as containers, cans, IBCs, barrels, or other packages, depending on the requirement. Additionally, the container can be inertized with protective gases like CO_2 or nitrogen to prevent unwanted oxygen contamination of the final product. These additive dosing systems are especially used in breweries for the production of beer mixed drinks. Using our inline additive dosing provides maximum flexibility in production right up to the bottling process. The system is characterized by highly precise and reliable measuring technology for volume and mass flow as well as precise control algorithms.

How does the ADS work?

Optionally, the component to be dosed can be homogenized in its transport container by connecting a gas hose to the outlet and mixing the contents by introducing CO_2 or nitrogen. The container is then connected directly to the dosing device, making transfer unnecessary. The gas hose is fixed at the top connection so that the content is charged with CO_2 or nitrogen when removed. This



step is crucial to prevent the ingress of atmospheric oxygen, which in turn contributes to microbiological safety. The dosing hose is attached to the outlet. When using a suction lance, the container is placed on a slightly inclined surface, and the suction lance is inserted through the opening. A special lance holder ensures that neither the lance nor the container tips over, even when the canister is empty.

During production, the volume flow of the product to which the component is to be dosed is recorded at the inlet of the system

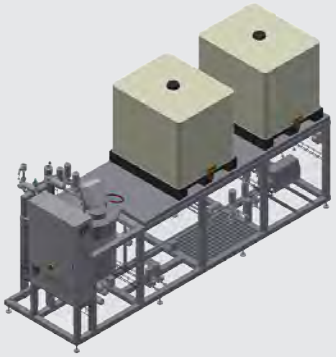
using an inductive flowmeter. The system then doses according to the product flow and the dosing ratio specified by the recipe, be it roasted malt beer, hop products, flavors, syrup, or enzymes. This is done using frequency-controlled hygienic dosing pumps or control valves. Depending on customer requirements, the flows can be recorded and controlled using volume or mass flow meters.

To produce beer mixed drinks and soft drinks, various components, including water, simple syrup, basic ingredients, and flavors, can be continuously and in real-time added to the beer or water. There is no limit to the number of components that can be dosed, enhancing product diversity and production flexibility. Alternatively, batch pre-mixing a finished syrup in a mixing tank, followed by continuous dosing into the beer flow, is possible, especially advantageous for larger production quantities.

Continuous dosing significantly increases flexibility for variety changes and batch size adjustments, allowing production to be halted at any time to respond to new requirements or recipes. Post-production, the entire dosing system is rinsed with water and cleaned as part of the regular CIP system cleaning, minimizing product losses and swiftly preparing the system for the next production. This represents a clear economic advantage, particularly in the food and beverage industry.

Why should you choose the ADS?

- **Continuous dosing:** Due to continuous dosing, changing varieties is possible at any time and quickly.
- **Perfectly regulated:** The integral dosing algorithm (IDA) ensures a perfectly mixed product and autonomously compensates for fluctuations in the shortest time.
- **Customized to your needs:** Every dosing task is individual. Therefore, each ADS is tailored to your product, your recipe, and your packaging.
- **Easy integration:** The system comes pre-assembled, pre-wired, and tested.
- **Fully automated operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Everywhere in view:** With our Smart Machine operational data acquisition, you have access to operational data and reports from anywhere.



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Individual dosing capacity from 1 L/h (smaller on request)

Adaptation to the dosed medium

Adapters suitable for the container, or alternative with suction lance

Use of customer-specific components and brands

Individual design and sizing according to your specific needs.

OPTIONS FOR YOUR REQUIREMENTS

Inline analysis

Frame for containers

PERFECT COMBINATION WITH OUR SOLUTIONS

BCS for subsequent dilution and carbonation (Page 47).

IN USE WITH THE FOLLOWING CUSTOMERS

SEIT 1870 BINDING DAS FRANKFURTER ORIGINAL

SOUTHERN TIER BREWING CO

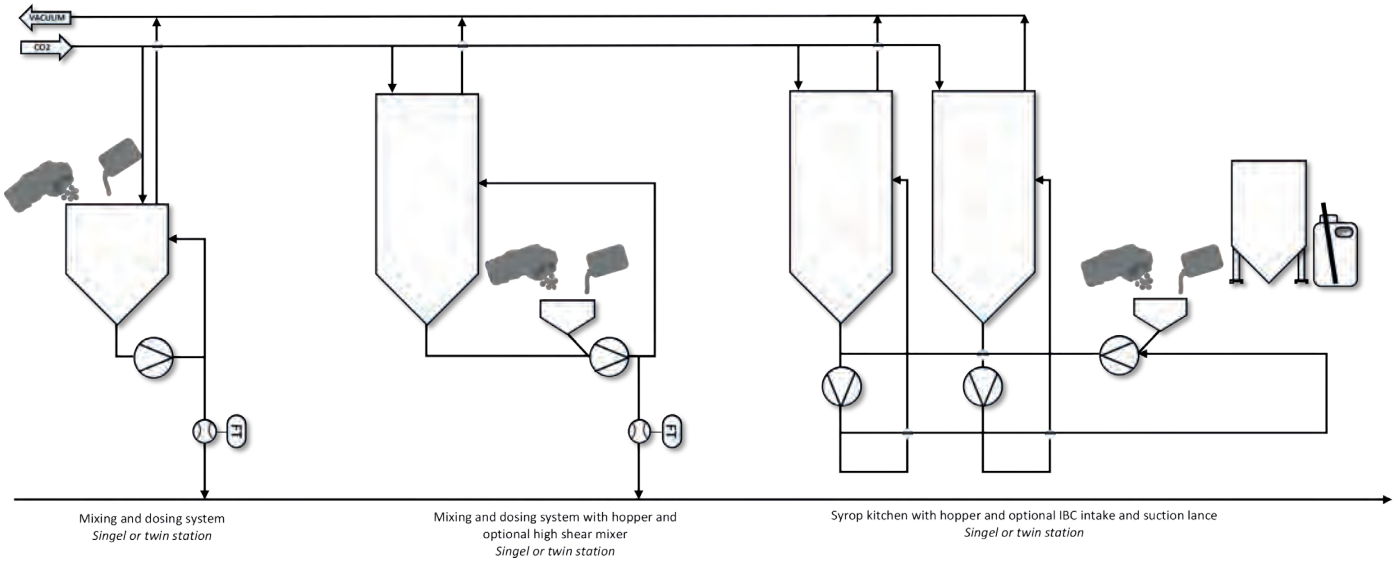
DISSOLVING, MIXING AND DOSING TANKS MDS

For the Optimal Solution

When a beverage contains powdery ingredients, they usually need to be dissolved first before they can be dosed inline. This dissolution process typically takes place in mixing containers that are filled with degassed water. Even if a multitude of individual substances need to be dosed, the number of dosing points can be reduced by mixing several components beforehand and dosing them together. In the simplest case, all components are mixed together and then diluted with water as a concentrate.

Our dosing is characterized by precise measurement technology and our integrated dosing algorithm IDA. This allows for immediate compensation of fluctuations and ensures consistently high product quality.

Single, Dual, or Multiple Tank Variants



In the **basic single tank design**, there is a primary tank where all the components are introduced, mixed, and dissolved for a consistent solution. This simplicity allows for a straightforward process where, once the components are blended, the mixture is extracted and dosed as required. When the contents of the tank are depleted, there are two potential next steps: beginning a new mixing batch or initiating a thorough cleaning process to maintain hygiene and quality standards.

The **dual tank system** offers greater flexibility, which is especially beneficial for high-production industries. In this configuration, one tank doses mixed components while the second tank is prepared for the next batch. This dual-process ensures a seamless switch to the second tank without significant downtime when the first is emptied. The first tank can then be refilled or cleaned for another cycle, achieving near-continuous operation and optimizing production timelines.

For even larger-scale operations, we offer the **multi-tank variant**. This system can incorporate multiple tanks, based on production requirement. The beauty of this design is its modular nature; industries can seamlessly and safely combine any number of tanks, ensuring there‘s no disruption in the dosing process. Each tank operates independently—each can be filled, emptied, or cleaned without affecting the operation of the other tanks. An example application of this setup is the creation of a ‚syrup room‘, where different tanks can hold various syrup solutions, ready to be dosed as required.

Our diverse range of mixing and dosing system designs ensures that our solutions cater to industries of all sizes, from boutique manufacturers to large-scale production houses. This guarantees efficiency, quality, and reliability in the production process.

Addition of Components in Every Size

Depending on the size of the tank and the container, there are various ways to introduce the components into the mixing tank. In

smaller tanks, this is usually done through a manhole. For larger tanks, this can be done through a suction nozzle at ground level in the circulation line, reducing the need for elaborate platforms. The feed can be either manual in all variants, via Big-Bag stations, or by bulk material conveyance from a silo. Powder detectors promptly close the inlet opening and prevent the ingress of oxygen. Additionally, it's possible to introduce liquid ingredients into the mixing tank in the same manner. Furthermore, containers like IBCs can be emptied, and suction lances can be used to dose components from canisters and barrels.

Stirred or Shaken

Each substance has unique properties, requiring different mixing methods. Circulating the tank's content with our mixing nozzle is generally sufficient. The tempering module can also heat the solution, enhancing the solubility of substances like ascorbic acid. Shear pumps aid in mixing substances that are challenging to dissolve.

Degassing

Mixing processes often introduce oxygen. While oxygen uptake is inevitable, we mitigate it through special input methods such as a suction nozzle or pump. We've applied water degassing principles to the mixing system. Using a vacuum and a special distribution nozzle, the solution is optimally degassed. Additionally, mixing tanks are overlaid with an inert gas like CO_2 to enhance quality and microbiological safety.

Why Choose MDS?

- **Flexible:** The mixing tank allows ingredients to be dosed in a wide range and dosage range. This is an advantage for special fillings and pilot productions, for example.
- **One for all:** Mixing and dissolving takes place directly in the tank from which dosing also takes place. There is no need for an additional mixing and dissolving tank.
- **Best solution:** By individually selecting the mixing process, we ensure a homogeneous and fast solution and mixing.
- **High quality:** Our degassing option removes unwanted oxygen from the mixing tank.
- **Perfectly controlled:** The integral dosage algorithm IDA ensures perfectly mixed product and compensates for fluctuations.
- **Easy Integration:** The system comes pre-assembled, pre-wired, and tested.
- **Fully Automated Operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Always Informed:** With our Smart Machine operational data acquisition, you can access operational data and reports from anywhere.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

Individual dosing flow from 1 L/h (smaller flows available upon request)

Individual tank size and number

Adaptation of the mixing technology to the medium to be dosed

Use of customer-specific components and brands

Custom design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Inline analysis with control

Big Bag Station

PERFECT COMBINATION WITH OUR SOLUTIONS

Use of the BCS for subsequent dilution and carbonation.

In the COROBEV COMPACT (page 52), you can blend ready-made syrups prepared in the mixing tank inline before the filler.

IN USE WITH THE FOLLOWING CUSTOMERS

Fürstenberg BIERKULTUR SEIT 1283

NEW BELGIUM BREWING

MIXING & DESOLVING

COROBEV COMPACT

Mixing System for Soft Drinks & Beer Mixtures

The COROBEV COMPACT mixing system excels in the continuous and precise production of carbonated beverages directly before the filler. It can also optionally dose beer or other ingredients. This system combines degassing, mixing, cooling, and carbonation in a space-saving unit with container dimensions.

The COROBEV COMPACT boasts flexible production capabilities with a performance range spanning 40% to 100% for the entire range of soft drinks. Precise measurement technology and automatic control ensure product quality.

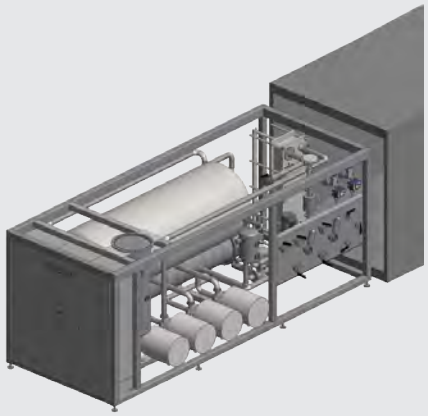
How Does the COROBEV COMPACT Work?

The COROBEV COMPACT operation involves degassing water to low oxygen levels, continuous mixing with syrup, and optionally additional ingredients. A centrifugal pump ensures optimal mixing, and the product can be cooled to the desired temperature.

Precise carbonation is achieved using the Gas Injector GDI, and quality parameters such as CO_2 content and Brix are monitored at the outlet of the buffer tank. Only products that meet the quality requirements are filled.

Why should you choose the COROBEV COMPACT?

- **Compact and Quick to Start:** All essential process steps, including water degassing, syrup dosing, inline carbonation, buffering, and distribution to the filler, are seamlessly integrated into a compact unit with container dimensions.
- **Lowest Oxygen Levels:** Thanks to the thorough corosys water degassing, residual oxygen levels are reduced to below 10 ppb—up to 100 times lower than comparable systems.
- **Reduced CO_2 Requirement:** By recycling CO_2 from the buffer tank for carbonation, the CO_2 demand is significantly reduced.
- **Perfectly Regulated:** The Integral Dosage Algorithm IDA ensures a perfectly mixed product and autonomously compensates for variations in the shortest time.
- **Gas Injector:** Our highly efficient CO_2 injector GDI has low pressure loss and ensures complete CO_2 dissolution, all without static mixers.
- **Easy Integration:** The system comes pre-assembled, pre-wired, and tested.
- **Fully Automated Operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Always Informed:** With our Smart Machine operational data acquisition, you can access operational data and reports from anywhere.



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Capacities from 25 to 1,000 hl/h for perfect coordination with your filler

Use of customer-specific components and brands

Individual design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Additional dosing points	Lantern for sirup
Vacuum degassing	Nitrogen dosing
Oxygen measurement	UV system for water
Cooler for product	

PERFECT COMBINATION WITH OUR SOLUTIONS

Using our dissolution and mixing tanks (Page 50), you produce the finished syrup.

Additional components can be dosed inline via an ADS (Page 48).

SUGAR DISSOLVER SDS

Efficient and Precise Sugar Dissolving

The corosys sugar dissolver efficiently dissolves crystalline sugar, enabling liquid sugar production. This liquid sugar can be further processed in the syrup room alongside other ingredients for finished syrup or dosed directly into an inline mixing system.

It plays a crucial role in the production of non-alcoholic beverages like soft drinks, juices, and blends, as well as in breweries, where it‘s used in wort or beer-based mixed drinks.

The sugar dissolver can be customized for various needs and conditions, offering continuous or batch options and cold or hot dissolving methods. It‘s capable of dissolving different sugar types beyond sucrose. Optionally, the syrup can undergo filtration for microbiological stability and treatment through heating or UV systems.

How Does the SDS Work?

Granulated sugar is supplied in various packaging options. For large processing quantities, it can be delivered in silo vehicles and conveyed into silos before reaching the sugar dissolver via conveyors or pneumatic systems. Smaller capacities often involve handling bagged sugar, with 50 kg bags manually emptied into a hopper. Alternatively, large big bags can be deposited using an unloading station equipped with a crane. The sugar can be delivered to the dissolving tank via a conveyor or dissolved directly inline with warm water using a pump.
The sugar is dissolved in batches with warm water, with temperature control achieved through an integrated heater.

Why Choose the SDS?

- **Effective:** The finely tuned interplay of control valves, precise inline measuring technology, and our control algorithms ensures the perfect adjustment of original extract, alcohol, and CO_2 content.
- **High Precision Production:** Precise adjustment of Brix value in liquid sugar with the help of an inline refractometer.
- **Batch or Continuous:** Depending on your preference, we can offer our sugar dissolvers for batch or continuous operation.
- **Hot or Cold:** Our sugar dissolvers are available as either hot or cold dissolvers.
- **Energy Efficiency:** High heat recovery in continuous hot dissolvers.
- **Easy Integration:** The system is pre-assembled, pre-wired, and tested for easy integration.
- **Fully Automated Operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Always Informed:** With our Smart Machine operational data acquisition, you can access operational data and reports from anywhere.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

Capacities from 25 to 1,750 hl/h for perfect coordination with your filler

Adaptation to the packaging of crystalline sugar

Use of customer-specific components and brands

Individual design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Big Bag Station	Conveying system for granulated sugar and silo vehicle reception
Inline refractometer	UV system

PERFECT COMBINATION WITH OUR SOLUTIONS

Continuously dose the sugar into your product using the Additive Dosing System ADS (Page 48).

Pasteurize the sugar syrup using our flash pasteurizing system FPS (Page 56).

IN USE WITH THE FOLLOWING CUSTOMERS

Freistädter Bier

Baumgartner – Der reife Hochgenuss!

PASTEURIZATION & TEMPERING

PRODUCT CATEGORIES

FLASH PASTEURIZER

WORT STERILIZATION

TEMPERATURE CONTROL SYSTEMS

PASTEURIZATION & TEMPERING

Pasteurization, Sterilization, and Tempering

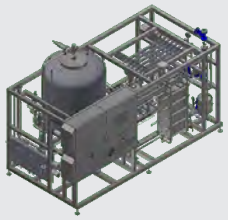
The thermal treatment of beverages is an essential part of extending their microbiological shelf life. Product safety, while minimizing quality loss due to heat input, is a top priority in pasteurization. Our Short-Time Heating System (FPS) offers both to our customers, along with easy operation, recipe management, and highly precise control algorithms.

The unspoken currency of pasteurization is the so-called pasteurization unit, which measures the pasteurization effect. Our systems regulate with high precision and recipe-based control to the parameters specified by the customer. The incoming beer is preheated via a regenerative heat exchanger and brought to the desired holding temperature using hot water in a secondary circuit. This resulting holding time can also be individually chosen by the customer for the product‘s process. Yeast propagation requires sterile wort, which is achieved efficiently and continuously with our Wort Sterilizer CWS. Similar to short-time heating, the wort is regeneratively heated and then heated to temperatures of up to 110 °C using steam or hot water. Our product coolers ensure rapid and efficient cooling after pasteurization, either as part of the overall FPS concept or as standalone systems, for example, used as young beer coolers to reduce long cooling times before bottling in the brewing process, or as wort coolers in conjunction with our Wort Aeration CWA. Cooling media can include various refrigerants, such as glycol or ammonia. In all temperature control processes, whether pasteurizing, sterilizing, cooling, or preheating, leak-tightness of the cooling or heating medium is important, along with precise and stable control. A pressure gradient from the product to the medium ensures absolute safety, which is regulated and monitored as needed.

Did you know?

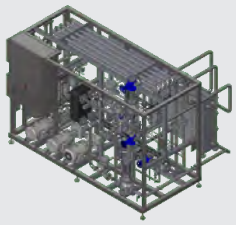
The basis for the pasteurization unit (PU) is the D-value and the z-value. The D-value represents the time needed to reduce the number of microorganisms by a factor of 10 at a specific temperature. The z-value, on the other hand, is the required temperature increase to reduce the D-value by a factor of 10. The z-value thus characterizes the dying behavior of microorganisms depending on temperature and time and is therefore part of the PU formula. However, the z-value is not only dependent on temperature but also on the medium and varies for each microorganism. Therefore, an average value is used in short-time heaters.

FLASH PASTEURIZER FPS



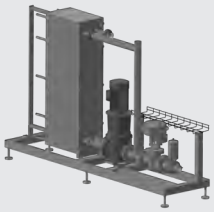
More on page 56

WORT STERILIZATION CWS



More on page 57

TEMPERATURE CONTROL SYSTEMS



More on page 58

PASTEURIZATION & TEMPERING

FLASH PASTEURIZER FPS

The FPS: Gentle Pasteurization and High Efficiency

Our flash pasteurizer system (FPS) short-time heating system gently pasteurizes beer, beer mixed drinks, and carbonated soft drinks. The product is heated regeneratively, brought to pasteurization temperature through a hot water line, then passes through the holding section and is regeneratively cooled, optionally with glycol or ammonia. The required pasteurization unit is precisely maintained without negatively affecting quality characteristics such as color and taste. Additionally, our system is characterized by high operational safety and an impressive heat recovery of up to 96%.

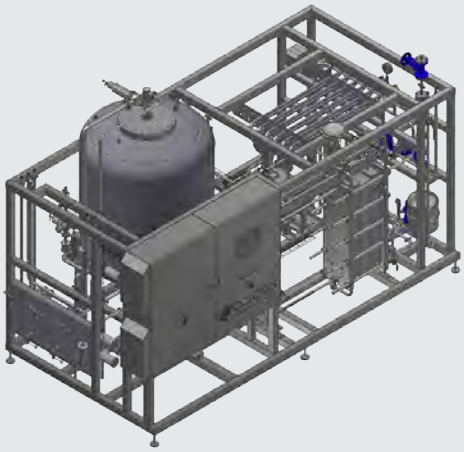
How does the FPS work?

In the FPS short-time heating system, pasteurization is carried out precisely and gently. The product is heated regeneratively and brought to pasteurization temperature. Control of flow and temperature ensures compliance with pasteurization units. After the holding section, regenerative cooling is performed using glycol or ammonia.
The pump configuration is crucial. Two pumps in series at the inlet maintain the product pressure above saturation pressure at pasteurization temperature, keeping CO_2 within the product. A third pump between regeneration and heating prevents the pressure in the pasteurized product from being lower than in the non-pasteurized product to avoid contamination.

During shutdown, controlled emptying with degassed water through media separation is performed based on volume or conductivity. Restart: degassed water is pushed out with the product, maintaining microbiological stability and product quality.

Why should you choose the FPS?

- **Product-friendly:** Heating is done as gently as possible due to a small temperature difference with the heating medium.
- **Stable control:** The PU.F.T controller algorithm ensures stable PU values.
- **High heat recovery:** Regenerative heating allows up to 96% heat recovery, saving both heating and cooling energy.
- **Wide performance range:** Compliance with all pasteurization parameters in a wide flow range from 40% to 100% of rated capacity.
- **Energy efficiency:** Thanks to the FLOW ADAPT algorithm, the system's performance adapts to the fill level in the buffer tank, saving energy, CO_2, and product losses.
- **Easy integration:** The system is pre-assembled, pre-wired, and tested.
- **Fully automated operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Everywhere in view:** With our Smart Machine operational data acquisition, you have access to operational data and reports from anywhere.



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Flexible design of pasteurization parameters (PE, holding time, and temperature) according to your requirements

Adaptation to the product to be treated (CO_2 content, solids content, etc.)

Use of customer-specific components and brands

Individual design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Integrated Carbonation system	Integrated Blending
Hot water instead of steam	Lantern in inlet

PERFECT COMBINATION WITH OUR SOLUTIONS

The corosys buffer tank, as an ideal addition, seamlessly yet securely connects the FPS with upstream or downstream processes, such as a filler. (Page 62)

Integrate the FPS into your blending system (Page 47) or a sugar dissolver.

IN USE WITH THE FOLLOWING CUSTOMERS

ROGUE

Kulmbacher Brauerei Aktien-Gesellschaft

PASTEURIZATION & TEMPERING

CONTINUOUS WORT STERILIZATION CWS

Continuous Wort Sterilization (CWS)

Sterile wort is a fundamental requirement for yeast propagation. Typically, wort is heated in a propagation tank and then cooled again for this purpose. Since no heat recovery is possible in this batch process, the demand for heating and cooling energy is enormous. Through the continuous process in Wort Sterilization CWS, up to 96% of the heat can be recovered.

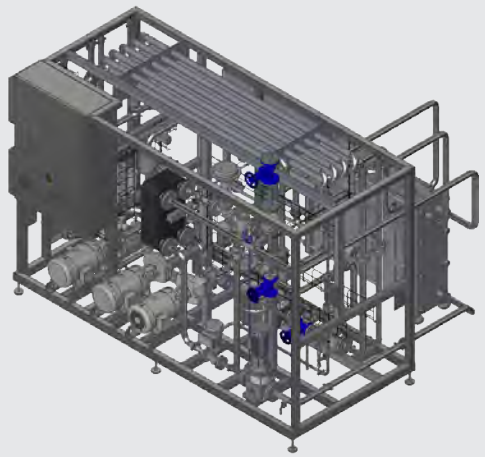
How does CWS work?

The wort to be sterilized is first heated regeneratively and then with steam or hot water to the sterilization temperature. Flow and temperature are regulated depending on each other to maintain constant conditions according to the specifications. After passing through the hot-holding section, the wort is regenerated and optionally cooled with the help of a coolant.

The pressure increase pump between regeneration and heater ensures that the pressure in the sterilized product is always higher than in the non-sterilized product, preventing contamination in case of leakage. During plant shutdown, a controlled product discharge is carried out with degassed water using media separation based on volume or conductivity. When the plant goes back into production, the degassed water is pushed out with wort.

Why should you choose CWS?

- **Gentle on the product:** The heating is carried out as gently as possible due to the low temperature difference to the heating medium.
- **Safe process:** A pressure gradient and double-seated valves with balancers ensure that untreated wort does not enter the sterilized product.
- **Stable control:** Precisely set sterilization temperature.
- **High heat recovery**: Up to 96% of the heat can be recovered through regenerative heating, saving both heating and cooling energy.
- **Easy integration:** The system is pre-assembled, pre-wired, and tested.
- **Fully automated operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Everywhere in view:** With our Smart Machine operational data acquisition, you have access to operational data and reports from anywhere



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Capacities from 25 to 1,000 hl/h

Adaptation to your desired sterilization temperature and hot holding time

Use of customer-specific components and makes

Individual design and dimensioning according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Chiller

PERFECT COMBINATION WITH OUR SOLUTIONS

The CWS wort sterilization system is the ideal complement to our YMS yeast purification system.
(Page 68)

IN USE WITH THE FOLLOWING CUSTOMERS

Ziemann Holvrieka

PASTEURIZATION & TEMPERING

TEMPERATURE CONTROL SYSTEMS

Precise Temperature Control

At many points in production, the product needs to be temperature controlled. The wort is brought to pitching temperature in the brewhouse. Young beer is cooled during racking, and very cold products are warmed before filling. These are just a few applications of a temperature control system.

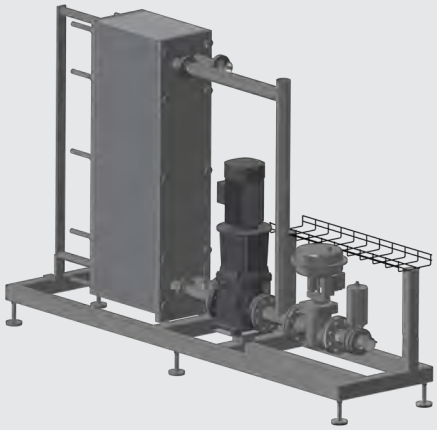
Besides setting the desired temperature, other aspects need to be considered. The heating should be gentle depending on the product, ideally with a minimal temperature difference. When cooling, care must be taken not to freeze the medium. In addition, the selection of the suitable apparatus (tube bundle or plate apparatus) as well as cleanability and maintenance accessibility should also be considered.

How does temperature control work?

Products are quickly and consistently cooled through a plate heat exchanger in counter-current to a refrigerant. The flow rate is controlled by an optional, frequency-controlled pump and a pressure control valve. When using glycol or ammonia as refrigerants, measures such as return mixing or evaporative pressure control are used to prevent freezing. For heating, steam or hot water can be used, with options for gentle heating through secondary circuits or temperature-controlled return mixing.

Why should you choose our temperature control system?

- **Product-friendly:** The heating is as gentle as possible due to a low temperature difference to the heating medium.
- **Freeze protection:** By designing the heat exchanger and setting a coolant temperature above the freezing point, freezing of the product is avoided.
- **High product safety:** A positive pressure gradient prevents the cooling or heating medium from entering the product.
- **Custom design:** The heat exchanger is designed for the product, taking into account its viscosity and the presence of particles.
- **Wide performance range:** Regulation within a wide flow range from 40 – 100 % of the rated performance.
- **Energy saving through multiple stages:** The product can be temperature controlled with various heat/cold carriers, e.g., pre-cooling with cold water.
- **Easy integration:** The system is pre-assembled, pre-wired, and tested.
- **Fully automated operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Everywhere in view:** With our Smart Machine operational data acquisition, you have access to operational data and reports from anywhere



INDIVIDUAL ADAPTATION TO YOUR NEEDS

- Possible nominal flow rates from 5 to 1,800 hl/h
- Adaptation to the product to be tempered (viscosity, solids content, heat capacity, etc.)
- Design according to your heat/cold carriers (steam, hot water, glycol, ammonia, etc.)
- Adaptation to energy recovery, e.g., hot water generation during wort cooling
- Use of customer-specific components and brands
- Individual construction and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Flow Control	Feed pump
Inline sensor for ammonia	Monitoring of the positive pressure gradient
Leak-proof plates (double plates)	

PERFECT COMBINATION WITH OUR SOLUTIONS

- You can integrate our wort chiller between the wort stripper (page 44) and wort aeration (page 69).
- Integrate a young beer cooler into your fermentation cellar TFM (page 61).

TANKS & TANKFARMS

PRODUCT CATEGORIES

TANK FARM MANAGEMENT

BUFFER TANK

DAW TANK

ETHANOL TANK WITH LOADING

TANKS & TANKFARMS

TANKS AND TANK FARMS

In every brewery or beverage production operation are tanks are indispensable. They serve as the workhorses of the industry, playing pivotal roles in various processes, from fermenting and storing beer, to housing critical liquids like hot water or degassed water. Tanks are essential for the efficient operation of the brewery, enabling the storage and distribution of vital ingredients, as well as managing potential safety risks. For example, sugar storage tanks must meet strict criteria for Clean-in-Place (CIP) procedures, ensuring the highest standards of hygiene are maintained. On the other end of the spectrum, there are tanks designed to handle substances with high potential hazards, such as ethanol tanks, which require both explosion-proof and leak-proof features due to their water-endangering properties.

The tank itself, while a core component, is just the beginning of a complex puzzle. Application-specific considerations must be taken into account for each tank. Questions arise about the required pressure levels, the temperature to which the tank must be designed, its vacuum resistance, and whether it should be double-walled or even type-tested. Effective tank cleaning processes are also critical to maintaining the quality and safety of the stored materials.

These questions may seem daunting, but we have answers. We possess the expertise to address these challenges, providing tailored solutions to meet the unique demands of every tank. We understand that every tank has its own set of requirements, and as such, we approach each project with an individualized assessment of the circumstances, ensuring that the tank design is not only fit for purpose but also optimally efficient and safe.

However, the complexity doesn‘t end with the tank itself. What happens around the tank is equally important. How does the medium enter the tank? How is it efficiently distributed within the system? How is it safely extracted from the tank for its intended purpose? Depending on the specific application, we offer a range of concepts that are rooted in the principles of simplicity and flexibility. These concepts ensure that the entire tank farm operates seamlessly, delivering the desired results while maintaining safety and efficiency as paramount concerns.

TANK FARM MANAGMENT TFM

More on page 61

BUFFER TANK

More on page 62

DAW TANK

More on page 63

ETHANOL TANK WITH LOADING

More on page 64

TANK FARM MANAGEMENT TFM

Tank farm management solutions for your brewery

Effective planning of tank farms in breweries is essential, whether for fermentation and storage cellars or pressure tank cellars. Short distances, user-friendly operation, and high flexibility are key considerations. corosys offers customized solutions that not only accommodate the desired level of automation but also integrate technological, design, and ergonomic requirements.

Hose Cellar TFMflex

Our hose cellar module, TFMflex, significantly automates the hose cellar. It handles inflows and discharges, as well as switching to a new tank. This module allows for connecting new tanks during operation and filling and emptying them oxygen-free. With quantity recorded during these processes, tank levels for all tanks are available, even without individual tank level measurements. Tank cleaning is also automatically performed via the CIP rail.

Pipe Fence TFMfence

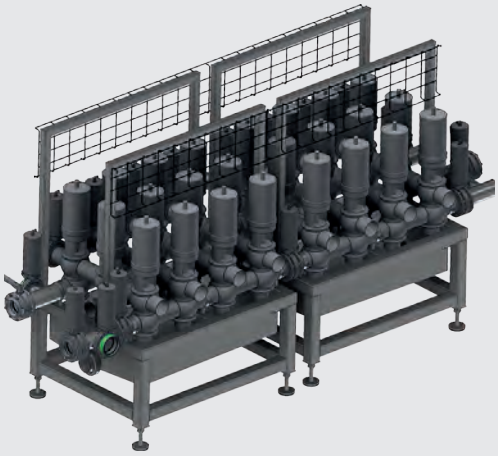
Our pipe fence cellar, TFMfence, builds upon the classic brewery setup, providing a cost-effective, flexible, and user-friendly piping system for your cellar. The TFMfence concept is characterized by well-planned cleaning paths and the elimination of branch lines, such as tank outlet lines.

Valve Node TFMfullauto

Our fully automated cellar, TFMfullauto, utilizes double-seated valves at valve nodes to control material flows. Well-designed piping concepts reduce the number of required valves and ensure pipelines are free from dead spaces.

Why choose TFM?

- **Full Overview:** Even in the lowest automation level, TFMflex, automation extends down to the tank level, providing a comprehensive view of all cellar processes.
- **Well-Designed Piping:** An elegant piping design is crucial in cellar design, saving not only on investment costs but also offering technological advantages.
- **Effective Mixing:** Our mixing system homogenizes tank contents using specially designed Venturi mixing nozzles while preserving product integrity.
- **Easy Integration:** The system is pre-assembled, pre-wired, and tested.
- **Inclusive Automation:** Intuitive control with the corosys compass. Alternatively, the tank farm can be fully integrated into your process control system.
- **Accessible Everywhere**: With our Smart Machine operating data acquisition, you have access to operational data and reports from anywhere.



INDIVIDUAL ADAPTATION TO YOUR NEEDS

- Adaptation to performance and flow needs
- Integration of any number of tanks, with the possibility of expansion
- Customization for individual supply and discharge lines
- Use of customer-specific components and brands
- Individual design and sizing according to your specific needs.

OPTIONS FOR YOUR REQUIREMENTS

- Turbidity measurement
- Tank mixing system
- Tank pressure regulation

PERFECT COMBINATION WITH OUR SOLUTIONS

Supply the beer filtration system from the cellar. (Page 74)

Our CIP systems are individually tailored to your cellar. (Page 71)

TANKS & TANKFARMS

BUFFER TANK

Use of Buffer Tanks in Production

In continuous production chains, buffer tanks are often employed to decouple production steps from one another. This is the case, for example, between inline mixing and the filling process or before and after beer filtration, to protect the filter from fluctuations and pressure surges.

Process steps in the Buffer Tank?

The process begins by displacing air from the cleaned tank from bottom to top using CO_2 to create an oxygen-free atmosphere. After pressurizing the tank to the required level, it is ready for filling. Level measurement allows for the control of processes before or after, ensuring a continuous production flow.

At the end of production, the tank is emptied, and the pressure is released. The CO_2 atmosphere is purged from top to bottom using compressed air. The tank is now ready to be cleaned together with the product line. Optionally, the tank can be sterilized using a steam connection.

Why should you choose the Puffer Tank?

- **High Safety:** The vacuum-tight design and integration into the hot cleaning of the line cleaning achieve a high level of microbiological safety. Optionally, the tank can be steamed.
- **High Product Quality:** Intelligent gas flow management enables effective and CO_2-efficient removal of oxygen.
- **Easy Integration:** The tank and fittings are specially designed for integration into the CIP of the product line, eliminating the need for a separate CIP connection.
- **Simple Installation:** The system is pre-assembled, pre-wired, and tested.
- **Automation Included:** Intuitive control with the corosys compass. Alternatively, the buffer tank can be fully integrated into your process control system.
- **Accessible Everywhere::** With our Smart Machine data acquisition system, you have access to operating data and reports from anywhere.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

Adaptation to buffer volume, buffer time, and required pressure per product

Use of customer-specific components and products

Individual design and dimensioning according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Discharge pump	Leak-proof separation
Flow measurement	CIP connection
Steam connection	Sterile filter for CO_2

PERFECT COMBINATION WITH OUR SOLUTIONS

As a buffer tank after our FPS (Page 56) or mixing system corobev (Page 52), you supply a filler directly.

IN USE WITH THE FOLLOWING CUSTOMERS

Genuss für Leib & Seele
KLOSTER Andechs
SEIT 1455

SOUTHERN TIER BREWING CO.

corosys beverage technology GmbH & Co. KG | Hessenstraße 23 | D-65719 Hofheim am Taunus | bbt.corosys.com | Tel.: +49 (0) 61 22 / 70 75 - 0

DAW TANK

DAW Tank and Distribution

In many areas of a brewery, degassed water is required. Typically, this water is degassed in a central water degassing system and is provided to individual consumers through various supply lines with pressure regulation. Compared to inline degassing at the consumer, central degassing is more efficient and can cover a wide range of performance requirements.

The DAW tank is kept under a CO_2 atmosphere to prevent the absorption of oxygen. Multiple pumps supplied from the DAW tank can be used to establish multiple supply lines for operation. These individual lines are adjusted to the pressures and flows required by the consumers. The pumps are frequency-controlled and ensure a constant pressure in the DAW network. Although multiple consumers are usually supplied through a single line, it is recommended to use a separate pump for pressure-sensitive systems, such as a blending system.

Why should you choose the DAW Tank?

- **High Safety:** A DAW tank can be supplied by two or more redundant degassing systems, ensuring high supply reliability.
- **High Flexibility:** With a tank and various supply lines, a wide range of consumers with different conditions (pressure, flow) can be supplied, regardless of the capacity of the water degassing system.
- **Expandable:** The tank can be expanded with additional supply lines.
- **Easy Integration:** The supply module is pre-assembled, pre-wired, and tested.
- **Automation Included:** Intuitive control with the corosys compass. Alternatively, the tank and supply can be fully integrated into your process control system.
- **Accessible Everywhere:** With our Smart Machine data acquisition system, you have access to operational data and reports from anywhere.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

- Individual tank volume
- Individual number of supply lines with individual pressure and flow
- Use of customer-specific components and brands
- Individual design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

- Swing bend panel
- Double-seat matrix
- Flow measurement

PERFECT COMBINATION WITH OUR SOLUTIONS

Complete our water degassing system (Page 30) with a DAW tank and distribution.

IN USE WITH THE FOLLOWING CUSTOMERS

Würzburger Hofbräu

Oskar Blues Brewery

TANKS & TANKFARMS

ETHANOL TANK WITH LOADING

Buffer Tanks and Ethanol Tank with TKW Loading

Ethanol produced during dealcoholization can either be discarded or captured for resale. The latter option is more effective and environmentally friendly. For this, a special storage tank and a TKW loading station are required. However, there are several considerations to keep in mind. Due to the risk of explosions, all components must be explosion-proof in accordance with the ATEX directive.

How does the loading process work?

At the loading station, the loading hose and the gas pendulum hose are connected to the TKW, and the TKW‘s overfill protection is engaged. Additionally, the TKW is grounded using an earthing clamp, which is ensured by a monitoring device. After approval from a brewery employee, the TKW driver can pre-select the loading quantity and initiate the loading process from an explosion-proof control panel.
Depending on the retention device, a dead man‘s switch must be activated every few minutes to prevent ethanol from leaking into the environment. At the end of the loading process, the loading valve is gradually closed to achieve the pre-selected quantity accurately. The hoses, overfill protection, and grounding clamp can now be disconnected.

Why choose the Ethanol Tank with TKW Loading?

- **Environmentally Safe:** An ethanol tank falls under the WHG (German Water Resources Act), leading to various requirements that have been taken into account in our tank design.
- **Calibrated Loading:** Loading can be calibrated to meet customs requirements.
- **Our Expertise:** Benefit from our experience in explosion safety and WHG compliance as a specialized business under §62 AwSV (German Federal Water Resources Act).
- **Easy Integration:** The loading module is pre-assembled, partially pre-wired, and tested.
- **Automation Included:** Intuitive control with the corosys compass. Alternatively, the tank and supply can be fully integrated into your process control system.
- **Accessible Everywhere:** With our Smart Machine data acquisition system, you can access operational data and reports from anywhere.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

- Individual tank volume
- Any number of tanks
- Adapter for each tanker connection
- Use of customer-specific components and brands
- Individual design and dimensioning according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

- Calibratable version
- Leakage monitoring
- Double-walled tank

PERFECT COMBINATION WITH OUR SOLUTIONS

Our ethanol tank complements the dealcoholization (Page 40) to collect the ethanol produced

IN USE WITH THE FOLLOWING CUSTOMERS

Störtebeker BRAUMANUFAKTUR

SPEZIALBIER-BRAUEREI FORST BIRRA · BIÈRE · BEER · BIER

YEAST MANAGEMENT

PRODUCT CATEGORIES

YEAST PROPAGATION & PITCHING

YEAST AUTOLYSER

CONTINUOUS WORT AERATION

YEAST MANAGEMENT

Optimizing Yeast Management for Quality Brews

Yeast, as the brewer‘s most essential tool, bears immense responsibility for the quality of the end product. To ensure that yeast can consistently deliver excellent fermentation results, an efficient yeast management system is crucial.

These systems play a key role in maintaining yeast in a constant and physiologically optimal state. In today‘s time, many breweries use a variety of yeast strains. One significant advantage of such systems is their modular structure, allowing for easy capacity expansion. Moreover, various components can be integrated into the system to support yeast to the fullest.

A wort sterilizer ensures the quality of the initial substrate by ensuring it is free from unwanted microorganisms. Spent yeast can be inactivated using a yeast autolysis system before reutilization to optimize the processes. To prevent any contamination of the yeast management system, it is recommended to use a dedicated one-tank CIP (Clean-in-Place) system for cleaning the yeast tanks.

Precise and real-time yeast monitoring is achieved through the measurement of yeast viability and vitality using specialized in-line measurement technology. In addition to full automation control, these systems offer the possibility to seamlessly integrate them into existing monitoring software or intelligent machine solutions, ensuring continuous data collection and process monitoring around the clock.

Flexibility is a primary focus in the development of yeast management systems. If you have a unique concept for yeast management and wish to implement it into a tailored solution, we are ready to assist you. Our goal is to ensure that your brewery achieves the highest yeast quality and optimally designs your production processes.

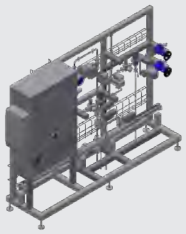
YEAST MANAGEMENT

More on page 67

YEAST AUTOLYSATOR

More on page 68

CONTINUOUS WORT AERATION



More on page 69

YEAST MANAGEMENT SYSTEM YMS

Propagation, Harvest, and Continuous Yeast Multiplication

The key component for producing high-quality beer is pure and vital yeast. Our yeast management system combines all processes to ensure optimal conditions for yeast.
Thanks to closed process control and adherence to the highest hygienic standards in our facility, we ensure maximum microbiological safety and prevent the intrusion of foreign organisms. The automated propagation operation ensures a consistently high quality of our yeast.

How does the YMS work?

In the cylindrical-conical propagation tank, wort is multiplied under strictly sterile conditions with yeast from the Carlsberg flask, with intensive aeration ensuring high vitality. This is achieved using corosys's gas injection technology, which efficiently mixes the yeast.

Once the yeast has multiplied its cell count tenfold, wort is added again. Upon request, the process can be used for continuous yeast multiplication to obtain particularly vital yeast strains.

Our harvested yeast is treated gently, cooled, and freed from excess CO_2 to enhance product quality. All components are designed to minimize mechanical stress on the yeast.

Why Choose the YMS?

- **High Flexibility:** Due to the modular structure comprising equivalent sections, all tanks can perform all tasks, and the system is easily expandable.
- **Multiple Yeast Strains:** Since all modules have identical setups and all functions, several yeast strains can be used simultaneously in a single system.
- **Gentle and Hygienic:** Each tank is equipped with a circulation line for aeration, which is particularly gentle and saves tank fittings.
- **Vital Harvested Yeast:** Automatic aeration and special distribution remove CO_2 from harvested yeast, ensuring vitality.
- **Easy Integration:** The system comes pre-assembled, pre-wired, and tested.
- **Fully Automated Operation:** Intuitive control with the corosy's compass. Alternatively, the system can be fully integrated into your process control system.
- **Always Informed:** With our Smart Machine operational data capture, you have access to operational data and reports from anywhere.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

- Desired Pitching Quantity
- Number of Different Strains
- Connection of Multiple Wort Lines
- Use of Custom Components and Brands
- Custom Design and Sizing to Suit Your Specific needs

OPTIONS FOR YOUR REQUIREMENTS

- Inline Sensor
- Cooling

PERFECT COMBINATION WITH OUR SOLUTIONS

- Yeast Autolysis YAS for Spent Yeast
- Secure Pure Culture with the Energy-Efficient Wort Sterilizer CWS (Page 57)
- Recovery of yeast beer with the CMF (Page 77)

YEAST MANAGEMENT

YEAST AUTOLYSATION SYSTEM YAS

Inactivation of Yeast Cells

The yeast autolyser is used for the reliable inactivation of yeast cells in spent yeast through heat. This spent yeast can then be resold, for example, as animal feed, creating an additional source of income.

This process is applied in the brewing industry since during the fermentation process in brewing, about 3 to 4 times more yeast is produced than is needed for fermentation. This results in an excess of harvest yeast that needs to be disposed of.

Our system is characterized by the precise maintenance of the heating temperature in conjunction with reliable autolysis of yeast cells. Additionally, we offer suitable solutions, in collaboration with our partner company M&L Consulting, such as cross-flow filtration, for beer recovery from the harvest yeast.

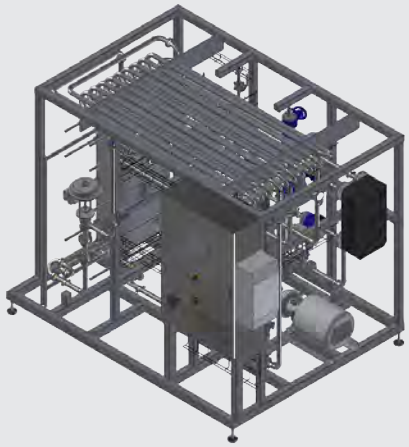
How does the YAS work?

The spent yeast to be autolyzed is first regeneratively heated and then brought to the required pasteurization temperature with steam. To achieve the desired autolysis, the heated spent yeast passes through the hot holding section, where it is maintained at a set temperature for a specified period. After passing through the hot holding section, the spent yeast is regeneratively cooled.

Because the heating of the spent yeast is done gently through a secondary hot water circuit, fouling of the plate heat exchanger is avoided, and valuable components in the product are preserved. The yeast autolysis system has been designed to meet the highest hygiene standards and is compatible with all common cleaning agents used in the beverage industry.

Why should you choose the YAS?

- **Product-Friendly:** Gentle heating is achieved with a minimal temperature difference to the heating medium, ensuring product preservation.
- **Stable Control:** The PU.F.T controller‘s control algorithm ensures stable PE (Pasteurization Equivalent) values.
- **High Heat Recovery:** Regenerative heating allows for the recovery of up to 96% of heat, saving both heating and cooling energy.
- **Easy Integration:** The system comes pre-assembled, pre-wired, and tested for easy integration.
- **Fully Automatic Operation:** Intuitive control with the corosys compass enables effortless operation. Alternatively, the system can be fully integrated into your process control system.
- **Accessible Everywhere:** With our Smart Machine operational data collection, you have access to operational data and reports from anywhere.



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Adaptation to the required capacity

Adaptation to the Dry Matter Content of the spent yeast

Use of customer-specific components and brands

Individual design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Phase Separation

Hot Water instead of steam

PERFECT COMBINATION WITH OUR SOLUTIONS

The yeast autolyser processes spent yeast from our yeast management system YMS (Page 67)

IN USE WITH THE FOLLOWING CUSTOMERS

Ziemann Holvrieka

CONTINUOUS WORT AERATION CWA

Gently aerated with the highest hygienic standard

The wort aeration system continuously and precisely doses sterile air or sterile oxygen into the beer wort. By introducing air in the form of the smallest bubbles, oxygen is optimally provided for the yeast fermentation, achieving a reliable and reproducible fermentation process.

The continuous process is used in the brewing industry between the wort chiller and the fermentation tank during the wort transfer. Wort aeration is characterized by highly accurate and reliable flow measurement technology and precise control algorithms. The corosys gas dispersion injector (GDI) divides the dosed sterile air into the smallest bubbles and maximizes gas dissolution.

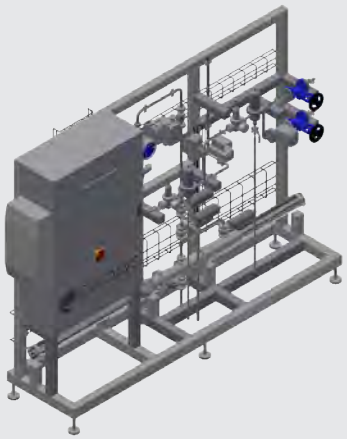
How does the CWA work?

Sterile air or sterile oxygen is supplied to the beer wort via the GDI gas injector developed by corosys. The injector divides the gas into the smallest bubbles and ensures that oxygen is dissolved in sufficient concentration. The wort line between the wort chiller and fermentation tank serves as the solution path. The control of gas dosing is done either with a manual needle valve and a flow indicator or fully automatically proportional to the wort flow with a pneumatic control valve and flow transmitters in the wort and gas lines. The aeration can be monitored and regulated via inline oxygen measurement.

The injector is flushed, sterilized, and cleaned with the wort line as well as the gas path including the sterile filter which is steamed. This can optionally be done fully automatically or manually.

Why should you choose the CWA?

- **High hygienic standard:** The design allows for maximum hygiene and cleanability.
- **Microbiologically safe:** A sterile air filter is included as standard. The gas line can be steamed separately.
- **Gas injector:** Our highly efficient GDI gas injector has a low-pressure loss, is gentle on the wort, and ensures optimal aeration – all without the need for a static mixer.
- **Easy integration:** The system is pre-assembled, pre-wired, and fully tested.
- **Fully automatic operation:** The intuitive control with the corosys compass enables effortless operation. Alternatively, the system can be fully integrated into your process control system.
- **Accessible Everywhere:** With our Smart Machine operational data recording, you have access to operational data and reports from anywhere.



INDIVIDUAL ADAPTATION TO YOUR NEEDS

- Performance from 25 to 1,800 hl/h wort
- Designed for sterile air or oxygen
- Manual, semi-automatic, or fully automatic execution
- Use of customer-specific components and brands
- Individual design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Pre-filter for gas and steam	Additional gas connection
Wort cooler	Oxygen measurement in the outlet

PERFECT COMBINATION WITH OUR SOLUTIONS

- Dose yeast into the wort with our yeast management (page 67)
- Install a wort stripper beforehand to remove DMS (page 44)

IN USE WITH THE FOLLOWING CUSTOMERS

Ziemann Holvrieka

KARBACH BREWING

CLEANING

PRODUCT CATEGORIES

CLEANING IN PLACE (CIP)

CIP CART

CLEANING IN PLACE CIP

Efficient Cleaning and Disinfection with CIP System

The corosys Cleaning In Place (CIP) system enables the cleaning of process plants, tanks, and filling equipment using both hot and cold cleaning agents and additives. Its primary purpose is to eliminate mineral and biological contaminants, production residues, general dirt, and microorganisms. Additionally, it includes a final disinfection and/or sterilization of the equipment components.

CIP cleaning is applied across various industries, including the brewing, beverage, food, chemical-pharmaceutical, and biotechnology sectors. It is essential where automated and reliable cleaning and disinfection of equipment are required. To operate the CIP system safely and economically, we collaborate closely with our customers to customize, size, and deliver it to meet their specific cleaning needs.

How does the CIP work?

Our CIP systems are adaptable, designed for various cleaning tasks with appropriate tanks and automated program sequences. Flow rates are optimized based on the task, with precise control of conductivity, temperature, and flow. We prevent cross-contamination through advanced engineering, ensuring compliance with stringent hygiene standards. Our CIP systems are compatible with common cleaning agents and can include internal cleaning programs and dedicated piping as an option.

Why choose the CIP?

- **Customized and Flexible:** Each system is tailored to your specific needs and can be expanded as required.
- **Program Variety:** We offer a wide range of custom and flexible cleaning cycles to suit your needs.
- **Economical:** Close and customized coordination with the areas to be cleaned allows for significant savings on resources.
- **Internal Cleaning:** Our CIP system not only cleans other equipment but also cleans itself.
- **Safe Cleaning:** Conductivity and temperature measurements in the return flow monitor and log the cleaning process.
- **Hygienic Design:** Even though the CIP system doesn‘t process products itself, we apply the same standards of hygienic design.
- **Easy Integration:** The system comes pre-assembled, pre-wired, and tested.
- **Fully Automated Operation:** User-friendly control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Always Informed:** With our Smart Machine data acquisition, you can access operational data and reports from anywhere.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

- Number and size of media tanks
- Number of cleaning tracks
- Heating medium: steam, hot water, or warm water
- Use of custom components and brands
- Individual design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Heater for hot cleaning	Concentrate dosing stations
Circulation tank for single-use media	Insulation for tanks with hot media

PERFECT COMBINATION WITH OUR SOLUTIONS

Clean the used alkali with a special version of the CMF (page 77) and reduce your chemical consumption.

IN USE WITH THE FOLLOWING CUSTOMERS

CARL JUNG

STONE & WOOD

CLEANING

CLEANING IN PLACE CART

The Mobile CIP Station

In the hose cellar, both production and tank cleaning are carried out using hoses. Mobile pumps are typically used for the CIP return. These pumps are usually simple in design, manually started with a switch, and typically lack dry-run protection. Additionally, the CIP inlet is limited to the spray ball. In contrast, the corosys CIP cart is equipped with a pump that provides dry-run protection and multiple automatically controlled valves for connecting the hoses. Control is wireless via Wi-Fi from either the CIP station‘s control software or the process control system.
With the integrated valves, multiple hoses can be connected simultaneously, allowing for efficient use of multiple CIP pre-runs. This makes it possible to effectively include additional tank connections, such as side connections or hopper lines, in the cleaning process. It‘s also possible to reverse flush the tank outlet.

How does the CIP Cart work?

The CIP cart can be easily moved with its smooth, large rollers and is pushed near the tank to be cleaned. The cart is plugged into the nearest power outlet and connected to power. Hoses are attached and confirmed using a control button on the cart. Feedback monitors which hose connections have been made. The cleaning process starts automatically. The intervals and cleaning program are configured in the CIP system‘s control and transmitted to the cart via Wi-Fi.

Why should you choose the CIP Cart?

- **Individual and flexible:** Designed for individual performance and the number of hose connections.
- **Ease of use:** Connect and start the CIP program. The automation takes care of the rest. Control buttons directly on the CIP cart streamline workflows.
- **Thoroughly clean:** All connections from the spray head, additional inlets and outlets, or hopper lines are periodically flushed, ensuring the cleanliness of all parts.
- **Pump safety:** Dry-run protection extends the pump‘s lifespan.
- **Easy integration:** Pre-assembled, pre-wired, and tested.
- **Fully automatic operation:** Intuitive control with the corosys compass. Alternatively, the system can be fully integrated into your process control system.
- **Always Informed:** With our Smart Machine data acquisition, you have access to operational data and reports from anywhere.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

Performance Flow

Number of hose connections

Use of custom components and brands

Individual design and sizing according to your specific needs

OPTIONS FOR YOUR REQUIREMENTS

Adapters for various hose sizes

PERFECT COMBINATION WITH OUR SOLUTIONS

Utilize the CIP cart together with our CIP system (Page 71).

FILTRATION

PRODUCT CATEGORIES

KIESELGUHR CANDLE FILTER

TRAP FILTER

BEER RECOVERY FROM YEAST

FILTRATION

M&L Consulting
Your filtration specialist

Perfection in Beer Filtration and Beyond

In the world of beer filtration, there is a wealth of technologies and innovations that significantly influence the taste and quality of the end product. M&L Filtration is the key to this pursuit of perfection in beer filtration.

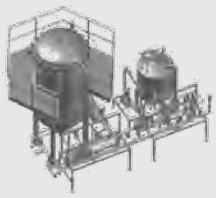
Our longstanding partnership with M&L Consulting in St. Gallen, Switzerland, has proven to be invaluable. They combine the in-depth experience and knowledge needed to develop tailored solutions for beer filtration. We work with our customers to understand the specific needs, whether it‘s for a fully automated filter, a retrofit for existing systems, or innovative processes like yeast recovery - all under the expertise of and collaboration with M&L Filtration.

However, our reach extends beyond beer. We also provide customized filtration solutions for clear beverages and sugar syrup, always under the proven expertise of M&L Filtration. Our common goal is to understand your specific requirements and assist you in finding the best filtration solutions for your business.

Our product range includes not only filter candles but also consumables such as M&L stainless steel filter candles for diatomaceous earth filters, M&L polypropylene filter candles for trap filters, ceramic membranes for beer recovery, and additives like PVPP or ML FISTA - all in close collaboration with M&L Filtration.

Customers can rely on our expertise when it comes to the quality and clarity of your beverages. We take pride in helping you find the best filtration solutions for your business and look forward to a continued successful partnership with M&L Filtration, elevating your beer and beverage filtration to a new level.

KIESELGUHR CANDLE FILTER



More on page 75

TRAP FILTER

More on page 76

BEER RECOVERY FROM YEAST

More on page 77

FILTRATION

KIESELGUHR CANDLE FILTER

Efficient Filtration of Beer Varieties

With the M&L Kieselguhr (diatomaceous) Candle Filter, all beer varieties can be effectively filtered. The result of reliable and cost-efficient filtration is brilliantly clear beers with the lowest levels of turbidity and oxygen. The diatomaceous earth candle filter remains one of the most economical filtration systems and also offers the option of reuse when switching to diatomaceous earth-free, regenerable filter aids.

How M&L Candle Filters Work?

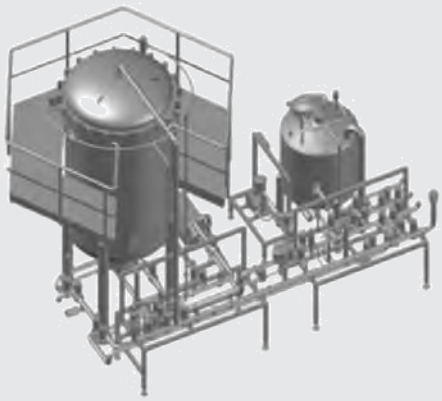
Stainless steel filter candles are used to achieve excellent filtration results. They serve as a support layer for diatomaceous earth and are first pre-coated with coarse diatomaceous earth and then flushed with fine diatomaceous earth. The pre-coating with coarse diatomaceous earth takes 15 minutes and forms the basis for filtration. Oxygen-free water is introduced during the process to establish a stable diatomaceous earth layer on the candles. The second filter layer, consisting of medium and fine diatomaceous earth, is applied in a similar manner and adjusted to specific requirements. After pre-coating, the degassed water, along with unfiltered beer, is pushed out of the filter. This mixture is collected in a pre-run buffer tank and immediately reintroduced into the filtration.

M&L‘s recommended process technology ensures extract losses of less than 0.3%. Throughout the entire filtration process, diatomaceous earth is continuously added to the unfiltered beer at the filter inlet to prevent blockages and rapid pressure increases, enabling longer filtration cycles.

At the end of filtration, the beer is discharged with degassed water. If the original wort in the pressure tank falls below the required value, this mixture is collected in the pre-/post-run buffer tank and reintroduced during the next filtration.

Why Choose M&L Candle Filters?

- **Customized design and sizing** tailored to the required task or filtration performance.
- **M&L‘s newly developed metallic** filter candles are advanced, maintenance-free, and durable. The long, slender design of the filter vessel ensures a reduced volume of the beer-water mixture phase, as well as during product changeovers, significantly minimizing beer loss.
- **Excellent filtration quality** with exceptionally low turbidity levels and absolute cost-efficiency.
- **Short commissioning** times.
- **Simple operation** with easy care requirements and long service life.
- **Reusability** for diatomaceous earth-free filtration.
- **Fully automatic operation** with standard Siemens or Rockwell controls.



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Services ranging from 25 to 1,000 hl/h

Filtration cycles from 150 to > 20,000 hl per filtration, depending on filter size

Matching filter size and filtration performance to the existing variety of brews, working hours, and overall required filtration quantity

Use of components and brands specified by customers

Custom design and sizing tailored to specific needs

Optional remote maintenance and service via a VPN connection

Optional integration of filtration into the process control system

Additionally, the diatomaceous earth candle filter can be expanded with trap filters, buffer tanks, blending and carbonation systems, additive dosings, CIP facilities, and other equipment around the filtration cellar.

IN USE WITH THE FOLLOWING CUSTOMERS

KARBACH BREWING

TRÖEGS INDEPENDENT BREWING

corosys beverage technology GmbH & Co. KG | Hessenstraße 23 | D-65719 Hofheim am Taunus | bbt.corosys.com | Tel.: +49 (0) 61 22 / 70 75 - 0

FILTRATION

TRAP FILTER

Efficient Filtration for Beer and Beverages

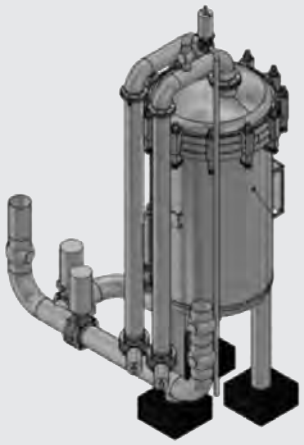
With M&L‘s Trap Filter, all types of beer can be effectively post-filtered, reliably removing diatomaceous earth particles and other filtration residues. The filter is also used in water treatment and sterile filtration in the beer, wine, and beverage industry.

How the Trap Filter Works?

The filter housings, available in various sizes, can be optionally delivered as pre-piped units with all necessary valves and instruments for semi or fully automatic filtration. The customer can specify the housing material and surface finish. When used for the final filtration of beer, the Trap Filter is integrated into the fully automated filtration and cleaning process. It is back-flushed with hot water after filtration, preventing microbial growth and extending the life of the filter candles. M&L‘s Trap Filter candles consist of up to 5 pleated layers of polypropylene support web with decreasing permeability and a highly effective filtration area. Furthermore, the filter candles provide precise and controlled filtration fineness with efficiencies of up to 99.98%. M&L‘s Trap Filter candles meet both European regulations for use in the food industry and FDA requirements. The filter candles are manufactured in a Class 10,000 cleanroom, and all polypropylene components are heat-welded, eliminating the use of adhesives or other binders. M&L filter candles are also available for other filter housings and connections.

Why Choose M&L‘s Trap Filter?

- **The filter candles** are known for their high performance in terms of filtration quality and their attractive cost-effectiveness
- **Excellent filtration quality**, with Trap Filter candles specifically tailored to the given filtration task.
- **Trap Filter in hygienic design** compliant with EHEDG and FDA regulations.
- **Trap Filter as a compact unit**, fully prefabricated.
- **Short start-up** times at the beginning of filtration.
- **Extremely reliable** and cost-efficient.
- **Easy operation**, low maintenance requirements, long service life.



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Performance: 30 - 1,750 hl/h (hectoliters per hour)

Number of Filter Candles: 3 to 56

Filter Fineness: 0.2 - 10 µm absolute as per β - 5000

Candle Length: 10" to 40"

Candle Connection for Housing: Code 7

IN USE WITH THE FOLLOWING CUSTOMERS

KARBACH BREWING

TRÖEGS INDEPENDENT BREWING

corosys beverage technology GmbH & Co. KG | Hessenstraße 23 | D-65719 Hofheim am Taunus | bbt.corosys.com | Tel.: +49 (0) 61 22 / 70 75 - 0

BEER RECOVERY FROM YEAST

CROSS FLOW MEMBRANE FILTRATION (CMF)

Reducing costs while maintaining quality is a crucial balancing act that breweries across all industries must master in the current turbulent economic climate. Rising raw material and energy prices pose a significant challenge.

CROSS FLOW Filtration (CMF) has been introduced as an alternative method for recovering beer from excess yeast produced during the brewing process. Yeast, a byproduct of beer production, typically contains about 10 to 12% dry matter and leads to beer losses ranging from 2 to 3% of the total beer volume produced.

How Beer Recovery Works?

Freshly harvested yeast is collected from fermentation or maturation beer in a yeast batch tank before being processed further in the beer recovery system.
From the yeast batch tank, yeast is transferred to the beer recovery system (Cross-Flow system), where it is thickened in a batch process, reaching up to 20%.
The recovered beer, or filtrate, is collected in a storage tank and continuously dosed during the main-stream filtration.
After passing through the beer recovery system (20% w/w) and drying, the recycled yeast can be sold to the feed or pharmaceutical industries.
Compared to centrifuges and filter presses, yeast membrane filtration is designed to produce the highest-quality permeate (filtrate), including taste and clarity. Additional heat treatment or returning the recovered filtrate to the fermentation/maturing cellar is not necessary, ensuring significantly higher cost-effectiveness.

Why Choose M&L Beer Recovery?

- **High quality** of the recovered extract (beer).
- **High yield in yeast recovery** through specially developed filtration and cleaning processes.
- **Very short payback period** (1 - 2 years, depending on brewery size).
- **Use of** chemically and mechanically robust ceramic membranes.
- **Significantly reduced** water and cleaning agent consumption through targeted process optimization.
- **Minimal need** for operating personnel.
- **High microbiological** safety due to easy cleaning and sterilization with hot water up to 90°C (194°F).
- **Modular**, easy expansion of existing systems.
- **Sterile filtrate** using a 0.2-micron membrane.
- **Low** maintenance costs.

INDIVIDUAL ADAPTATION TO YOUR NEEDS

Specific Performance: >20 l/m2/h (liters per square meter per hour)

Number of Filter Elements: 30 - 55 per module

Filter Unit: 0.2 to 0.6 microns

Candle Length: 1,000 - 1,200 mm

corosys beverage technology GmbH & Co. KG | Hessenstraße 23 | D-65719 Hofheim am Taunus | bbt.corosys.com | Tel.: +49 (0) 61 22 / 70 75 - 0

INSTRUMENTS & COMPONENTS

PRODUCT CATEGORIES

ETHANOL METERING SKID
GAS DISPERSIONS INJECTOR
STATIC MIXER

INSTRUMENT & COMPONENTS

Engineering: Where Innovation Meets Process Perfection“

For us, the “whole is more than the sum of its parts,” and this fundamental concept guides our approach, ensuring this principle always holds true. To achieve this, we emphasize the importance of a deep understanding of processes and the careful selection and harmonization of the right tools and instruments within the overall concept. In the dynamic landscape of industry and technology, it‘s often necessary to make adjustments and optimizations in well-established operations.

As processes and work methods evolve, so does the range of products and services offered by companies. This necessitates the ability to continually and quickly adapt, to make the most of existing equipment and infrastructure. We take pride in our capacity to conduct comprehensive process analyses while collaborating with our customers to develop optimal solutions.

Our strength lies with our robust background in large-scale process engineering, we offer the flexibility to either utilize our pre-existing application instruments, such as our ethanol gauge or gas injector, or engage in a personalized conversation about your specific application requirements. We are ready to work with you to initiate a retrofit for one or more of your existing facilities, whether you need a single sensor or a complete automation solution.

Just like you, we are passionate about charting new courses and exploring uncharted territories. We thrive on innovation and actively seek out opportunities to break away from conventional approaches in order to uncover new and more efficient ways of achieving our goals.

We want the insights and ideas you bring to the table. Your input is invaluable to us, and together, we can continue to push the boundaries of what‘s possible in the ever-evolving landscape of process engineering and technology. We look forward to your contributions to our ongoing journey of discovery and innovation.

ETHANOL METERING SKID

More on page 80

GAS DISPERSION INJECTOR

More on page 81

STATIC MIXER

More on page 82

INSTRUMENTS & COMPONENTS

ETHANOL METERING SKID

Precision and Versatility: The Capabilities of the Ethanol Metering Skid

The corosys ethanol metering skid continuously measures both the mass flow and the ethanol concentration with extremely high precision. The system calculates and counts the produced volume of alcohol water mixture (AWM) and pure ethanol at a reference temperature of 20°C, for registration by the customs office. Additionally, the average alcohol concentration is calculated and displayed.

The ethanol metering skid is used in ethanol fuel production, distilleries or de-alcoholization systems for recording the ethanol production volume for customs registration. A simpler system can be used to measure and control alcohol concentration and flow in any production process.

If operational availability is of importance, the ethanol metering skid can be installed with a second redundant metering track. A third metering track can be added for feeding non-spec ethanol back into the production plant.

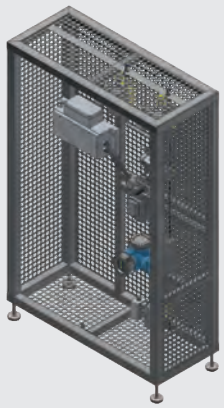
How does the Ethanol Metering Skid work?

A Coriolis mass flowmeter measures the mass flow of ethanol in the main stream. The alcohol concentration is measured in a bypass by an extremely precise density meter from Anton Paar of Graz, Austria. The signals of both instruments are evaluated by a flow computer. The volume of the alcohol / water mixture and the volume of pure ethanol at a reference temperature of 20°C is calculated, counted and stored.

The calibration of the metering skid can be carried out with a special tank standing on calibrated load cells. Instruments, valves and pumps are built into a stainless steel frame. The flow computer, a protocol printer and mechanical counters are installed in a switch cabinet outside the explosion proof area. Metering skid and switch cabinet are prepared for lead sealing.

Why Choose the Ethanol Metering Skid?

- **Extremely accurate metering** of mass flow and ethanol concentration
- **Calculation** of produced ethanol volume at a reference temperature of 20°C
- I**ndividually dimensioned** and designed for each specific application
- **System prepared** for lead sealing by authorities
- **Easy operation**, low maintenance effort, long service life
- **Fully automatic operation**
- **Optional integration** in process control system
- **Highest availability** due to redundancy



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Measuring range alcohol concentration: 0 – 100 % (v/v) or (w/w)
Accuracy / repeatability: 0,03 / 0,01 w/w (90 – 100 %) 0,05 / 0,02 w/w (0 – 100 %)
Measuring range mass flow: 6 – 270.000 kg/h
Accuracy / repeatability: 0,10 / 0,05 % of measured value
System repeatability: better than 0,03 %
Temperature range: + 5 to + 40 °C

IN USE WITH THE FOLLOWING CUSTOMERS

Störtebeker BRAUMANUFAKTUR

Weihenstephan

corosys beverage technology GmbH & Co. KG | Hessenstraße 23 | D-65719 Hofheim am Taunus | bbt.corosys.com | Tel.: +49 (0) 61 22 / 70 75 - 0

INSTRUMENTS & COMPONENTS

GAS DISPERSION INJECTOR

Gas Injector GDI: Efficient Gas Dispersion & Dissolution for Diverse Applications

The corosys gas injector GDI has a large number of applications when a high disperse distribution and very efficient and rapid dissolution of gases in liquids is required, e.g. aeration of wort or carbonization of beer.
Its compact and maintenance free design in stainless steel or higher graded materials, the consequent sanitary design and the high efficiency for a wide range of throughputs makes it unique for the beverage, chemical and pharmaceutical industry.

For the optimized application of the injector corosys offers a comprehensive service for the customer starting from the support in customer specific design of the injector up to complete and automated package units around the injector, e.g. a carbonization unit.

How does the Gas Injector GDI work?

The corosys injector efficiently combines liquid and gas. Gas is introduced laterally, while the liquid flows horizontally through the injector. Mixing occurs in a specially designed chamber, creating turbulence and promoting uniform dispersion. This results in a high surface/volume ratio for rapid saturation and mass transfer.

A key feature of the corosys GDI is its vortex and cavitation mixing, which generates small, evenly distributed bubbles while minimizing pressure drop. Cleaning the system with CIP is straightforward, and the sanitary design ensures extended CIP/SIP intervals.

Why Choose the Gas Injector GDI?

- **Inline-Injector** for the dispersion of gases in liquids in a wide range of gas and liquid mass flow applications
- **Highly efficient** dispersion and mass transfer
- **Minimized pressure** drop
- **Product-friendly** design
- **Numerous applications**, e.g. wort aeration, carbonization
- **Customer- and application-specific** consulting and design
- **Sanitary design,** full SIP-/CIP-capable, GMP capable
- **No maintenance requirements,** no moving parts, no gaskets, robust and compact
- **Welded or flange version** for all in beverage, chemical and pharmaceutical industry typical flanges

INDIVIDUAL ADAPTATION TO YOUR NEEDS

Application range:
DN 25 (liquid) | DN 10 (gas) | L 150 mm | 30 hl/h
DN 40 (liquid) | DN 10 (gas) | L 175 mm | 70 hl/h
DN 50 (liquid) | DN 15 (gas) | L 225 mm | 150 hl/h
DN 65 (liquid) | DN 15 (gas) | L 275 mm | 300 hl/h
DN 80 (liquid) | DN 25 (gas) | L 325 mm | 400 hl/h
DN 100 (liquid) | DN 25 (gas) | L 375 mm | 700 hl/h
DN 125 (liquid) | DN 25 (gas) | L 425 mm | 1.100 hl/h
DN 150 (liquid) | DN 25 (gas) | L 500 mm | 1.600 hl/h

Materials: 1.4301 or higher graded materials, e.g. alloys, titanium

Process connections: Welded ends or flanges according to customer specifications (DIN, ANSI, etc.)

INSTRUMENTS & COMPONENTS

STATIC MIXER

Enhanced Mixing with the corosys Static Mixer CSM

The corosys Static Mixer (CSM) is perfect for applications requiring high-quality mixing and gentle yet rapid homogenization of liquids or suspensions. Its compact, maintenance-free design in stainless steel or higher-grade materials, combined with hygienic considerations, sets it apart in the beverage, chemical, and pharmaceuticals industries.

How does the Static Mixer work?

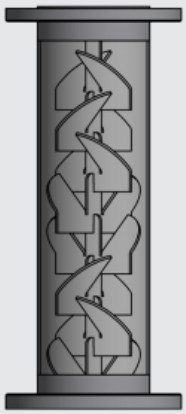
The liquid or suspension flows longitudinally through the static mixer and is repeatedly divided into several partial flows by the static mixer elements. Due to the very high partial flow generation with respective remixing, a very high homogeneity is achieved with at the same time gentle conditions such as low shear forces and pressure losses. After the static mixer, the piping is continued in the inlet diameter with a homogeneously mixed medium.

In many applications a specific length Lm/D of 5 is sufficient to achieve a homogeneous mixture. Due to the short specific length and the design, the pressure loss can be minimized at the same time, see blue curve for a yeast homogenization application. In laminar processes (Re <100), the resulting shear forces are sometimes significantly lower than in upstream and downstream pumps and valves.

CIP/SIP: The CIP is carried out lengthwise through the static mixer. In the case of lateral feed dosage, it is recommended to clean the feed inlet with the CIP solution via a bypass and then sterilize it with steam (SIP). The hygienic design ensures long CIP/SIP-free intervals.

Why Choose the Static Mixer?

- **Helical multilayer** elements, especially for gentle laminar mixing with low shear forces of liquids or suspensions
- **Highly efficient** mixing and mass transfer
- **Minimized pressure** drop
- **Numerous applications**, e.g. yeast homogenization or dispersions
- **Standardized static mixers** with customer- and application-specific consulting and conception
- **Hygienic design**, fully SIP/CIP compatible
- **No maintenance requirements**, no moving parts, no seals, robust and compact
- **Numerous options,** e.g:
  - Weld ends or flange design for all typical flanges in the beverage, chemical and pharmaceutical industry
  - Temperature-controlled version
  - Feed dosing of the second medium to be mixed in via injector



INDIVIDUAL ADAPTATION TO YOUR NEEDS
Min. pressure: ca. 2 barg liquid
Application range: Flow range up to 1.000 hl/h 1)
Diameter up to DN 150
Materials: 1.4301 or higher graded materials such as e.g. alloys, titanium
Process connections: Welded ends or flanges according to customer specifications (DIN, ANSI, etc.)

AUTOMATION

PRODUCT CATEGORIES

COROSYS SMARTMACHINE

AUTOMATION HARDWARE

PROCESS AUTOMATION

AUTOMATION

Solutions for Brewing & Beverage Industry: Our Services

We are your trusted partner in the fields of Data Acquisition for Machinery, Process Automation, and Automation Hardware. Our extensive experience and ongoing commitment to innovation ensures that we can professionally and efficiently meet your specific requirements. Read below to discover what we can do for you:

Data Acquisition for Machinery (Smart Machine):

- **Optimize Your Processes:** Utilize our data acquisition technology for machinery to gather real-time data and maintain control over your machines and equipment, enabling increased efficiency and productivity.
- **Remote Access and Control:** Our solutions allow you to control and monitor your machines from anywhere in the world, allowing for greater flexibility and responsiveness.
- **User-Friendly Interfaces:** We develop user-friendly interfaces that simplify machine operation and enhance data interpretation.

Process Automation:

- **Custom Solutions:** Our experts plan and implement tailored process automation solutions precisely aligned with your requirements.
- **Integrated Control:** Our systems offer seamless integration of controls, sensors, and actuators to ensure smooth operation of your processes.
- **Quality Management:** With our solutions, you can ensure quality and consistency in your production processes, increasing customer satisfaction.

Automation Hardware:

- **High-Quality Components:** Our range of automation hardware includes top-quality components such as control cabinets, sensors, switches, and controllers.
- **Customized Solutions:** Our experts develop customized hardware solutions to match your specific requirements.
- **Reliability and Longevity:** Our hardware components are designed to withstand the demands of industrial environments and guarantee a long lifespan.

Our extensive experience and commitment to excellence are the keys to our success. We are ready to support you in the fields of Data Acquisition for Machinery, Process Automation, and Automation Hardware, helping you optimize your operations.

SMART MACHINE

More on page 85

AUTOMATION HARDWARE

More on page 86

PROCESS AUTOMATION

More on page 87

Empowering Efficiency and Control: Introducing SmartMachine and SmartCustomerSupport

As automation levels continue to rise in modern production plants, so does the demands for comprehensive documentation and data acquisition. However, for many of our customers, the available process software solutions on the market can be overly complex and costly. These solutions often lack the simplicity needed for presenting essential production data and an efficient tool for quick insights.

Our commitment is to design process systems that are both straightforward and user-friendly, a principle embodied in our SmartMachine application. With this application, we provide our customers with a robust platform for recording their technical operational data and establishing a seamless reporting system. The beauty of it all is that these capabilities are accessible and manageable through a user-friendly web application, compatible with any smart device.

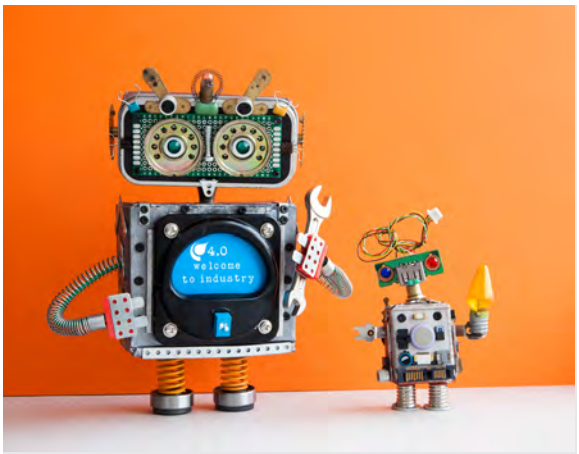
SmartMachine offers a single-user dashboard that not only streamlines data presentation but also facilitates remote connections, enabling real-time monitoring and control of vital processes for real time decision making.

For customers seeking a higher level of service and support, we offer the SmartCustomerSupport package. In addition to the features of SmartMachine, this package includes access to a customized service contract tailored to your specific needs. With this service contract, we guarantee unwavering support from our team and offer discounted spare parts for enhanced operational efficiency and peace of mind.

In an era where data and connectivity are paramount in production, our aim is to empower our customers with accessible, cost-effective, and user-friendly solutions that make the most of advanced technology while keeping complexity at bay. Your success is our priority, and our SmartMachine and SmartCustomerSupport offerings are designed to ensure you achieve optimal operational efficiency with ease and confidence.

The functional scope at a glance

- Redundant data recording and the automation software on our own hardware in Germany
- Production data is available for 400 days
- Set up own reports, measurement views and key figure analysis
- In case of an error, the SmartMachine automatically reports to the corosys Support Center
- VPN access with the possibility of remote control
- Annual remote service including evaluation and report to the plant operator
- One user for the dashboard and remote connection



INDIVIDUAL ADAPTATION TO YOUR NEEDS

- Acquisition of data points as desired
- Definition of time index (second by second, minute by minute) according to customer's request
- Individual ranges according to customer's request
- Reports sending by mail
- Using via smartphone possible

IN USE WITH THE FOLLOWING CUSTOMERS

Hutthurmer DIE BRAUHANDWERKER.

SOUTHERN TIER BREWING CO.

AUTOMATION

AUTOMATION HARDWARE

Solutions for Brewing & Beverage Industry: Our Services

Benefit from our competence and many years of experience in the field of switch cabinet engineering and building for the brewing and beverage industry. From individual project planning and production to commissioning by our specialists, we supply everything from a single source.

We offer you our service for building new switch cabinets as well as for the retrofitting and modernization of existing systems. Depending on the customer's needs, we can completely switch cabinets, only individual components, or the mounting plate can be replaced.

We can also easily supply the North American market. Here, we plan and manufacture according to UL/CSA guidelines and can provide the switch cabinets with the panel shop label after successful testing.

Our range of services?

Engineering

- Creation of signal lists and bills of material
- Development of network concepts and automation structures
- Compliance with national and international standards, as well as customer-specific factory standards

Designing

- Creation of circuit diagrams in EPlan P8 including assembly planning, climate calculation and design
- Modification of existing circuit diagrams in EPlan 5.70
- Creation of terminal diagrams and cable lists

Production

- Individual production of terminal boxes, small switch cabinets and complex control systems
- Inspection and acceptance of the switch cabinets before delivery
- Optional factory acceptance test (FAT) together with our customer

Installation

- Professional installation, wiring and connection of the switch cabinet at the customer's site
- Electrical function tests and measurements after successful installation
- Provision of installation teams and supervisors

Commissioning

- Comprehensive signal test of all connected components
- Parameterization and calibration of sensors and actuators
- In addition: Maintenance plans and spare parts offers, remote maintenance

INDIVIDUAL ADAPTATION TO YOUR NEEDS

Plant operation: Ex-free area or ATEX

Standards used:
EN 60204-1: Safety of machinery
EN 61439-1: Low-voltage switchgear and controlgear assemblies
UL508-A: Industrial Control Panels
NFPA 79: Electric Standard for Industrial Machinery
CSA C22.2 No. 14: Industrial control panels and assemblies

Components: Siemens, Rockwell Automation, Rittal, Danfoss, SMC, Phoenix and more

Fieldbus: Profibus DP, Profibus PA, Profinet, Etnernet IP, Modbus, AS-Interface

PROJECT HIGHLIGHTS

Switchgear for brewhouse control of a brewery consisting of 3 large motor cabinets each with 400 kW connected load

Commissioning of frequency converters with 690 V and 600 kW

Pneumatic cabinets with up to 192 valve actuators

WE ARE BUILDING AFTER:

CE UL

Process Automation

We supply innovative complete solution packages based on leading control systems and software for the automation, visualization and documentation of your processes. Our special focus is on the brewing and beverage industry. Based our long-term experience, we also supply automation solutions to the chemical-pharmaceutical and biotechnology industries.

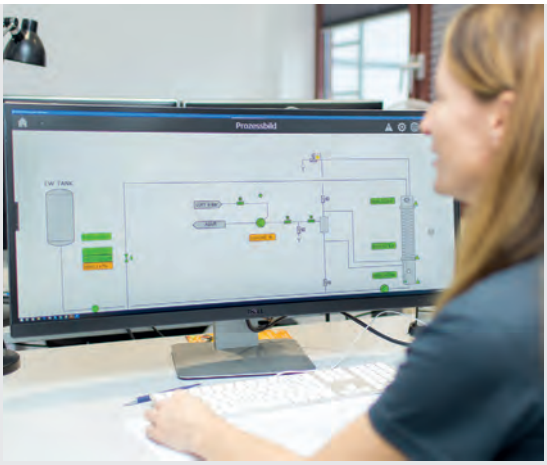
We can automate the entire brewing process from malt intake to bright beer tank area. Everything is available from a single source – planning and delivery of the electrical switch cabinet and operator stations, the development and implementation of the software as well as production assistance after the commissioning.

With more than 15 years of experience and corresponding know-how in the area of automation, we can seamlessly integrate our process systems in any other existing automation process and system.

Our industry alliances are your benefit. For example, we can deliver our process expertise as a turnkey plant with precisely the same automation system employed as a standard in your facilities!

Advantages & Functions

- Complete solutions for hardware and software
- Extensive repertoire of higher-level control and process control systems
- Reliable integration into existing control and plant technology
- Customer-oriented stand-alone solutions if required
- Specifically tailored to the needs of our customers
- Close dialog with our customers during the development and installation of the automation system
- Professional solutions for production data acquisition, production reports and operator-specific records
- Increased reliability through the use of redundant systems
- All-round service from planning to acceptance
- Own support portal for fast service and advice
- Quality guarantee on all components used



INDIVIDUAL ADAPTATION TO YOUR NEEDS

Control solution in ProLeit or Braumat

Advice on licenses and hardware

Individual design of the server system

Support in the creation of the process description

PROJECT HIGHLIGHTS

Automation of complete breweries

Conversion of a brewery to ProLeit during operation

Modernization of a cellar with ProLeit including the replacement of the hardware

WE ARE PROUD PARTNER OF;

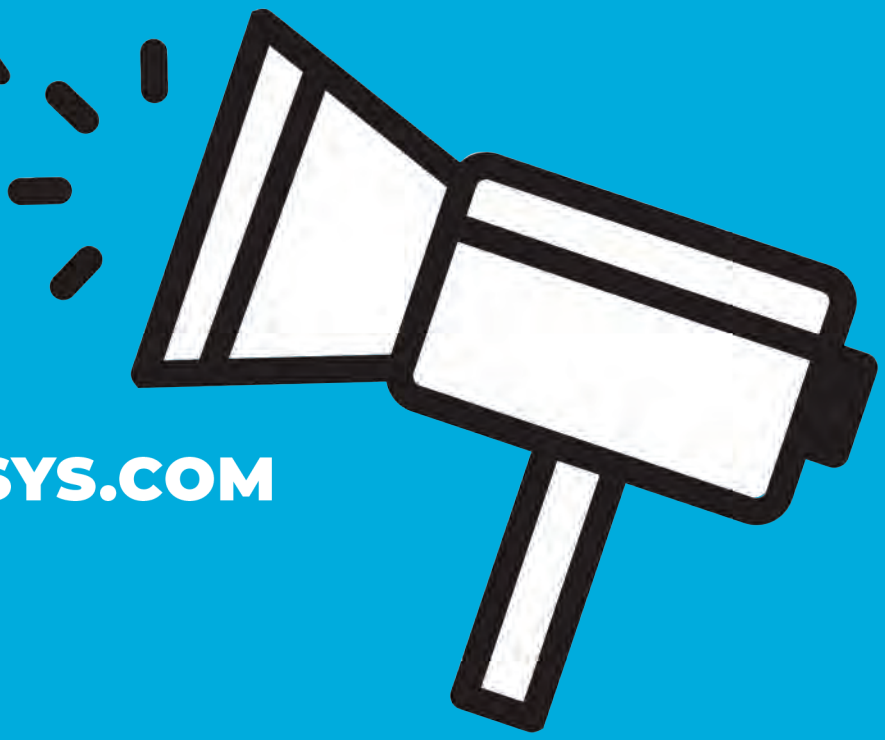
ProLeiT by Schneider Electric

Solution Partner Automation Drives SIEMENS

Rockwell Automation

LOOKING FOR A JOB?

WE ARE HIRING!



APPLY NOW

JOBS.COROSYS.COM

OPEN POSITIONS

ELECTRONICS- / AUTOMATION TECHNICIAN
AUTOMATION COMMISSIONING SPECIALIST
PROJECT MANAGER - BEVERAGE TECHNOLOGIES

... you got other talents? Impress us with your unsolicited application:

JOBS@COROSYS.COM

we look forward to your application

WWW.COROSYS.COM