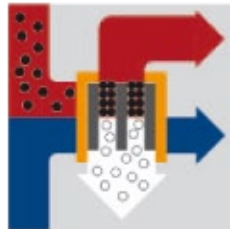


## BHS Autopress

Solid-liquid separation –  
recovery of solids and filtrates.



**BHS**  
SONTHOFEN

# BHS-Sonthofen

Innovative  
and competent.



**BHS**  
**SONTHOFEN**

**The BHS plant in Sonthofen. For centuries a driving force behind the economic and technological development of the Allgäu.**



Tradition at BHS-Sonthofen goes back to the year 1563. In those days, the site of the factory was used for smelting iron ore from the surrounding area. The pig iron that was produced went to the local nail smiths and armourers. The 19th century then saw the advent of mechanical engineering. Numerous patents from that time bear witness to the company's long-standing tradition of technical inventiveness, earning it a place among the market's best. Filtration

systems for separating solids and liquids have been in production for over 50 years. Today, BHS-Sonthofen is an independent, medium-sized hi-tech company with activities all over the globe. It has extensive experience in using filtration systems for reliably and rationally separating suspensions of all types. The BHS product range comprises several different filter types, providing the appropriate solution to any problem definition. The BHS Autopress, a fully automatic, gas-tight pressure filter, is used in many critical solid-liquid separation processes worldwide.

# Applications and benefits

The BHS Autopress – developed for the most critical filtration, washing and drying operations for a wide range of applications.

## **Bulk and final pharmaceutical products**

GMP requirements demand the very highest quality of equipment for product processing in terms of surface finish, CIP capability, complete containment of solids, liquids and vapors, and heel-free discharge.

*Plant extracts, lifestyle products, fillers, carrier materials*

## **Active pharmaceutical ingredients (API's)**

Validation to GMP processing guidelines, FDA-approved materials, and CIP and SIP operation are provided with the BHS Autopress.

*Broad-spectrum antibiotics, acetyl salicylic acid, virucides, interferones*

## **Catalysts, activated carbon, precious metals and similar products**

In addition to the separation of reaction components from the active substance solutions, it is possible to avoid cross contamination when separating, washing and treating catalysts and other absorbing materials.

*Activated carbon from active substances, precious-metal catalysts, precious metals, precious-metal solutions*

## **Paints, dyes and pigments**

It is possible to filter, wash and dewater very fine particles. Equipment cleaning between campaigns is easily accomplished without cross-contamination and residual solids.

*Photochemicals, printer pigments, intermediate paint products, resins*

## **Specialty, fine and agricultural chemicals**

Difficult-to-process products, complete containment, gas-tight and dust-free cake discharge are typical areas in which the BHS Autopress is used.

*Self-igniting products, toxic substances, gas-generating products, crystallizing and sticky products, lithium compounds, corrosive products, silanes and arsenic compounds are typical applications*

## **Environmental applications**

High throughput rates and cost-effective dewatering processes are the goals that can be achieved with a BHS Autopress.

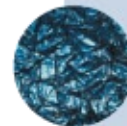
*Industrial effluent, conditioning of spent filter aids, separating organic substances from waste water, precipitation residues*



Bulk & final pharmaceutical products



Active pharmaceutical ingredients



Catalysts, activated carbon etc.



Paints, dyes & pigments



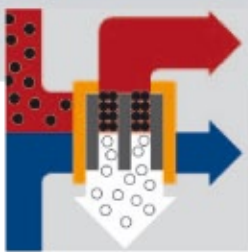
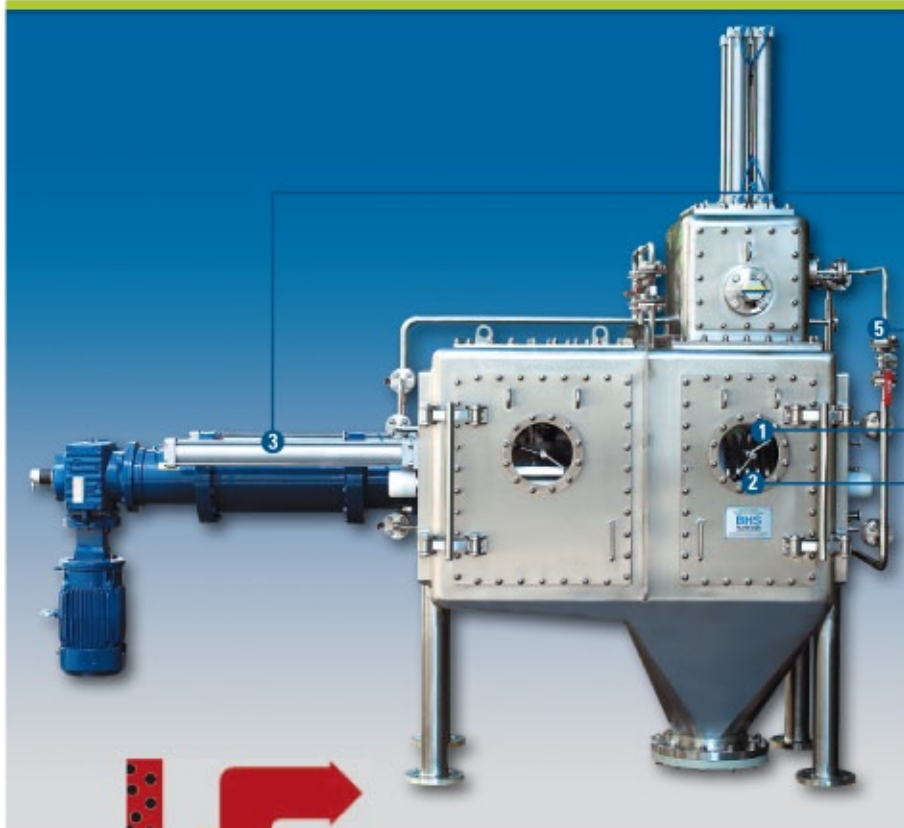
Specialty, fine & agricultural chemicals



Environmental applications

## BHS Autopress

A fully automatic, gas-tight pressure filter for the most critical process requirements.



Filtrating,  
Washing, Extracting,  
Dewatering

BHS Autopress filters are fully automatic, batch pressure filters with vertically positioned filter plates. Moderately to poorly filtering suspensions can be efficiently filtered in an absolutely closed system. Products that need to be processed in a sterile environment or in closed equipment for reasons of toxicity and workplace safety can be handled in the pure state. Filtration and cake formation take place on both outer sides of the filter plates. The filtrate is channelled through centre of the filter plates and drawn off through filtrate outlets.

The filter cake is normally discharged in a pre-dried state. In addition, the cake can be washed, extracted, compressed, blown out and dried. At all stages of the process, the filter plates can be compressed to exert pressure on the filter cake.

Using a large number of filter media (synthetic, single-layer or multi-layer-metal) and materials it is possible to gear the BHS Autopress exactly to the application.

The BHS Autopress is available in closed design for the most critical of tasks, paying particular attention to surface quality, processing guidelines and compatible materials.

# Specifically designed for your applications

A filter engineered exactly to your separation activities.

## 1 Filter plates

### 1 Filter plates

The filter plates in stainless steel or synthetic are lined on both sides with filter media supported by backing screens which act both as supporting as well as drainage layers and ensure a high filtrate system flux rate. Textile or metal filter media as well as sintered or multi-layer materials can be used as the filter medium. Both sides of each of the filter plates are served by two separate filtrate outlet systems. This not only duplicates the filter area but also the filtrate outlet cross section. This unique system provides an optimum cake structure and also enables the filter cake to be treated, washed and extracted from both filtrate sides.

## 2 Plate stack

The filter elements are supported on two guide rods between both end plates at the head and foot section of the unit. Pressed mechanically or hydraulically, the end plates force the intermediate plates together to form a stack. Ranging from 20 to 40 mm, the distance between the plates is determined by the thickness of the spacers. The spacers provide for reproducible cake depth and can be changed to meet the process requirements. Using compressible spacers made of high-quality elastomers, it is possible to compress the plate stack and thus the filter cake. At the same time, the diaphragm in the sliding cylindrical housing gives the filter cake dimensional stability between the filter ele-

ments and ensures complete containment of the plate stack at the head and foot section.

## 3 Compressing system

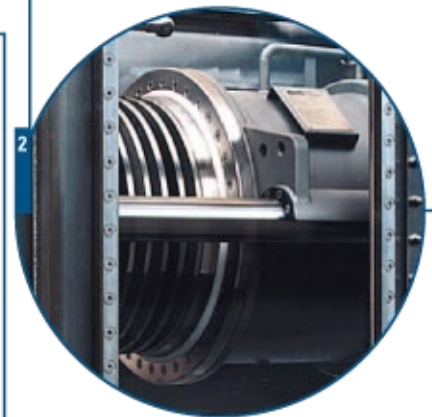
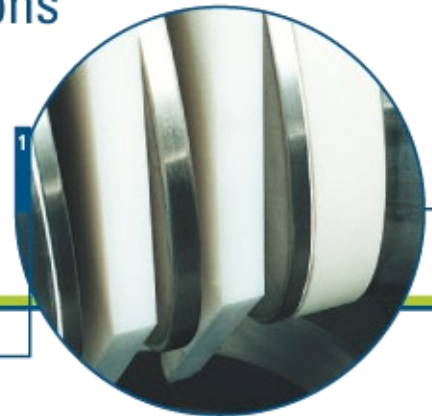
Hydraulically operated cylinders or electromechanical spindle drives enable the plate stack to compress to a pressure of 40 bar onto the filter cake. The hydraulic drive is separate from the BHS Autopress and can be installed outside of the clean-room environment.

## 4 Cake discharge

The filtered, washed and dried solids are discharged fully automatically at the end of cycle. The discharge is heel-free and the cake can be fed directly to downstream dryers, IBC's or other equipment. The process housing is moved to the home position, the plate stack is relaxed and the filter cake between the filter elements discharged with cylinder-operated scrapers.

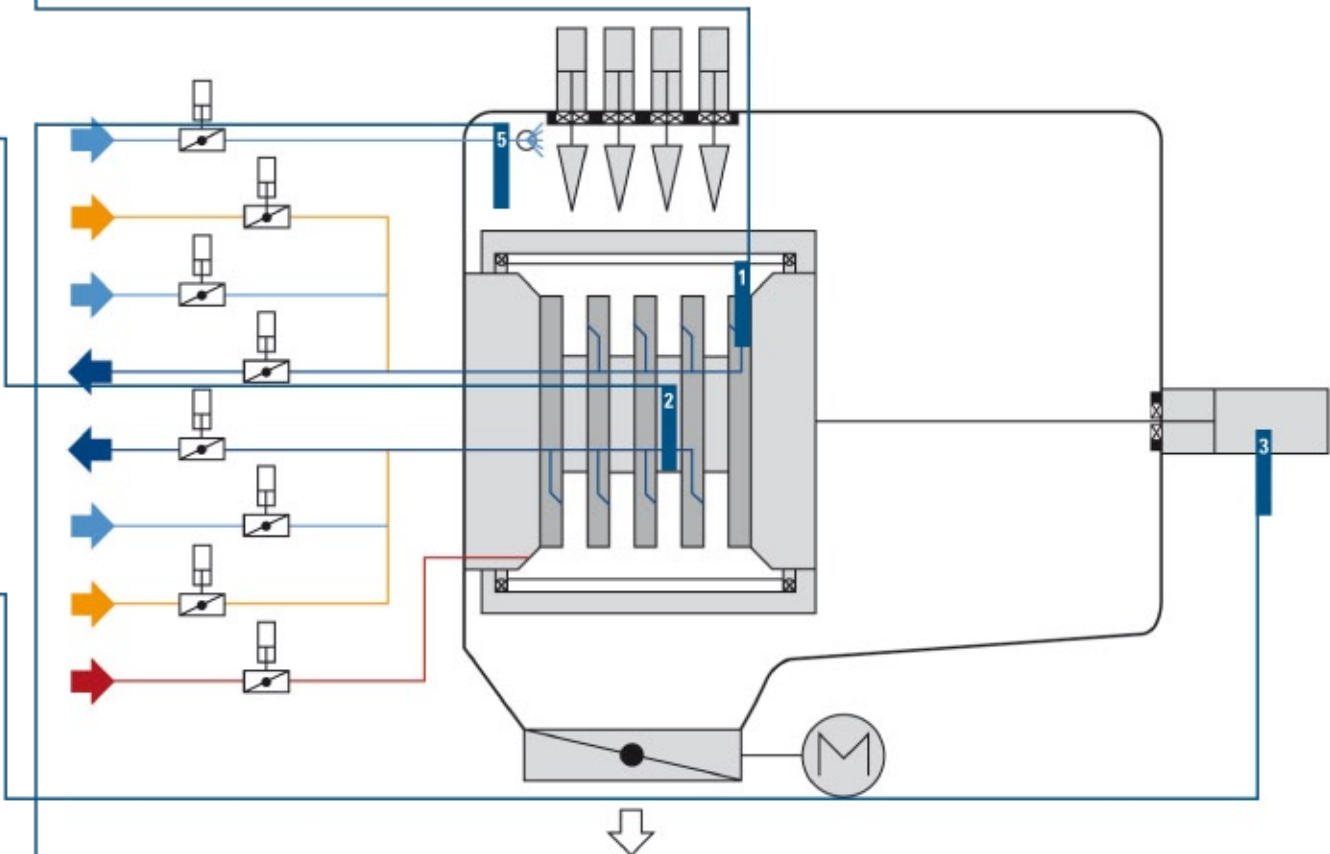
## 5 CIP cleaning

With the filter housing open, the filter plates are readily accessible and can be cleaned with spray heads and nozzle system. The sliding filter housing and the entire enclosure are equipped with the nozzles and connections necessary for automatic CIP operation.



## The BHS Autopress in brief

The suspension being processed is pumped into the filter housing of the BHS Autopress where it distributes in the spaces between the plates. The solids are retained on both outer sides of the filter plates and, as a result of the pressure difference, the filtrate flows through the filter medium into the filtrate channels and through the filtrate outlet lines. As the filter cake builds up and grows it completely fills the cavity, thereby providing maximum efficiency for displacement washing in the direction of flow.



The washing medium is pumped through one of the two filtrate outlet lines into the Autopress where it is evenly distributed throughout the filter plates and pressed through the filter cake. The wash liquid flows through the opposing filter plate into the filtrate outlet system. While the filtration, washing and cake dewatering processes are taking place, the elastic diaphragm is pressed over the plate stack. This prevents cross filtration and also prevents the filter cake from moving from the filter plates during the washing or drying process.

Once the process cycle has finished, the filter plates are relaxed, the housing is opened and the filter cake is discharged fully automatically. The filter cake is removed from the filter medium by a pulse of compressed gas and removed from the chambers between the plates by scrapers.

The process chambers and filter plates are then ready for CIP cleaning.

# The BHS Autopress and specifications and options

PLC control systems and ancillary equipment offer a solution to meet your project objectives.

The right solution for every application.

**Pharmaceutical version**, ground-smooth and rounded welds, polished and validated

- surface finish Ra < 0.8 μ
- certified materials (FDA)
- design to processing guidelines (GMP)
- integrated cleaning equipment (CIP)
- sterilizable

**Modular skids**, for easy installation

- complete systems, including pump, valves, piping and control
- locally operated PLC control systems including purged panels, MMI's (Man-Machine Interfaces) and other custom-designs
- user-friendly filter systems for application flexibility

**Special-material versions**, corrosion-resistant and to high and low temperatures

- parts coming into contact with product are made of high-quality stainless steels, Hastelloy and similar materials
- filter plates and diaphragm in special synthetic materials (PTFE, PVDF, PFA and similar materials)
- filter media can be synthetic, single-layer or multi-layer metal

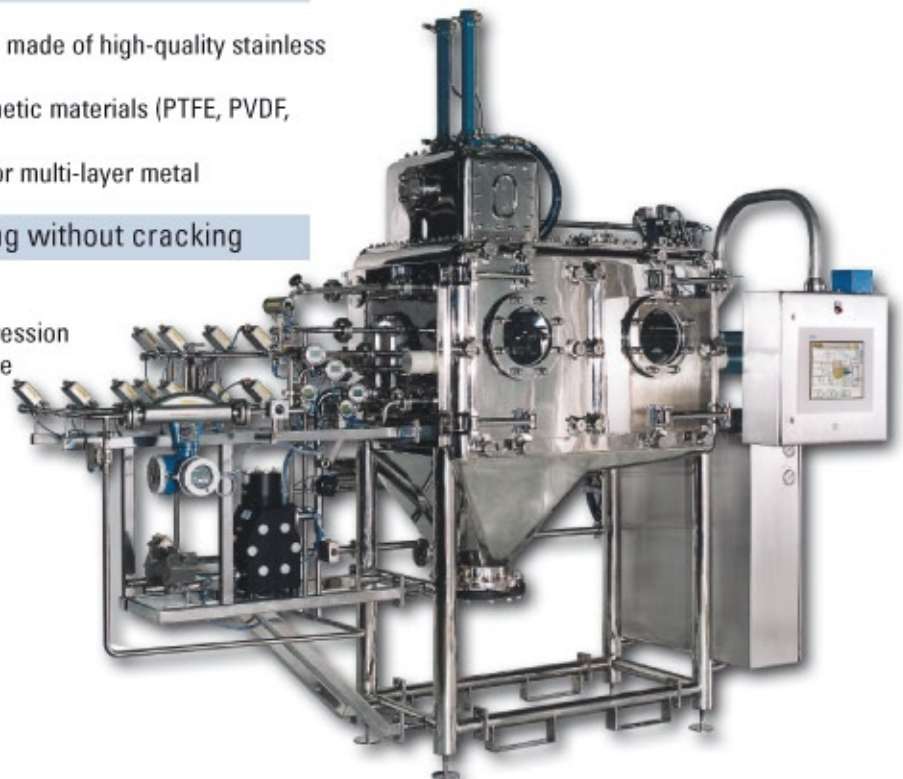
**Cake compaction**, washing and drying without cracking

- elastomeric plate spacers
- cake washed and dried under slight compression
- mechanical or hydraulic compression of the filter cake up to 40 bar

## Technical Data: standard filter

type	plate Ø, m	filter area, m <sup>2</sup>	dimensions l x w x h
AP 300	0,3	0,2 - 1,0	2,9 x 1,1 x 2,5
AP 500	0,5	1,0 - 5,0	4,0 x 1,4 x 3,3
AP 700	0,7	2,0 - 14,0	4,5 x 1,6 x 3,7
AP 1000	1,0	10,0 - 25,0	5,0 x 1,8 x 3,9

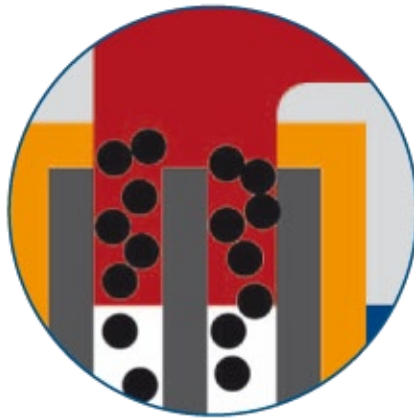
Dimensions and weights are subject to technical development. We reserve the right to alter these without notice. Dimensions and weights are rounded and only approx. figures.



## How our filters work

BHS Autopress for all conceivable chemical process applications.

**Filtration**  
**Cake formation**  
**Filtrate outlet**



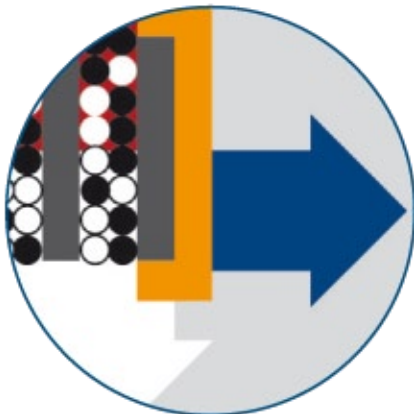
### **Cake formation**

The BHS Autopress can be operated in one of two ways. Filtration takes place either at constant pressure or constant flow.

Slurry feeding continues to the end of the filtration cycle when the chambers between the filter plates are filled with filter cake.

As the tubular diaphragm expands to tightly enclose the plate stack, the filter cake is unable to escape, producing a compact cake of even porosity.

**Cake washing**  
**Cake treatment**  
**Plug flow**



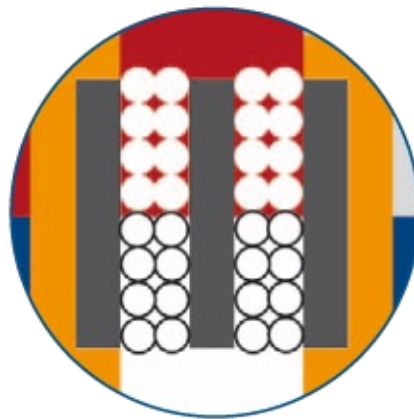
### **Washing process**

At the conclusion of filtration cycle, the even pore structure of the filter cake as well as the thin cake depth provide the ideal conditions for efficient displacement washing.

The medium provided for washing the cake is pressed through one of the two filtrate outlet lines through the filter cake and into the filter plate on the opposite side. In order to enhance the displacement of the interstitial capillary liquid, it is possible to reverse the washing process, i.e. reverse the direction of flow, which alters the pore structure of the filter cake. This significantly improves the washing result and substantially reduces the consumption of washing medium.

During the washing process it is additionally possible to compress the filter cake slightly which prevents the formation of cracks.

**Cake dewatering**  
**Drying**  
**Pressing**



#### **Cake dewatering**

The BHS Autopress offers many different ways of pre-drying or drying the filter cake efficiently using either mechanical or thermal processes.

Once the cake has been washed, liquid is displaced from the pores in the same way using pressurized gas. In order to optimize gas throughput and dewatering, the filter cake is additionally compressed while drying takes place. The filter cake can also be heated with hot gas or steam to meet economic and worker safety objectives. The gas-liquid mixture is collected on the filtrate side and returned to the process by means of a gas circulation system.

**Cake discharge**  
**Filter cloth cleaning**  
**CIP cleaning**



#### **Cake discharge**

At the end of the cycle, the solids are discharged heel-free and fully automatically. The filter plates are relaxed after opening the housing and the distances between the filter plates widened so as to create space for the scrapers to remove the filter cake. A pulse of pressurized gas from the filtrate side assists cake discharge.

Even thin filter cakes are fully discharged because they are compressed to form a complete segment during the separation process. The cake can be discharged and filter plates and housing cleaned without dismantling using an automatic CIP system.

## BHS-Sonthofen – the experts in filtration, cake washing and drying operations.

We can solve your difficult filtration problems early in the project phase. In order to determine the filter best suited to your application, BHS conducts special trials in our testing facility – with your actual slurry.

We work with you to develop a concept for the overall system, including flow diagrams for each filtration process, engineering and programming for all of the process sequences.



Challenge us today to meet your project objectives!

Weitere Produkte:



Tellerdruckfilter



Kerzenfilter



Druckdrehfilter



Bandfilter

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