BUCHER
unipektin

CERINOX® BR

Cross-flow filtration plant with ceramic membranes

For beer recovery from surplus yeast

- Short payback period
- Economic system with diafiltration
- High quality of recovered beer

Characteristics

CERINOX® is a compact cross-flow filtration plant equipped with ceramic tubular membranes. The plant consists of two main parts, the filter unit and the CIP station. Both parts can be arranged separately or on a common skid. Different automation levels are available, from manually controlled units up to fully automated plants.

The special design of the so-called dual-flow modules allows high packing density of filter surface, which leads to small footprints and lower heights of CERINOX® plants. Especially because of the latter, the CERINOX® is easy to maintain. Due to the compactness of the plant, its inner volume is small compared to the installed filter area. This leads to low water and energy consumption as well as low product losses. Tailor-made ceramic membranes for beer recovery from surplus yeast guarantee high economical benefit and high quality of recovered beer. The high durability of the membranes, together with a well proven process based on over 20 years of experience with more than 100 plants installed worldwide, lead to very reliable systems with very low demand for operator presence and maintenance. This, and the short pay back periods, made the CERINOX® a standard solution for beer recovery today.

Basic process

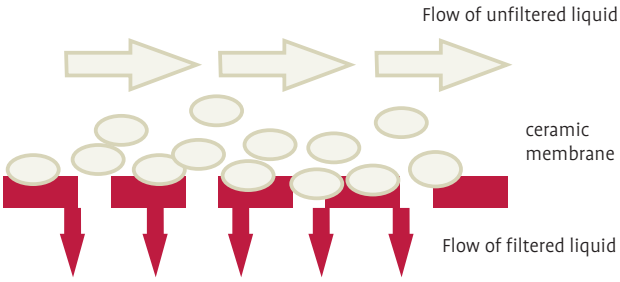
During the brewing of beer, surplus yeast settles in the fermentation and storage tanks. The total volume of surplus yeast represents about 2 to 3 % of a brewery's output. Approximately 50 % of the volume of surplus yeast is beer, which is lost to the brewery if the slurry is sent untreated to farms or food producers. If yeast is discharged into the sewerage system, very high treatment charges arise because of the very high biological oxygen demand. The average B.O.D. value is around 140,000 mg/kg. For these reasons, the valuable component "beer" is recovered from surplus yeast.

Working principle

The cross-flow principle as shown in the following picture is characterised by the flow directions of the unfiltered and filtered liquid, which are perpendicular to each other.

The preferably-turbulent flow of the unfiltered liquid, which is parallel to the membrane's surface, prevents particles from depositing on the membrane or carries away already deposited substances. Hence the throughput of filtered liquid through the membrane is kept high.

A pressure gradient across the membrane forces the filtered liquid to penetrate the membrane.



Characteristics of the membranes

For the beer recovery, process tailor-made ceramic membranes in tubular multi channel elements have been developed:

Channel diameter	8 mm
Pore size	0.3 µm
Pressure resistance	30 bar
Temperature	> 90 °C
pH	0~14

The robustness of the ceramic material guarantees long lifetime of the membranes, high availability of the plants, low membrane replacement costs and low maintenance costs.

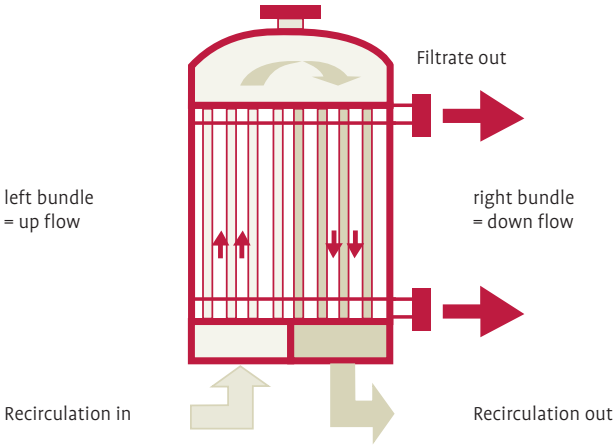
Quality of recovered beer

The membrane's pore size of 0.3 µm guarantees high quality of recovered beer:

Turbidity of filtrate	< 08. EBC (90° angle)
Yeast cells in filtrate	< 5 cells / 100 ml
Bacteria reduction	> 10^5

The dual-flow module

The name of the dual-flow-module is derived from the two different flow directions – upwards and downwards – of the unfiltered liquid in the channels of the installed ceramic elements.



Thanks to this concept, a maximum of packing density and a minimum of pipe connections are achieved. Complete venting and draining is guaranteed by discharging the liquid through the top and bottom plate.
This concept allows for easy maintenance by simply taking away the top cover of the housing.
With two different sizes of dual-flow modules, one with 20 m^2 filter area, the other one with 48 m^2, and hence by modularly increasing filter area, an optimal plant design for all required brewery sizes is possible.

Space requirements

The maximum height of these plants amounts to 3.3 metres. The required floor space for the CIP station is around 2.5 x 1.0 m. The required floor space depends on the number and type of dual-flow modules installed. Some typical values for plants with the bigger type of module are:

No. of modules	1	2	3
Filter area / m^2	48	96	144
*Yeast / hl/day	240	480	720
Space / m	2.2 x 2.0	3.0 x 2.0	3.0 x 3.0

*depending on dry matter and gravity; incl. diafiltration

Process

CERINOX® for beer recovery works according to the "batch principle". While the yeast is recirculated through the plant and the batch (feed) tank, beer is recovered. Thanks to the batch tank, the concentration of the yeast increases slowly so that the plant works only for a very short period with the maximum concentration. The specific flow rate is increased by this type of process. A semi-continuous operation can be achieved by substituting the volume of the recovered beer by fresh feed yeast slurry until the tank is filled with highly-concentrated yeast. Diafiltration can be applied for increasing extract yield and, hence, increasing the economical benefit. For these purposes, recovered beer is substituted by deaerated water. The remaining beer in the yeast slurry is continuously diluted so that beer with slowly decreasing gravity is recovered.

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Bucher Unipektin, Competence Center Filtration – ***Let's be clear!***

Bucher Unipektin, Competence Center Filtration, is the world leading manufacturer of turn-key filtration systems for the beverage industries. Apart from the well-known candle filter for the pre-coat filtration with kieselguhr and PVPP, **Bucher Unipektin, Competence Center Filtration,** also develops, designs, and manufactures other advanced technologies such as filters for sugar syrup and gelatine filtration, filter systems for beer-recovery and many more.

Bucher Unipektin, Competence Center Filtration, is a business partner with a long-term industrial focus, committed to fair partnership with our customers, employees, and business associates.

Bucher Unipektin worldwide

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Products and Services
Process technology for fruit and vegetable processing to juices, concentrates and puree production, for beer filtration, for milk powder production, for the vacuum drying of liquid and solid products, for freeze drying of coffee, tea, fruits, vegetable, etc. Technology for municipal and industrial sludge dewatering and drinking water filtration

Products Fruit reception lines, mills, mash heaters, hydraulic presses, membrane filtration equipment, adsorber, ion exchanger, evaporators and aroma plants, pasteurizers, CIP systems, vacuum and freeze drying cabinets and belt dryer, zeolite adsorber, complete processing lines

Services Process development and project engineering; assembly and commissioning; technical support; original spare parts; inspection; service contracts; retrofits; training; service and maintenance; NetService