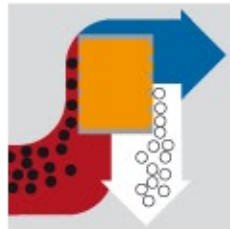




## BHS Candle Filter

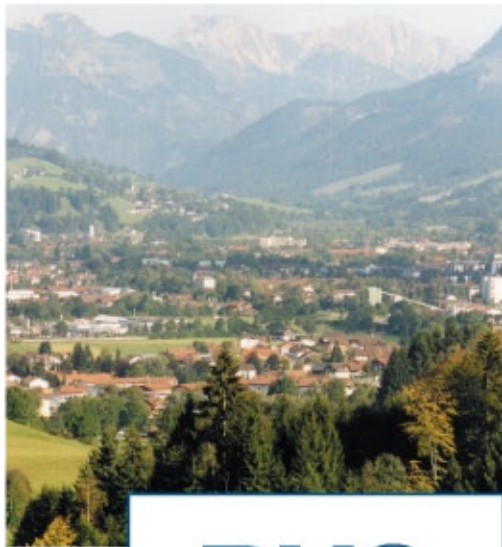
Solid-liquid separation –  
recovery of solids and filtrates.



**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 longstanding 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, providing the appropriate solution to any problem definition. BHS Candle Filters have been in use for many years in more than 200 applications worldwide to the tremendous satisfaction of its operators.

# Applications and benefits

The BHS Candle Filter is installed for a wide range of uses and applications.

## Pharmaceutical products and antibiotics

No moving parts in the product zone, no shafts passing through the machine, GMP compliant design and polished surfaces satisfying all the requirements of a fully validatable filter system capable of CIP operation.

*Antibiotics, penicillins, myceles, fermentation products, activated carbon from active components, bleaching soil, kilo-labs and pilot plants*

## Catalysts, activated carbon, filter aids

When using filter cloths in the BHS Candle Filter even finest carbon and catalysts can be retained. A particle-free filtrate quality is obtained.

*Activated carbon, palladium carbon, hydrogenated catalysts, precious metal catalysts*

## Applications in chemical processing industries

Large amounts of difficult-to-process products, complete containment as well as dust-free and gas-tight cake discharge are typical applications for candle filters.

*Self-igniting products, toxic substances, acidic products, polymers, organic solvents, iron hydroxide, intermediate synthetic products, resins*

## Agricultural chemicals and mineral products

Large filter areas with minimum floor space and the use of tight-woven textile filter cloths meet the stringent requirements placed on the processing of large amounts of slurries containing fine or amorphous particles.

*Zeolites, silicates, phosphates, aluminum hydroxides, aluminum oxide, sulfates*

## Oils and foodstuff

The separation of sensitive agglomerates as well as the processing of crystalline products is possible meeting USDA and FDA requirements. The candle filter is known for its air tight design and operation under inert atmospheres.

*Frying oil, edible oils, pectines, lecithines, tartaric acid, citric acid, caffeine, plant extracts*

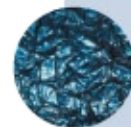
## Applications in environmental & energy technology

High throughput rates, optimum washing and dewatering of the residues, corrosion-proof material design, automated operation and much more are the criteria demanded from BHS Candle Filters.

*Recycled waste water, industrial effluents, power station effluents, electrolytic solutions, pickling baths, sewage sludge, liquid sludge, scrubbing amines*



Pharmaceutical products & antibiotics



Catalysts, activated carbon, filter aids



Applications in chemical processing industries



Agricultural chemicals & mineral products



Oils & foodstuff



Applications in environmental & energy technology

## BHS Candle Filter

Batch operated filter for the most stringent requirements for clarification, filtration and recovery operations.



Filtration,  
washing, extracting,  
dewatering

The BHS Candle Filter is a batch filter.

Filtration and cake formation are effected under pressure. The cake is built up, washed and dewatered on candle shaped filter elements that are arranged vertically in a pressure vessel. Assisted by a gas expansion of the filter cloth from the filtrate side the residues are released from the filter elements and discharged in dry or wet condition.

Candle filters are used for the filtration of residues, particularly for suspensions with low solids con-

tent or very fine, amorphous, difficult-to-separate particles.

Due to a variety of options BHS Candle Filters can be used in a wide range of applications; normally in batch-type operations with dry discharge, but also as a sludge or wet discharge filter in batch and continuous operation, using multiple filter vessels.

The completely enclosed machine is ideally suited for the filtration of toxic products and GMP compliant production under inert and sterile conditions.

# Specifically designed for your applications

A filter engineered exactly to your separation activities.

## 1 Filter elements

### 1 Filter elements

The filter candles consist of three major components: internal filtrate discharge pipe, perforated supporting body with evenly-spaced welded rods and a textile filter cloth that can be selected to meet specific requirements. The candles are covered with replaceable filter cloths and are fixed at the top and bottom end by means of special locking devices. The filter candles are either made of metallic materials or completely of polypropylene or other resistant plastic materials that also meet all FDA plastic test requirements. The unique design and the large and open cross sections of the supporting bodies and discharge pipes ensure good adhesion of the particles during the filtration phase, a high filtrate flow rate and safe cake release from the cloth by means of gas-expansion or rinsing from the backside.

### 2 Register system

The filter candles are arranged in an optimum configuration within the pressure vessel. The candles are mounted to individual collection registers. Individual registers provide for controlled cake discharge, easy candle maintenance and the ability to isolate a register in the case of a problem candle without interrupting the process operation. Leak-free operation and elimination

of by-pass is ensured by a positive seal connection between the candle and register and at the register pipes. Register supports prevent the register pipes from becoming mis-aligned during operation.

### 3 Heel filtration

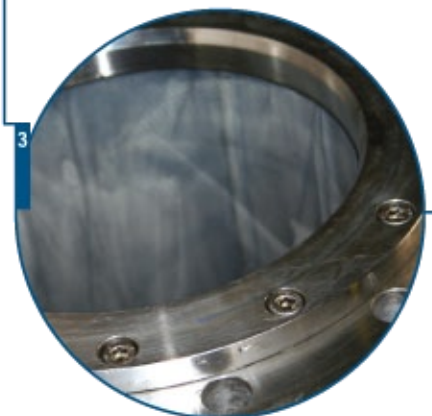
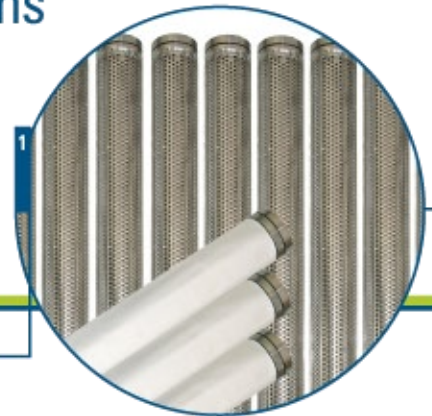
Operating safety also includes a process for filtering small amounts of liquid and the residual heel. Two alternatives are available for this purpose:

- BHS falling film filtration
- Internally filtering candles at the vessel cone.

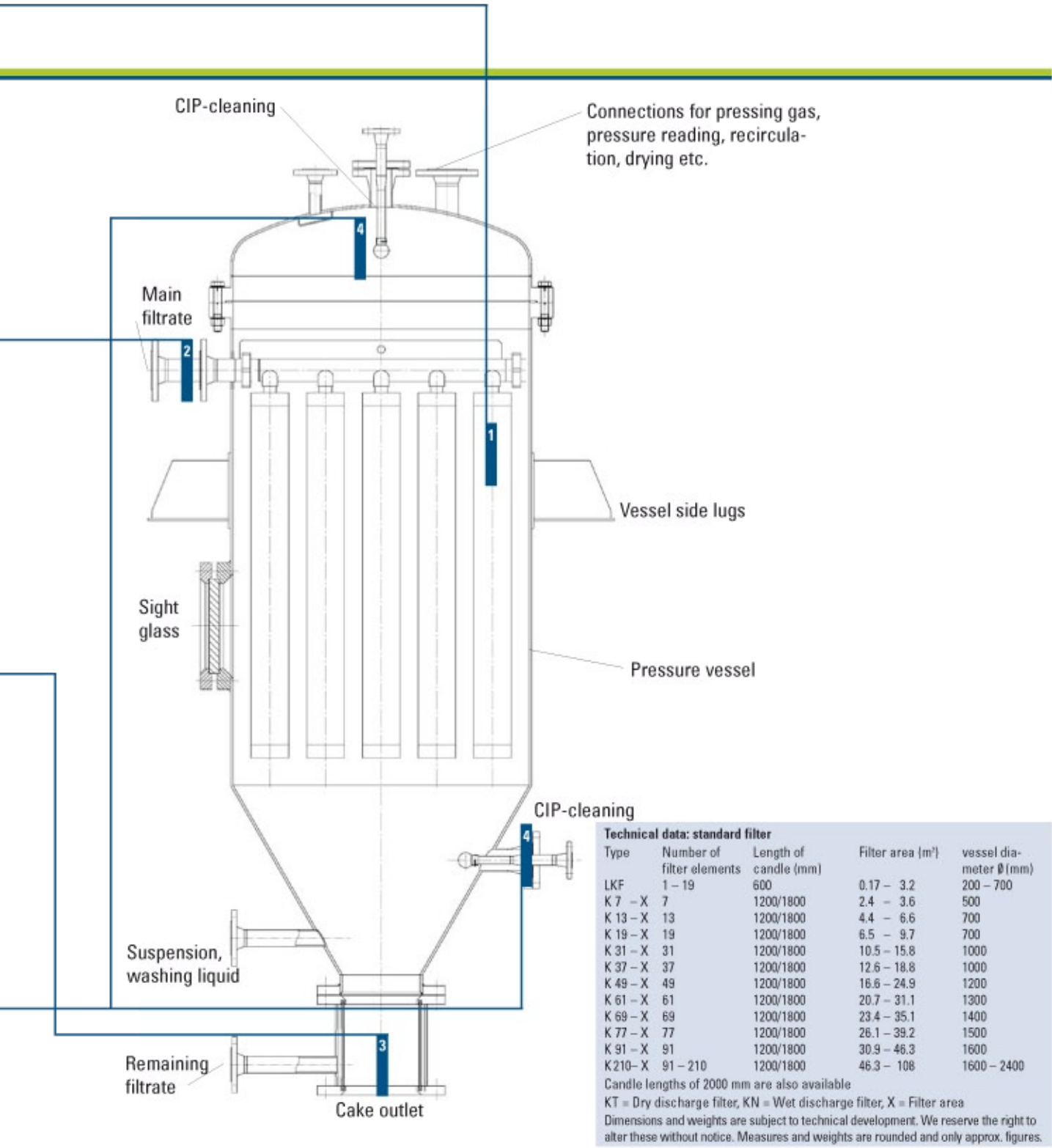
Both alternatives offer complete heel filtration with a minimum of compressed gas.

### 4 CIP system

The built-in CIP system of the BHS Candle Filters enables convenient cleaning of the inside of the vessel, the register pipes and filter candles, without the need for opening or dismantling the equipment. For this purpose the cleaning fluid is sprayed under high pressure via tank cleaning nozzles in the filter cover and focussed jet nozzle assemblies placed at the vessel wall and in the conical section.

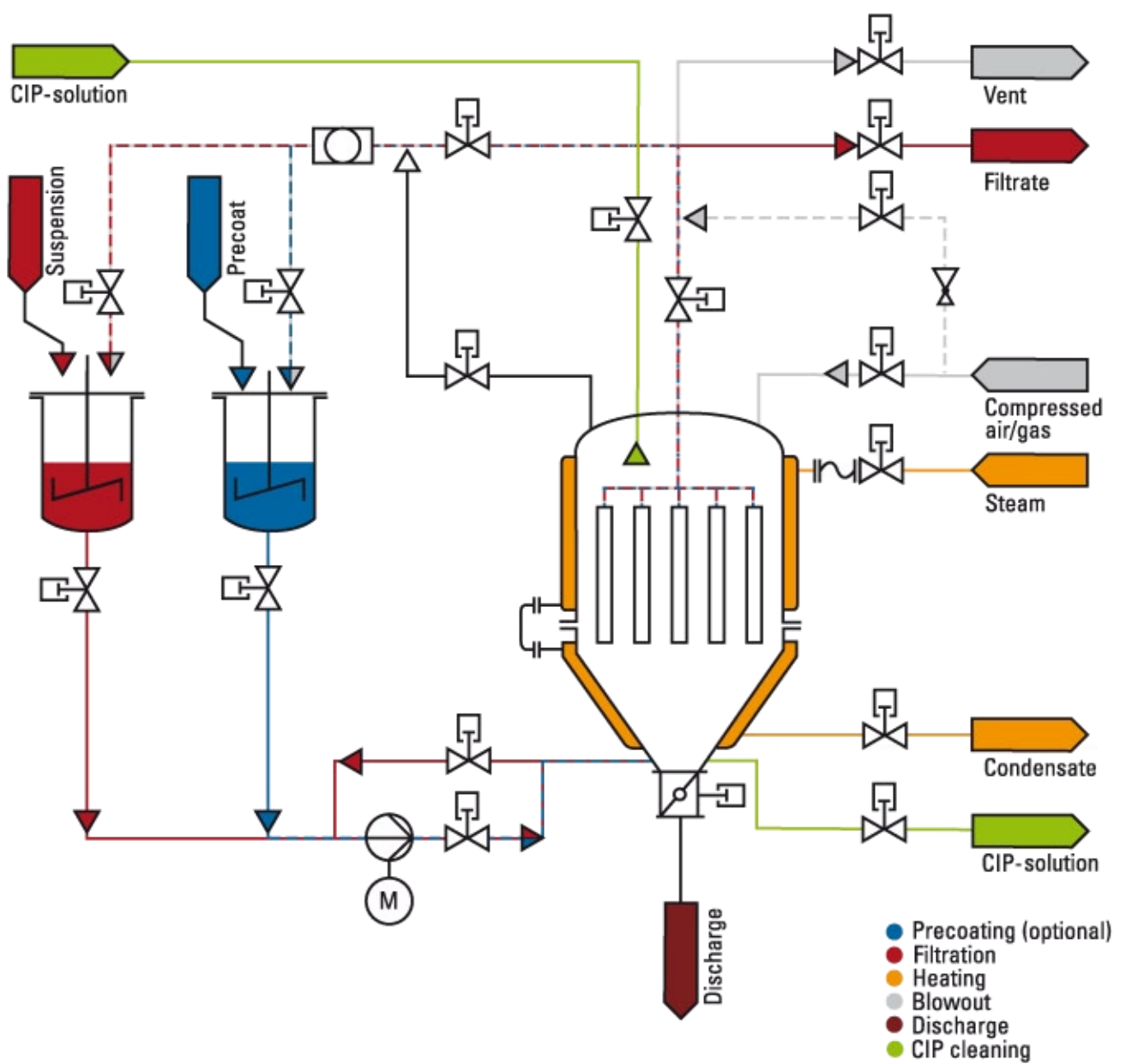


# The BHS Candle Filter at a glance



# Possible installation of a BHS Candle Filter

Typical process flow diagram (PFD) with CIP cleaning system.



## Operational details

A batch operated pressure filter.

**Filtration**  
**Cake forming**  
**Filtrate separation**



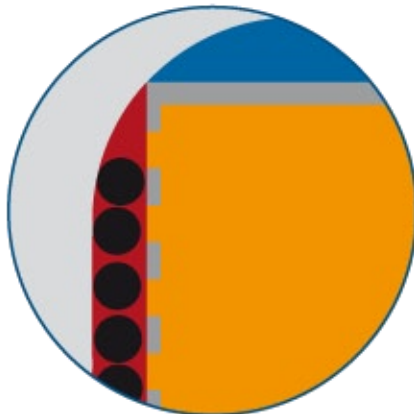
### **Cake formation**

The BHS Candle Filter is ideal for many separation tasks.

Resulting from the prevailing pressure differential the solids are retained as filter cake on the filter cloth. The filtrate flows through the perforated supporting structure and through the dip pipe integrated in the filter candle and then exits the vessel through the register pipes.

The filter cake is built-up on the filter candles, which can be made either of metallic or synthetic material.

**Cake washing**  
**Cake treatment**



### **Post treatment**

Even though candle filters are typically used as clarifying filters, the cake can be washed very well due to the special surface structure of the BHS filter candle and thus very uniform cake structure.

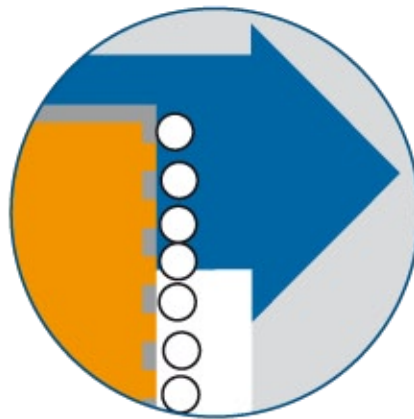
Dissolved substances are removed out of the pores of the filter cake layer by means of displacement washing.

The washing medium is pumped into the vessel, pressed through the filter cake and discharged through the filtrate outlet system.

This procedure can be repeated using various media.

Besides washing, the cake can also be treated by steaming and extraction.

**Cake dewatering**  
**Drying**  
**Steaming**

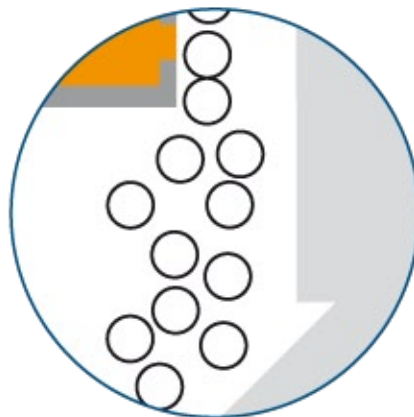


**The drying phase**

If the cake has to be dewatered, it usually undergoes a drying step by blowing ambient temperature or hot air, nitrogen or other gases through the pores. Steam can also be used to assist the dewatering or drying process.

Compaction of the filter cake during the dewatering process under pressure is assisted by the geometry and configuration of the filter candle. As a result, the formation of cracks can be eliminated.

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



**The cake discharge and cloth cleaning**

An easy and complete cake discharge is an essential precondition for a fully automatic filter operation.

For dry discharge compressed gas is introduced to the filter candle from the filtrate side, causing an expansion of the cloth and cracking of the cake along the welded rods.

The well directed movement of the cloth will release the filter cake completely. The dry residues fall through the vessel cone and open discharge valve.

During thickening filtration the filtrate is pressed in the reverse direction of flow into the filter candle and through the filter cloth, washing away the residues.

After successful cake discharge the vessel is filled with liquid and the filter cloth can be cleaned by means of backwashing or blowing if necessary.

## 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 BHS Candle 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!

Other Products:



Rotary Pressure Filters



Pressure Plate Filters



Autopress



Belt Filters

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