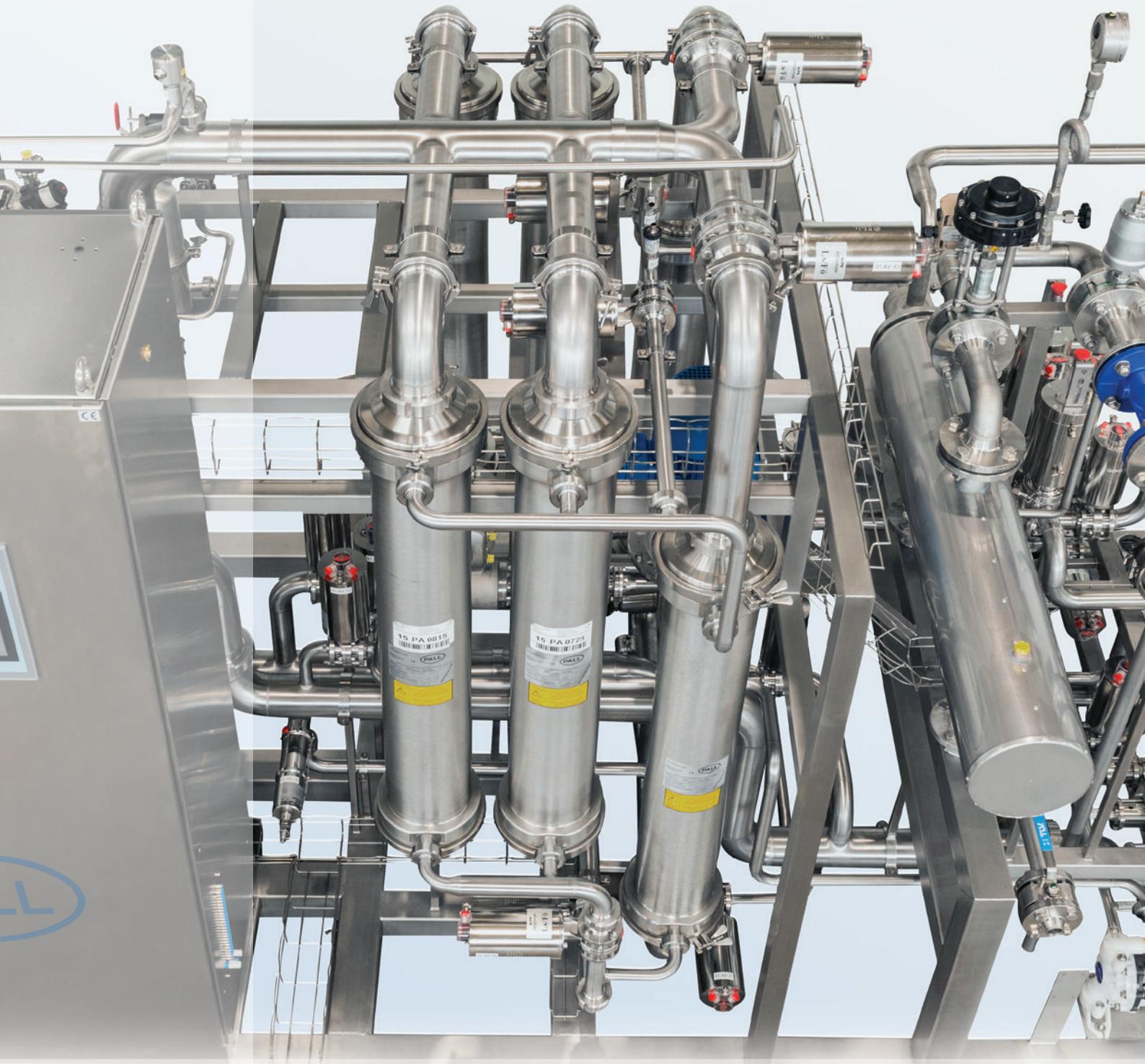




Food and Beverage



Pall PROFi Craft System

Gentler processing for high quality beers



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Changing requirements in the craft brewing scene have encouraged brewers to rethink their production technologies. The constant growth in beer sales results in longer distribution time and therefore the need for increased shelf life, making filtration an essential step to preserve the high product quality.

By implementing the PROFi Craft system, craft-brewers can realize the benefits of membrane filtration. The Craft series capitalizes on the strengths of the proven PROFi concept while further considering the specific needs of smaller breweries to reduce operating costs, increase production yield and maintain respect for the qualitative characteristics of high quality beers.

The PROFi Craft Technology

The PROFi beer filtration system is designed for the clarification of beer after fermentation/maturation.

The system utilizes membrane filtration downstream of a customer owned centrifuge.

Combining the most appropriate technology for separation of the different solids allows for a filter design characterized by gentle beer filtration with excellent economics.

The centrifuge enables separation of solids like yeast, coarse colloids and stabilizing materials prior to the filtration system. The membrane filtration block (MBL) removes colloidal fine particles, remaining yeast and haze forming substances.

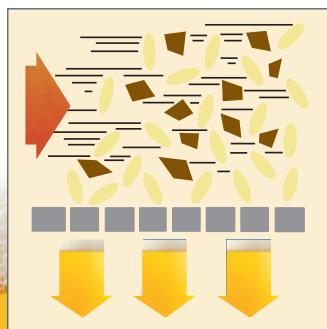
With low solids in the membrane system, the batch length between cleanings increases while the energy requirement or crossflow velocity used to control the fouling layer is minimal. This results in extremely gentle beer processing.

The PROFi Craft system operates without a yeast beer tank and without pre and post runs, which allows a more compact system design, smaller installation footprint, reduced waste volumes and better process control.

Additionally, with DE-free filtration, there is no exposure to iron or manganese which can negatively impact both flavor and oxidation. Furthermore the enclosed system design results in extremely low oxygen pick up.



Unfiltered Beer



Crossflow Filtration



Filtered Beer



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The PROFi Module

Craft beers are beverages rich in complexity with a delicate chemical and physical balance. It is essential to work with the most inert and passive filtration membrane combined with a gentle process to preserve the bitterness, the unique taste profile and balance.

At the same time, the contaminants, whether from beer's natural evolution or a result of the manufacturing process, can be very small in size. The membrane must be designed to handle these solids whilst preventing blockage.

Manufactured in polyethersulfone, the Pall PROFi membrane is characterized by inertness and excellent chemical compatibility that allows cleaning procedures that are particularly effective in maintaining system productivity throughout its service life.

A beer specific membrane combined with the unique PROFi concept gives, after many years of experience in the field, absolute excellence in performance.

The membrane design is based on a reusable stainless steel housing combined with a polymer insert holding the hollow fibers. For easy membrane exchange, the inserts are simply changed within minutes.

The PROFi module inserts meet the requirements for food contact as detailed in European Regulation (EC) Number 1935/2004.

The materials of construction meet FDA requirements for food contact use as detailed in Code of Federal Regulations, 21 CFR paragraphs 170-190.

In addition, PROFi modules are covered by a Kosher certificate.



Modules



Membrane Packaging



Module Housing



Membrane Installation



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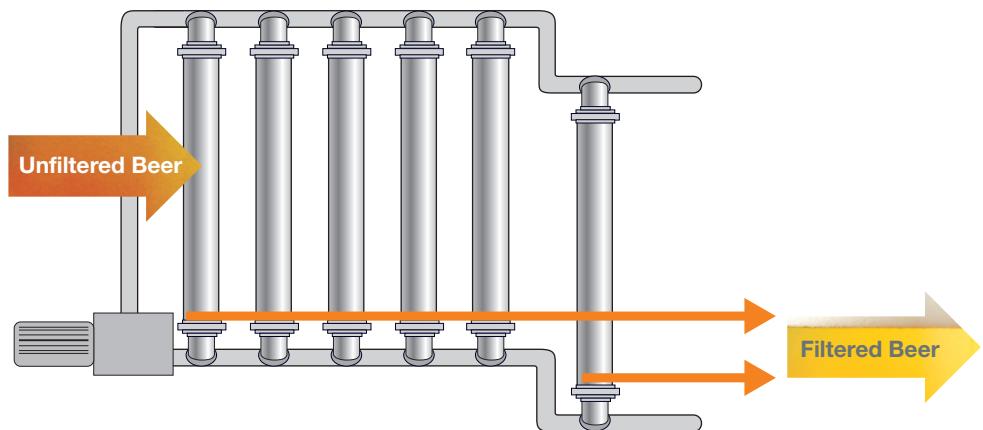
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PROFi Process

With multiple brands and small batches, craft brewers require flexible systems with minimal losses. The PROFi Craft series utilizes a batch production process controlled by the beer flow and the trans membrane pressure of the modules. At filtration end, the remaining beer is carefully pushed through the filtration membranes and out of the system to the filtered beer tank with CO₂. One hollow fiber module is configured in a lower position to enable a nearly complete emptying of the system.

For brand changes, the process is simple and short. A CO₂ soft push also applies. Beer mixing is negligible. Only an intermediate rinse is required when subsequent brands have significant flavor differences.

In addition to low beer losses, utility fluid consumption is also minimal. The small system design combined with an intelligent cleaning concept results in low use of water and chemicals.



Simple Operation

While brewery staff is typically well versed in upstream operations (mashing, fermentation, etc.), finding experienced filtration staff is often difficult. With the PROFi Craft system, this is no longer an issue. Performance is independent of the operator. The system utilizes membrane filtration for consistent beer quality every run. There is no chance for filter aid break through or the need for re-processing.

Additionally, the membrane system is automated with full control over the production, emptying and cleaning processes. Frequency controlled pumps enable automatic flow or pressure controlled beer filtration. Process trend recording is available to monitor and optimize filtration performance and troubleshooting. Cleaning is simple and fast. Typical brewery cleaning agents are automatically dosed during a process that takes a maximum of 90 minutes.



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Feature	Benefit	Value
No filter aid requirement (DE)	- Less labor and handling - Lower disposal costs - No iron or manganese uptake in beer	- Lower operating costs - Environmentally friendly - Improved working conditions - Better taste stability of beer
Combination of centrifuge and membrane	- Gentle processing - Low membrane fouling - Longer membrane life	- No change in taste and bitterness - Fast return on investment - Better yield - Low water and cleaner consumption
Enclosed system design	- Minimal oxygen pick up - Maintains beer quality - Hygienic operation	- Brand protection
Low hold-up volume	- Processing of small batches - Reduced beer losses - Fast and easy brand changes	- Less downtime - Brand protection
Inert PES membranes	- Maintain beer quality - Easily cleaned and regenerated - Applicable for food contact	- Lower operating costs - Lower consumables - Regulatory documentation
Fully automated working cycles	- Simple to use - Unattended operation	- Lower operating costs - Safe operation - Constant product quality
Membrane insert design (Pall patent)	- Fast membrane changes - Easy fiber pinning	- Lower operation and membrane cost

Sustainability, Quality and Maintenance

The PROFi Craft system enables brewers to significantly reduce energy, water consumption and waste. Accordingly, the design and material selections were chosen considering these aspects of environmentally friendly operation. The system utilizes components with proven reliability from well-known, industry-accepted manufacturers. This allows for convenient supply of spare parts anywhere in the world.

Qualified Pall personnel are available to carry out scheduled maintenance service for objective verification of the operating system, ensuring optimal use.



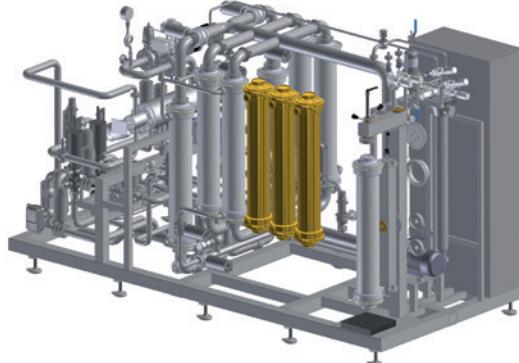


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PROFi Craft Technical Data

The PROFi Craft is a skid mounted filter unit including CIP, valve manifold, membrane block, control cabinet, controls, program and interface connections.



The PROFi Craft series was designed for breweries with annual production capacities between 12,500 and 215,000 BBL (15,000 and 250,000 hl). To meet different brewery requirements, the PROFi Craft series is available in two different models. While the system sizes vary, they share the same operating principle, membranes, warranties, product quality, reliability and safety. The information below provides a guideline for average performance. Our beer specialists are available to you help select the appropriate system to meet your specific requirements.

Beer Filtration Conditions

- Nominal flow
 - PROFi Craft 6 30 – 80 hl/h (26 – 68 bbl/hr)
 - PROFi Craft 12 60 – 120 hl/h (51 – 102 bbl/hr)
- Temperature range -2 to +12 °C (28 °F – 54 °F)
- Temperature uptake max 1.5 °C (35 °F)
- Pressure range TMP 0.3 – 2.0 bar (4.3 – 29 psi)
- Max pressure 6 bar (87 psi)

Dimensions

Length	4,350 mm (14.3 ft)
Width	1,650 mm (5.4 ft)
Height	2,350 mm (7.7 ft)



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Please contact Pall Corporation to verify that the product conforms to your national legislation and/or regional regulatory requirements for water and food contact use.

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