

Pall CBS Beer Stabilization System: Maximum Shelf Life at Minimum Cost

Maximum Shelf Life at Minimum Cost with Pall CBS Beer Stabilization System

Today, consumers expect a long shelf life of beer without changes in clarity and appearance. Aside from microbial stability, colloidal beer stability is the main influencing quality criteria for an enhanced shelf life of package beer.

The polyphenols in beer play an important role in beer stabilization as part of haze forming compounds. To control the level of polyphenols in beer, brewers use PVPP as adsorbents for stabilization. The technology of beer stabilization with PVPP was developed by Schenk as part of today's Pall Corporation.

Based on Pall's experience with classical PVPP stabilization systems it was an obvious approach to follow this well-known stabilization technology also for a continuous system solution.

The new Continuous Beer Stabilization System (CBS system) is a flexible polyphenol stabilization solution from batch to continuous operation, providing precise stabilization effectiveness at the lowest cost and with negligible beer losses.

The CBS system provides a seamless link in the brewing process between batch or continuous clarification and final filtration. This uninterrupted mode of operation eliminates the need for batch PVPP and cuts silica gel dosing to a minimum.

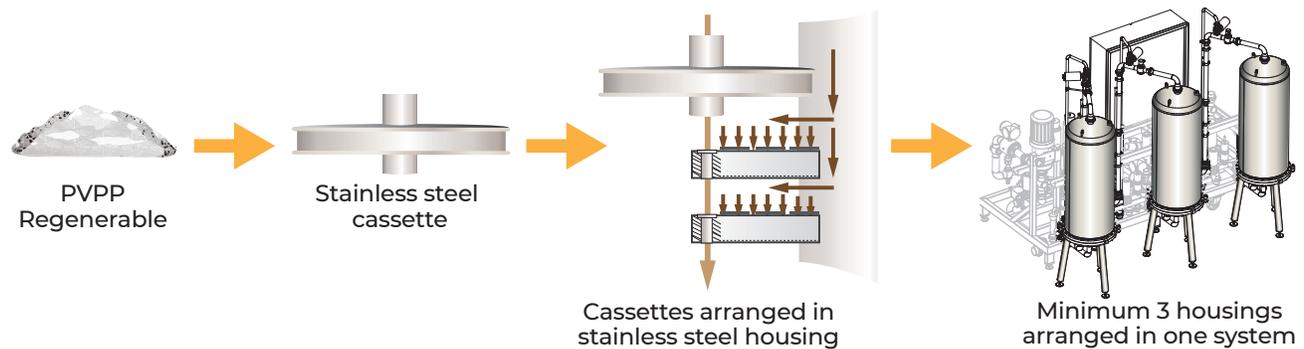


Pall's CBS System combines approved materials in beer stabilization (PVPP) with a new technology, enabling continuous stabilization of all types of beer. This streamlined process also enhances product consistency and maximizes throughput at volumes ranging from 80 hl/h to 800 hl/h. The system can be easily integrated with continuously operating membrane filtration systems and allows flexible handling of varying stabilization demands for different types of beer.

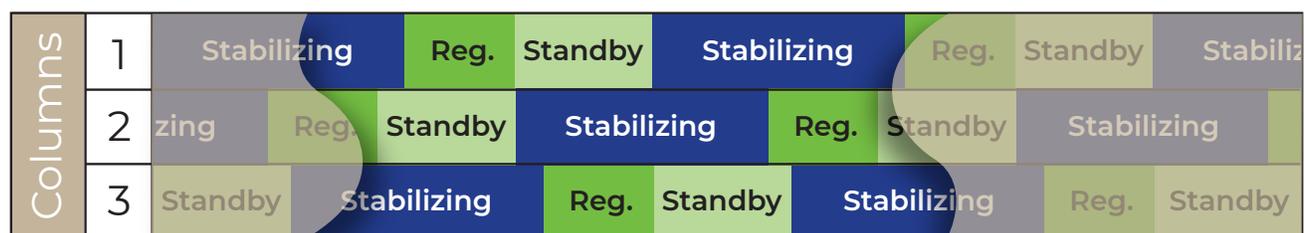
The CBS Technology

The newly developed stabilization solution combines the well-proven stabilizer material PVPP and its related regeneration sequences with new operation processes and system designs.

CBS systems operate with high quality PVPP from premium supplier as base material. The PVPP is caged in a stainless steel cassette as a fixed bed adsorber for multiple use. Between 20 and 30 cassettes are installed in a housing, representing one stabilization column. three to six columns build a process unit, which is connected to a valve knot and a CIP unit.



During processing the columns are operated in an alternated sequence with varying throughputs or partly in regeneration and standby. The combination of alternating sequences combined with controlled flux variations per column results in a continuous process with a highly precise stabilization effectiveness.



The stabilization level is adjusted for each brand and type of beer individually to allow optimum stabilization at lowest cost. The system operates fully automated. Due to the fixed bed technology there is no mechanical stress on the PVPP, thus powder handling and replenishment of PVPP is not required during entire cassette service life.

PVPP losses are below the detection limit due to application of a defined PVPP particle size combined with zero movement inside the cassettes. Measurements have shown a reduction of 0.3% over 1000 regeneration cycles corresponding with a loss rate per stabilization cycle of 0.0003%. This very low level is near the limits of detection and not from relevance anymore for any particle release to product.

Typical periods between refills are > 1,000 regeneration cycles or > 24 months. Refills are done on site and offered by Pall service technicians.

CBS systems are typically installed directly after beer clarification with kieselguhr or crossflow membrane filtration.

CBS cassettes are made from stainless steel and can be reused multiple times and refilled with fresh PVPP once the existing PVPP is exhausted.



Features and Custom Benefits

Compact system design

- Serves continuous and batch operations
- Valve connection and CIP are integrated
- Small floor space requirements
- Easy installation and flexible positioning
- Negligible oxygen uptake from start

Fixed bed technology

- No powder handling
 - Eliminates PVPP handling failures
 - No storage, dosage or dust exposure
 - Aligns with breweries' sustainability programs
- No PVPP movement
 - Reduces PVPP losses
 - Prevents particle release into product
- Easy stop and start operation
 - Equates to flexible scheduling and permanent availability

PVPP as stabilizing agent

- Well-known material and highly specific to polyphenols
 - Creates high-quality, food contact compliant product

Highly automated process

- Easy to operate with low to no need for operator engagement
- Eliminates false dosing rates and other operator errors
- Dynamic adjustment to stabilization needs of the beer
- Easy and fast brand change and startup/finishing

Low system hold-up volume

- Very low beer and beer extract losses
 - < 0.1 %
- Low water and caustic consumption for cleaning and regeneration
 - OPEX at \$.01 to .02/hl
- No need for CIP tanks
 - Less space required and lower capital costs

As a result, from the above described customer benefits the CBS systems provides the lowest in class investment and operation cost for beer stabilization with PVPP.

CBS Technical Data

The CBS systems are skid-mounted stabilization units including CIP, valve manifold, cassette columns, control cabinet, controls, program and interface connections.



Example of a CBS 630 system for 600 hl/h continuous beer stabilization

The CBS series was designed for breweries with filter line capacities between 80 and 800 hl/h. To meet different brewery requirements, the CBS series is available in three different models: the 3, 6 and 9 series. While the system sizes vary, they share the same operating principle, cassettes, warranties, product quality, reliability and safety. The table below provides a guideline for average performance. Our beer specialists are available to help you select the appropriate system to meet your specific requirements.

	CBS System
Flow rate range (hl/h; bls/h)	80 – 800 (68-681)
Max pressure (bar/psi)	6.0/87
Max temperature (° C/F)	85/185
No. columns/unit	3-6 (9)*
No. cassettes/column	20-30
Specific system volume (l/m ²)	2.6-2.8
CE Mark	Yes
Dimensions 3-series (m - l/w/h)	3.70/2.60/2.50 to 3.00
Dimensions 6-series (m - l/w/h)	5.05/2.60/2.50 to 3.00
Dimensions 9-series (m - l/w/h)	6.50/2.60/2.50 to 3.00
Dimensions CIP (m - l/w/h)	1.85/1.10/1.90
Connection to line	Double seat valve DN 80/100
CIP	Single use/Zero tank
Hygienic design	Certified by Hygienic Institute Weihenstephan, Reference 751030
Pressure vessel design	According to national regulations of final installed location
Control	Stand-alone (Siemens or Alan Bradley) with industrial standard connection

*Number of columns can be customized up to 9.

Sustainability, Quality and Maintenance

The CBS 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.

Beer IoT

To gain maximum advantage from the data generated by a PLC or Scada control system, Pall implemented IoT based digital information and process management to beer systems. With this IOT-based extension of data management in real time, different levels and hierarchies in the brewery have constant access to defined data in a user edited format.

Typical examples for digital data analytics are:

- **Specific consumption data:** e.g., water, cleaning agents, electricity, membranes
- **Performance data:** e.g., degree of utilization, efficiency, and downtimes
- **Quality data:** e.g., oxygen uptake, color, original extract, haze
- **Push notifications:** e.g., alarms and messages
- **Documentation and service data**

In addition to actual real time data, trends, historical reviews, brand related influences, and raw material impact, other key influencing factors can be analyzed with the IoT tool. Benchmarking with other installations within a brewery group and against the industry average is also possible and can be switched on and off.

Pall IoT provides direct online availability of all systemspecific documentation and training documents, spare parts lists, service reports, operating instructions, safety instructions and acceptance reports.

Alarm messages can be displayed directly on multiple display devices, reducing response time in the event of a production problem. This function can be switched activated by each individual user, selectively.

In summary, Pall IoT solutions contribute to improve plant KPI`s, process optimization and product assurance.

CBS Installation

The CBS Technology is ideal for stabilization in combination with Pall PROFi hollow fiber clarification systems but also works perfectly with other crossflow or classic DE filter systems. Installations are typically directly downstream of the PROFi systems without the need of a buffer tank in between. This saves investment cost but also reduces consumption of cleaners and de-aerated water and improves oxygen uptake.

Additionally, CBS systems can also be coupled with other crossflow systems or technologies where there is a sufficient clarification upstream.



PROFI hollow fiber clarification system

About Pall

Pall Corporation provides critical filtration, separation and purification solutions to meet the demanding needs of a broad spectrum of life sciences and industrial customers around the globe.



+1-866-905-7255 **Food and Beverage toll free**
foodandbeverage@pall.com

Corporate Headquarters
Port Washington, NY, USA
+1-800-717-7255 toll free (USA)
+1-516-484-5400 phone

European Headquarters
Fribourg, Switzerland
+41 (0)26 350 53 00 phone

Asia-Pacific Headquarters
Singapore
+65 6389 6500 phone

Visit us on the Web at www.pall.com/foodandbev
Contact us at www.pall.com/contact

Pall Corporation has offices and plants throughout the world. To locate the Pall office or distributor nearest you, visit www.pall.com/contact.

The information provided in this literature was reviewed for accuracy at the time of publication. Product data may be subject to change without notice. For current information consult your local Pall distributor or contact Pall directly.

IF APPLICABLE 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.

© Copyright 2022, Pall Corporation. Pall, and  are trademarks of Pall Corporation.
® Indicates a trademark registered in the USA.

FBBRCSENB
AUGUST 2022