



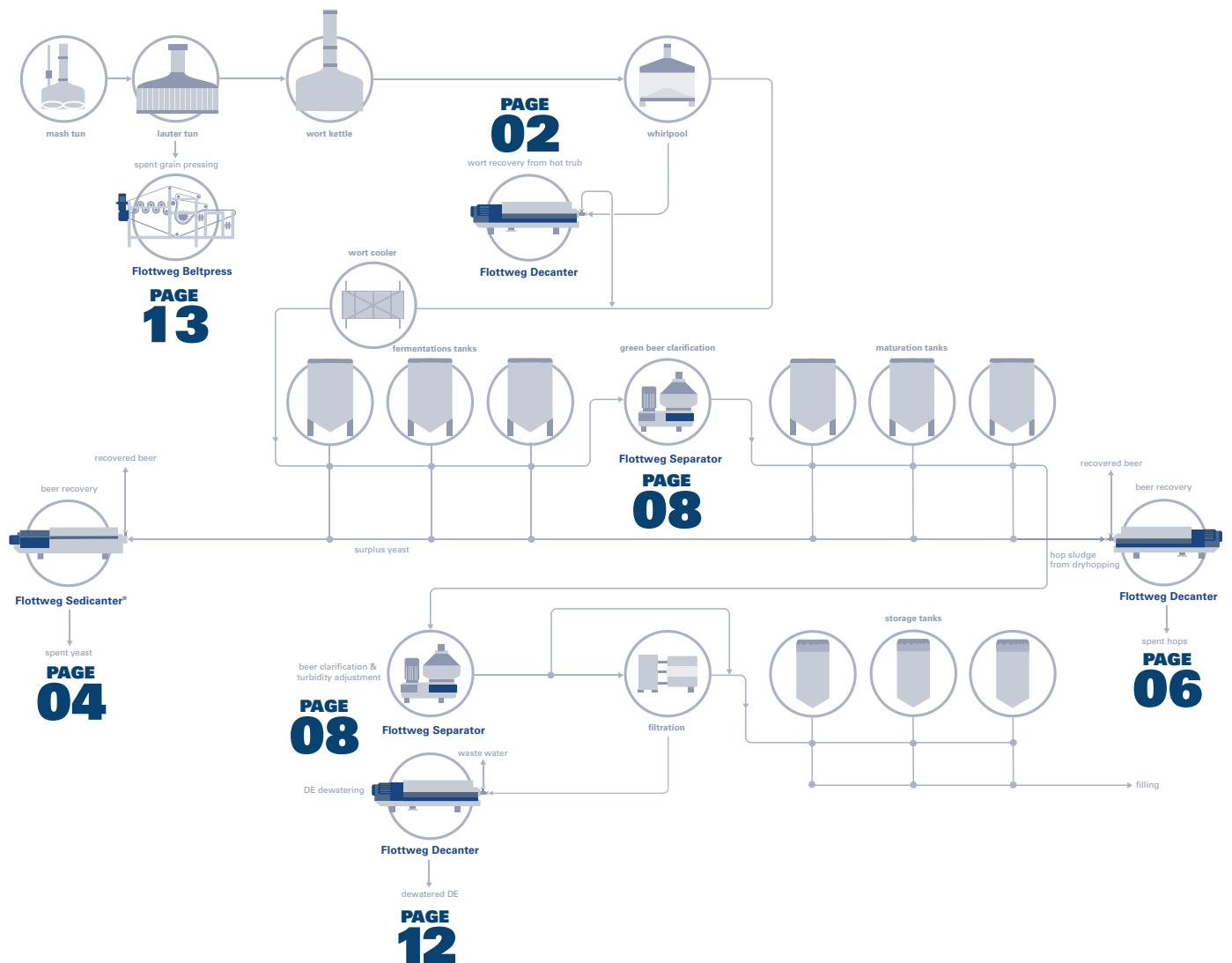
# **SUCCESS IS** **KEEPING HOP AND** **MALT FROM EVER** **BEING WASTED**

**Optimizing the Brewing Process  
by Using Fewer Resources**



We offer customized solutions in separation technology for the entire brewing industry – from the small craft brewer to large breweries.

When designing our machines, we already consider the process as a whole since every drop counts. With our technology, we support you in the brew house, in the cellar and in filtration in order to maximize work efficiency and conserve resources so that neither hop nor malt get lost.





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# WORT RECOVERY FROM HOT TRUB

## Higher Yields in the Brewhouse

The hot trub separated during wort clarification in the whirlpool still contains up to 75% liquid wort which may be recovered. The **Flottweg Decanter** in the brewery supplements the trub separation from hot wort. Even high feed trub content can be processed without problems. The separated hot trub is optimally concentrated. The recovered hot wort can be added directly to the clarified hot wort stream coming from the whirlpool.





## Dry Solids Discharge

The Flottweg Simp Drive® automatically regulates the differential speed based on the scroll torque. This is how the machine automatically adjusts to different load conditions, e.g. higher quantities of hot trub, which are especially relevant for late hopping. Maximum recovery of hot trub is therefore always ensured.



## Optimum Process Control

- Continuous and automatic operation
- Reduced retention time in the whirlpool



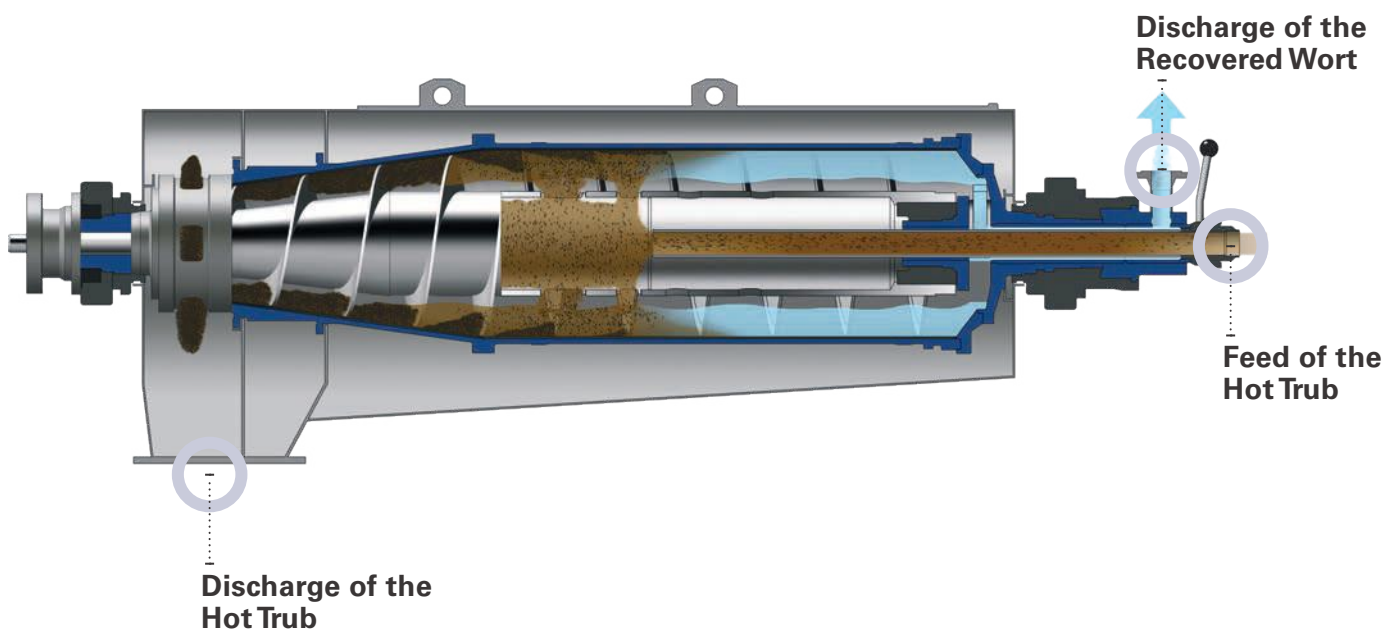
## Clear Wort

- Optimum adaption to the requests of different recipes and hot trubs thanks to the adjustable impeller
- The clarified wort is discharged under pressure.



## The Best Manufacturing Quality

- Hygienic design and use of seals in compliance with the food law
- Optimum adjustment of the machine to high product temperatures and aggressive media (CIP cleaning)



# BEER RECOVERY FROM SURPLUS YEAST

## Reducing Beer Losses

Beer recovery from surplus yeast after fermentation and/or storage is an ideal opportunity to reduce your beer losses.

Recovering beer from surplus yeast allows you to recover two resources: beer, which can be returned into your process, and yeast which can be sold, for instance, for further processing in the food industry, as a vitamin rich dietary supplement or as animal feed. Moreover, recovering beer from surplus yeast helps to reduce waste water.

Other systems for beer recovery such as disc stack centrifuges, membrane filtration or yeast presses exhibit big differences regarding beer quality, process ease, handling, as well as operation and maintenance costs. The **Flottweg Sedicanter®** represents an extremely interesting alternative, both technologically and economically.

Besides easy and gentle processing of the beer, it is also possible to process fluctuating quantities of yeast in the feed without problems. As well as producing higher yields, the system also has substantially lower investment and operating costs.



## Safe and Gentle Processing

Continuously high product quality thanks to a clever design

## Optimum Process Management

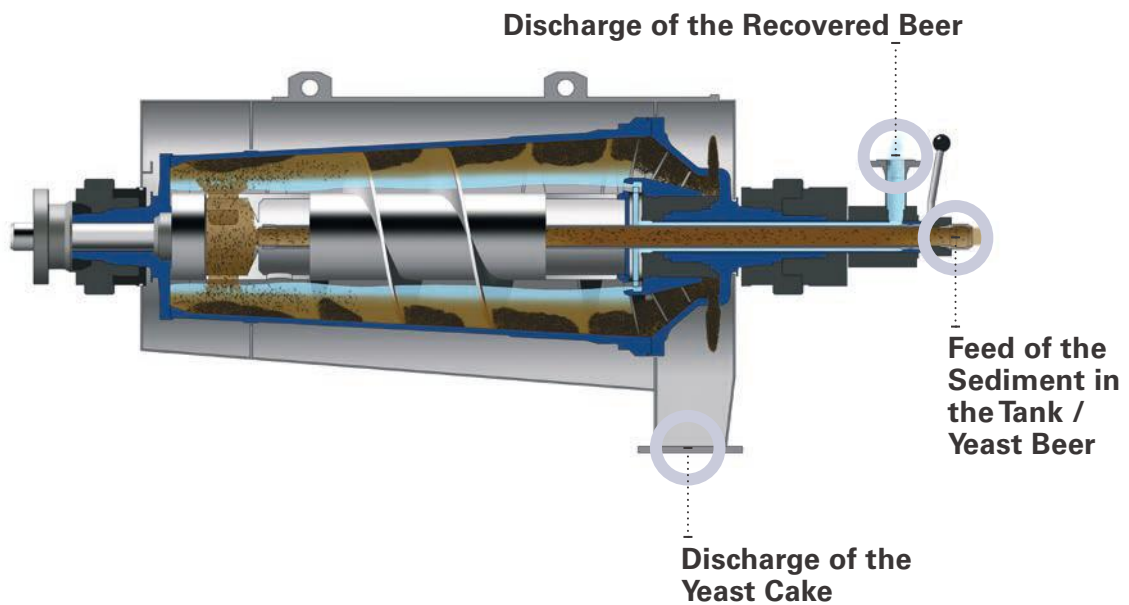
- Fine adjustment of the machine during operation thanks to the automatically adjustable impeller
- High yields even in case of varying feed conditions
- The recovered beer is discharged under pressure. Depending on the process, additional pumps may not be required.

## High Beer Yields

- Due to the high g-forces (up to 10,000 x g) and thus the high clarification impact in the centrifugal field, the recovered beer is almost free of yeast.
- Compact yield cake with a high dry matter content (between 24 and 28 per cent by weight)
- It is not necessary to dilute the surplus yeast before processing. This means saving process water, a higher capacity of the machine and reduced energy demand.

## High Manufacturing Quality

- The machine design is specifically adapted to the high hygienic demands of breweries.
- Easy implementation into existing CIP systems





# BEER RECOVERY WITH DRY HOPPING

## Minimizing Losses and Automating Processes

Dry hopping has developed in recent years into an established technique in the entire brewing industry. It is used especially for beers that contain a large amount of hops. In general, hop pellets are used. They are introduced during extraction for the fermentation and maturation process, giving the desired flavoring agents to the beer and settling as trub at the bottom of the tank.

Handling hot trub this way requires a lot of work, complicating subsequent process steps. The product flow (pipe works and valves) tends to block, and downstream separation and filtration are overloaded due to the high solids load. In general, this trub is separated from the beer by simply removing it (similar to yeast harvesting) before further processing. High-quality beer is contained in this hop sludge, so significant amounts of beer are wasted; around 5–20% of the tank content is typically lost. At the same time, the solids load which is conveyed to the waste water increases greatly.

The Flottweg Decanter separates the spent hops from the liquid beer phase and uses pressure to return this to storage or bottling. This significantly reduces beer losses and relieves the load placed on downstream centrifuges and filtration. Dry hopping can be further automated, and clarification times and thus tank occupancy can generally be reduced. The problem of waste water treatment is also resolved.

Besides hops, alternative flavor carriers such as fruits, coffee beans, herbs etc. can also efficiently be separated. Flottweg Decanters allow for considerable savings in a reproducible production process.







### High Yields

By adjusting the centrifuge to different amounts of hops or to various recipes, between 75 and 97% of the beer may be recovered.



### Safe and Smooth Processing

- No false flavors, e.g. hop burn thanks to a defined extraction process
- CO<sub>2</sub> blending to avoid oxygen pick-up in the beer



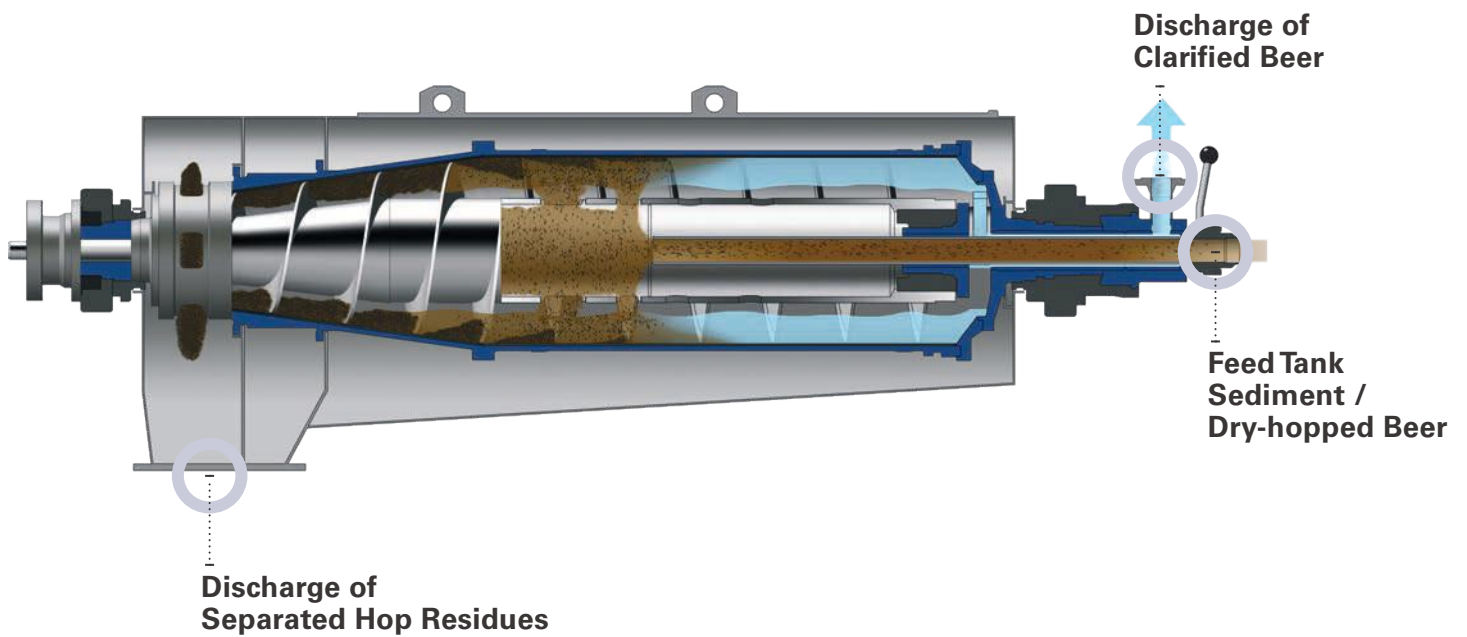
### High Manufacturing Quality

- Hygienic design, food certificates for lubricants and seals
- Optimum adjustment of the machine to high product temperatures and aggressive process media (CIP cleaning)



### Efficient Cleaning

All critical parts such as the hood, the rotor, the solids discharge system and other liquid-wetted parts are cleaned using spray nozzles.



# BEER CLARIFICATION USING THE FLOTTWEG DISC STACK CENTRIFUGE

## Optimizing the Filtration Process

Filtration often presents challenges to the brewer. Besides the varying quality of the raw material, the quality and the concentration of the yeast affect the filterability of the beer. These factors determine the length of the filter service life as well as the amount of filter additives consumed.

The **Flottweg Disc Stack Centrifuge** helps optimize workflows in the filter cellar, reduce beer losses and adjust the desired turbidity.

### Longer filter service life

With the use of disc stack centrifuges, most of the yeast can be separated smoothly before filtration. Thus, filter service life can be extended by up to 100%. At the same time, the necessary quantity of kieselgur and thus the costs for its procurement, handling, and disposal are reduced. Additionally, beer losses as well as cleaning and waste water costs are reduced. Any filter system can be upgraded quickly and simply with the disc stack centrifuge for pre-clarification.

### Turbidity adjustment for wheat and cloudy beer

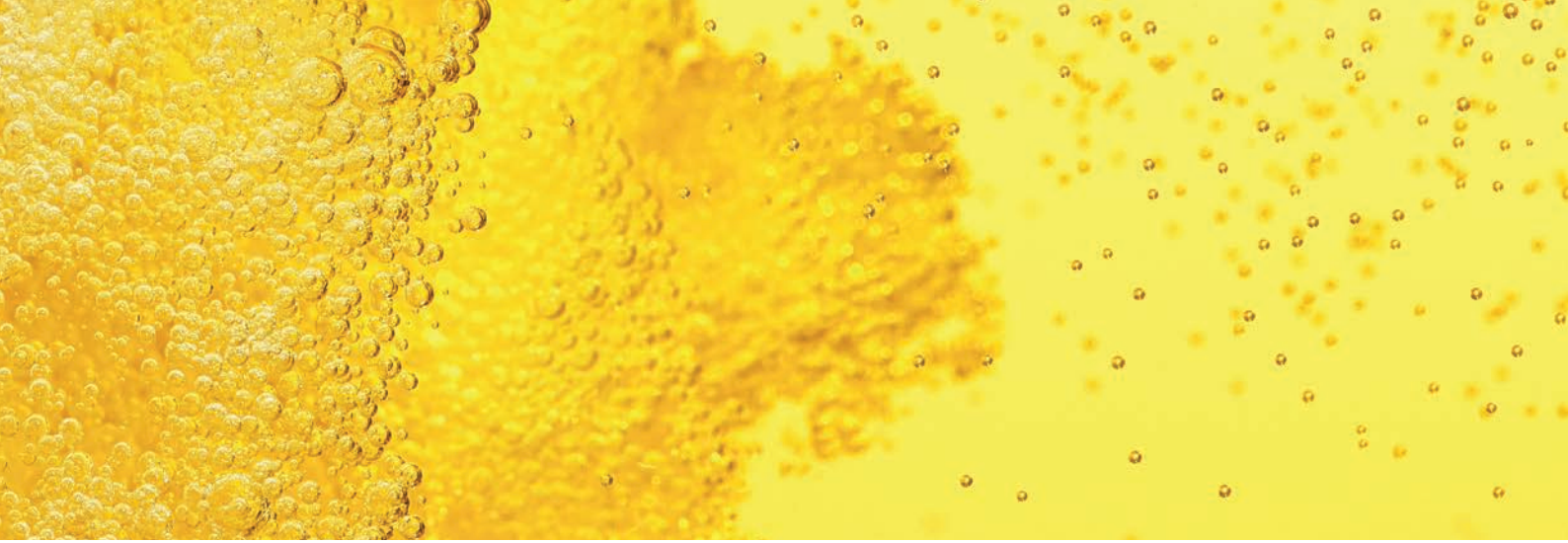
Especially during the storage of wheat beer or cloudy beers, the yeast content is irregular due to sedimentation in the tank. The disc stack centrifuge elegantly balances undesired yeast fluctuations. The brewer determines the required turbidity value in the beer. The rest is done automatically. The control system monitors the yeast concentration by measuring the turbidity in the feed and in the discharge systems. With automatic adjustment of the flow rate, the required separation efficiency can be maintained. Moreover, turbidity can be adjusted using the bypass method. Thus, the beer always shows the same turbidity and constant quality.

### Optimizing the fermentation process with green beer clarification

By adjusting the desired number of yeast cells in the green beer (by means of the disc stack centrifuge), process conditions of maturation and secondary fermentation are standardized. This improved secondary fermentation allows for consistent beer quality. Yeast autolysis processes are reduced and relieved thanks to reduced yeast loads.

The disc stack centrifuge can also be used for the production of alcohol-free beers depending on the process, e.g. in case of stopped fermentation.





## Plug & Play: Benefits of Our Skid Solutions

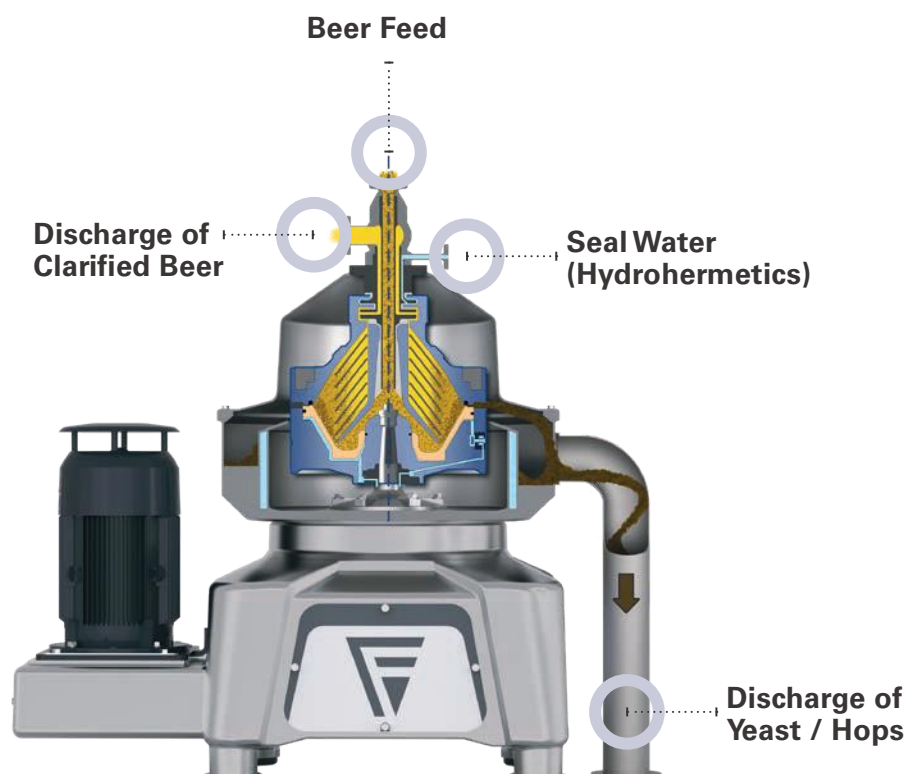
Our pre-configured platform solutions allow for an even easier integration into existing processes:

- Simple commissioning in existing production and CIP processes since all components and monitor devices (valves, sensors) are already pre-installed
- Fully automatic operation thanks to monitoring devices, e.g. turbidity measurement device
- Maximum flexibility thanks to recipe pre-selection for the beer to be processed





# THE DISC STACK CENTRIFUGE IN DETAIL





## Optimized Disc Stack Centrifuge Bowl

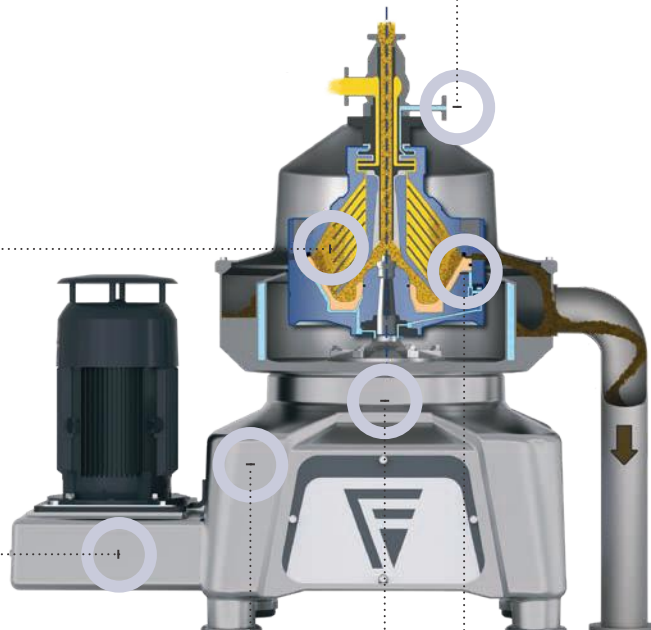
- High separation efficiency and productivity of the machine
- Easy maintenance thanks to the compact and sturdy design
- For the beverage and food industry: High quality of surfaces for all product-wetted parts for safe production and efficient CIP cleaning
- Easy assembling and dismantling
- Reduced vibrations as well as smooth and silent operation



## Safe Processing

thanks to the Flottweg hydrohermetics system. Building up a seal water ring, including de-gassed water, efficiently prevents oxygen pick-up

- No additional CO<sub>2</sub> gassing required
- No mechanic wear (in contrast to shaft seals)



## Design

- Easy accessibility for maintenance
- Compact construction for a small footprint
- Easy and flexible integration into existing processes



## High Beer Yields

- Accurate partial and total discharges ensure a high solids concentration in the discharged yields and thus high yields
- Reduced noise thanks to the Soft Shot® discharge system; no additional noise protection required
- Reduced amount of bowl seals, thus easy and economical in maintenance and operation



## Efficient Belt Drive

- Energy efficient
- Reduced vibrations as well as smooth and silent operation
- Standard drive motors, thus high availability
- Economic in maintenance and servicing



## Optimized Spindle Bearing

- Efficient power transfer from the gear to the bowl
- Easy construction reduces wear and operating costs



# WASTE WATER MANAGEMENT & UPCYCLING OF RESIDUALS

Sustainability and environmental management are becoming increasingly important in the beer and beverage industry. Economic reasons like increasing disposal costs and legal requirements are not the only motivations. Ecological market requirements in particular, which sometimes influence buyers in their decision to buy a certain product, play an essential role when evaluating the existing processes.

#### **Reducing the disposal costs of brewery sewage sludge treatment plants**

Many breweries already profit from the advantages of biological wastewater treatment, thus generating sewage sludge, which can be used in agriculture, incinerated or taken to a landfill. The costs of sludge disposal are reduced with the increasing dryness of the sludge, regardless of the type of disposal. Decanter centrifuges help reduce these waste disposal costs considerably through sludge dewatering. Dewatering means to considerably increase the dry substance content of the sludge, thus reducing the amount of sludge to be disposed of and therefore also the disposal costs.

#### **Reducing the amount of kieselguhr to be disposed of**

Kieselgur filtration is still the technology which is used most for final beer clarification all over the world, generating a large amount of kieselgur sludge which makes disposal very expensive due to its large content of liquid. Similar to sewage sludge, special decanter centrifuges are used for dewatering. Kieselgur has a strongly abrasive impact. Therefore, Flottweg machines are equipped through special wear protect features, thus assuring longer service lifetimes and easy maintenance. Depending on the feed concentration, the amount of kieselgur is reduced to up to 80%, resulting in less disposal costs.



## Dewatering Spent Grains for Improved Recycling

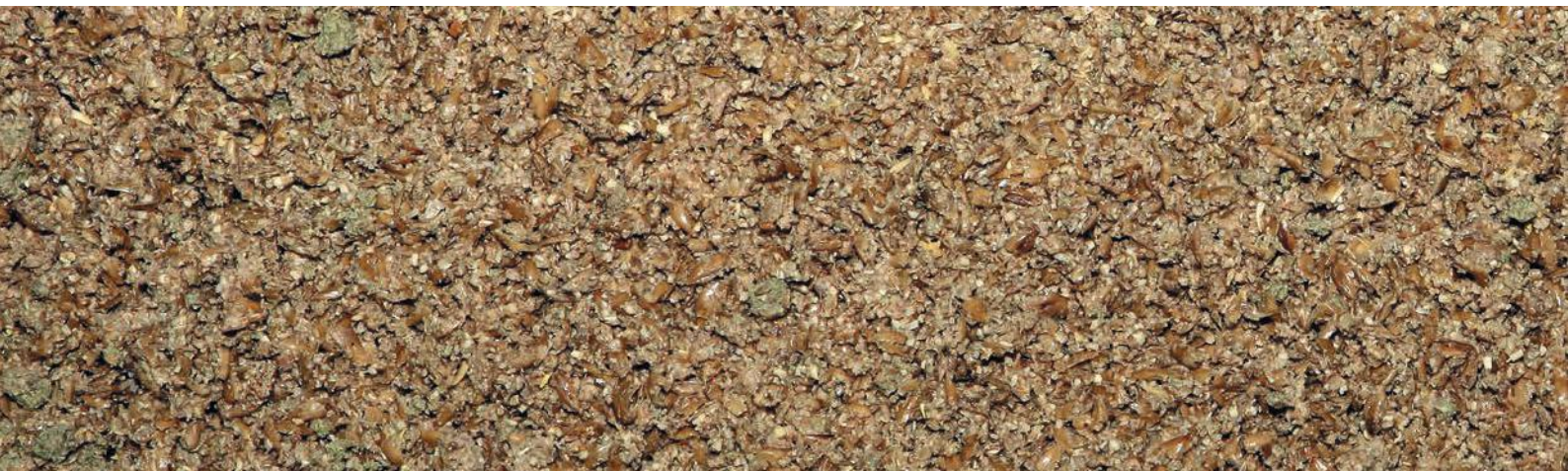
Spent grains represent the biggest part of waste and residues in breweries. In general, they are used for animal feed. Moreover, spent grains are used for recycling in biogas plants or as an alternative energy provider.

Spent grains, however, are becoming increasingly important for recycling and use in the food industry. Thanks to the high content of proteins and fibers, spent grains deliver precious substances and are thus predestined for sustainable upcycling.

Wet spent grains in breweries on average still contain a liquid content of approximately 80%. As a consequence, mechanical dewatering as a first step is inevitable for the applications mentioned above. Flottweg offers belt presses for this purpose. Thanks to efficient pressing, the liquids content is reduced so that it is under 58% and thus as dry as possible through mechanical separation technology for further process steps.



Feed of the Wet Spent Grains





## Automatically Brewing Good Beer

In order to reduce operating costs, nearly all breweries rely on a mostly fully automatic and unsupervised operation of their system. Our new user interface InGo makes it easy for the brewer to intervene if necessary. Thanks to the intuitive menu structure and a simplified user interface, our machines can be operated without requiring a long time to become familiar with them. Simply “into the system and go.”

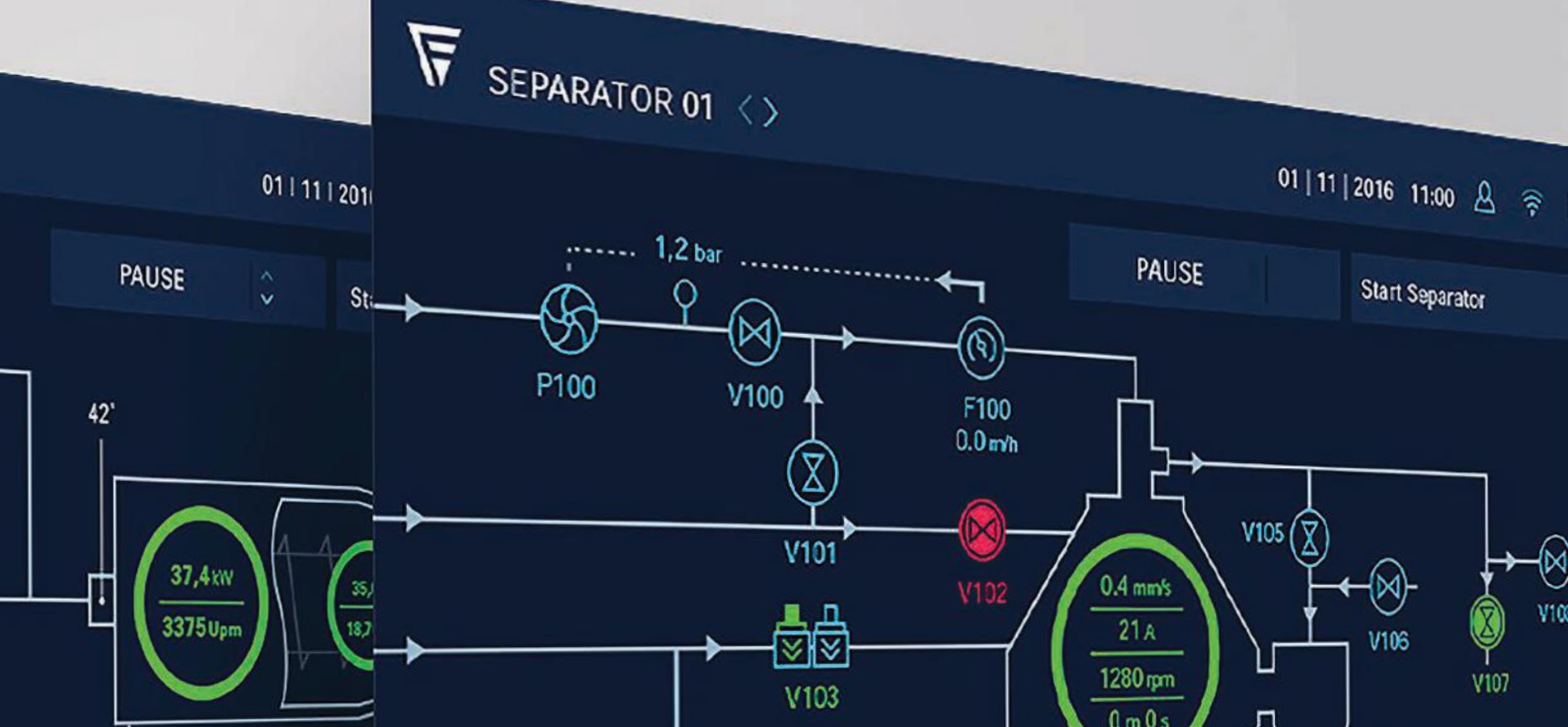
Different types of beers and recipes can be stored in the control system. Thus, in the case of a product change, the machine can be adjusted to the required process parameters simply by pressing a button.

What is new at first glance is the revolutionary color design. We draw the eyes of the user deliberately to the most important information for every machine and system state. In contrast to some other user interfaces, with our visualization system, we do not only show the machine, but also the entire engineering process.

The sensors as well as the different process states of the machine can be captured to monitor, analyze and optimize your brewing process. Different BUS connections (Profibus, Anybus etc.) allow for easy integration into the overall process (PLC).

We also adapt our automation systems to individual existing brewery processes.





With InGo, All Process Steps in and Around the Machine Can Be Shown Clearly and Thus Be Optimized.

### Selecting the Recipe

Adjust the machine parameters easily using the recipe selection. Parameterizing is done on-site during commissioning and is adjusted individually to the product and the process.

00.01 SEPARATOR > RECIPE PRODUCT

	Speed_SP	Durchsatz SP	Flow_max	Trub_SP	Trub_contr	Trub_Disch.Lim	Trub_Disch.Se	Bypass_SP	Bypass_Sel	Sep_time
Water	0	0	65	30	0	28	0	25	0	0
Feed turbidity	100	200	300	400	500	600	700	800	900	999
Flow rate max	55	50	45	40	35	30	25	20	15	10
GK Flow	20	30	40	50	60	70	80	90	100	110
GK Pressure	4	3.2	2.8	2.4	2.0	1.8	1.6	1.4	1.2	1.0

beer  
wheat beer

loaded recipe

	1	2	3	4	5	6	7	8	9	10
Feed turbidity	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0	100,0
GK Flow	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0	100,0	110,0
GK Pressure	4,0	3,2	2,8	2,4	2,0	1,8	1,6	1,4	1,2	1,0



# SUCCESS IS ALWAYS HAVING THE RIGHT SERVICE

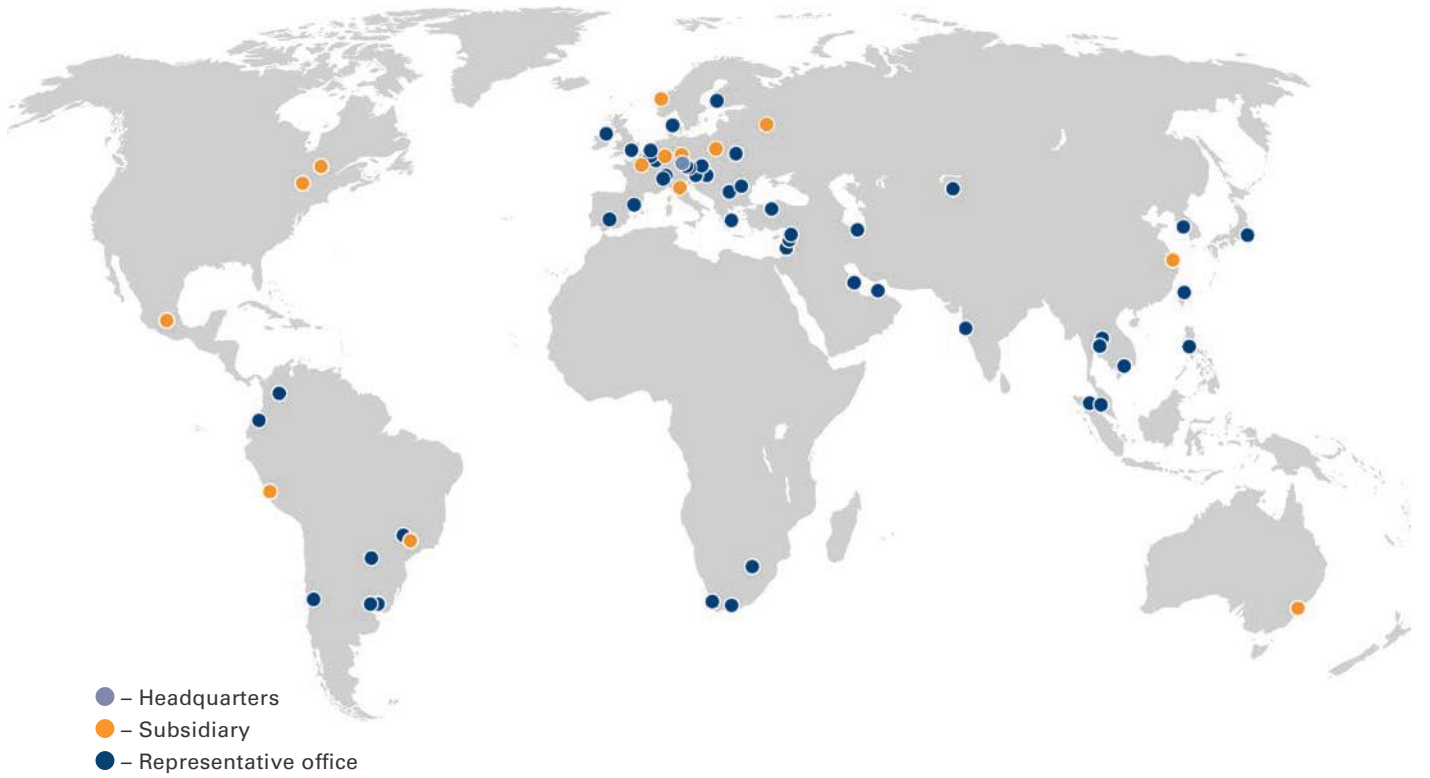
## Our Services

From the first consultation and the decision to buy, from commissioning to the utilization phase: when it comes to industrial centrifuges and belt presses, you need a reliable partner at your side. Somebody you can trust at any time, because our machines play a crucial role in a variety of industry sectors and processes. They are often in operation for 30 years or longer.

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## We Will Be Happy to Show You How Our Services Can Contribute to Your Success:

- Consultation and optimization of processes
- Product analysis in our laboratory
- On-site tests under real conditions
- Rental machines and long-term tests
- On-site service as well as maintenance in our workshop
- Training for your employees / operator training in our Flottweg Academy
- Customized maintenance contracts and measures for warranty extensions



We are able to serve customers all over the world, thanks to our vast global sales and service network. We're there when and where you need us, in more than 100 countries. All Flottweg subsidiaries and representative offices are staffed with skilled service technicians, each of whom has gone through specialized training at our Flottweg Academy.





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