

## **THE FLOTTWEG DISK STACK CENTRIFUGE**

Made in Germany – Maintenance Friendly and Robust



# FLOTTWEG DISK STACK CENTRIFUGES

Engineered for Your Success

## APPLICATIONS

Disk stack centrifuges are high-speed centrifuges for the mechanical separation and clarification of mixtures comprising solids and liquids. These machines can be used in a wide range of applications. Due to their special design, disk stack centrifuges work at a higher rotation speed than other centrifuges such as decanters. As a result, the centrifugal acceleration (g-force) generated by a disk stack centrifuge is significantly more powerful than in decanter centrifuges. Moreover, the disks included provide a large clarifying area. Thus, it is possible to separate ultrafine solid particles from a liquid and to separate liquid mixtures in an efficient way.

## THEREFORE FLOTTWEG

Due to the high acceleration forces and the resulting high mechanical strain, disk stack centrifuges generally require regular maintenance intervals. This is where the Flottweg Disk Stack Centrifuge plays out its strengths in full. Thanks to its compact and robust design, the bowl can quickly and easily be dismantled and re-assembled for maintenance work. Thanks to a reduced number of wear parts and seals, operation costs are reduced, maintenance is simplified, and the availability of quickly rotating components is increased.

An outstanding feature of Flottweg AC (automatic cleaning) Separators is the Soft Shot® discharge system. Compared to other systems, the Soft Shot® makes hardly any noise. The separated solids are ejected silently and in a material-friendly manner. This hydraulic system also offers a large number of options for adjustment to allow the machine to be adapted optimally to your process, increasing your product yields.

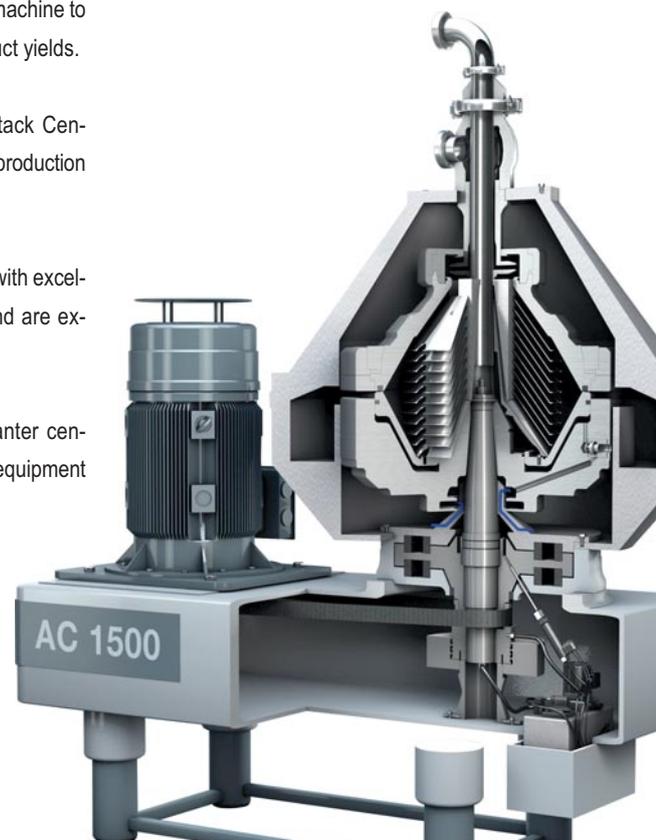
Like our Flottweg Decanter Centrifuges, Flottweg Disk Stack Centrifuges are also developed and manufactured entirely at our production facility in Vilsbiburg, Germany.

Our disk stack centrifuges win customers all over the world with excellent quality, feature highest standards of workmanship, and are extremely maintenance-friendly.

Thanks to our wide range of disk stack centrifuges, decanter centrifuges, and belt presses, we can offer the right separation equipment for any application and process.

## Advantages of the Flottweg Disk Stack Centrifuge

- Easy maintenance and fair prices for service and maintenance thanks to compact machine design
- Flottweg Soft Shot® discharge system: barely audible solids discharge
- Individual and flexible adaptation to customer processes for optimal yields
- 100% Made in Germany
- Customized solutions which can easily be integrated into existing processes and systems
- Optimum process layout: selection or combination of different separation equipment: decanters, disk stack centrifuges, belt presses and systems



# FLOTTWEG DISK STACK CENTRIFUGES

## Applications

### BEVERAGE / BREWING INDUSTRY

- Fruit and vegetable juices
- Pectin
- Citrus fruits and tropical fruits
- Essential oils
- Beer
- Wine
- Coffee and tea
- Potable alcohol

### CHEMISTRY / BIOTECHNOLOGY

- Process waste water
- Production of vitamins
- Pigments
- Solvents
- Algae (food, cosmetics)
- Fermentation broths (industrial biotechnology)

### FATS / OILS / BIOFUELS

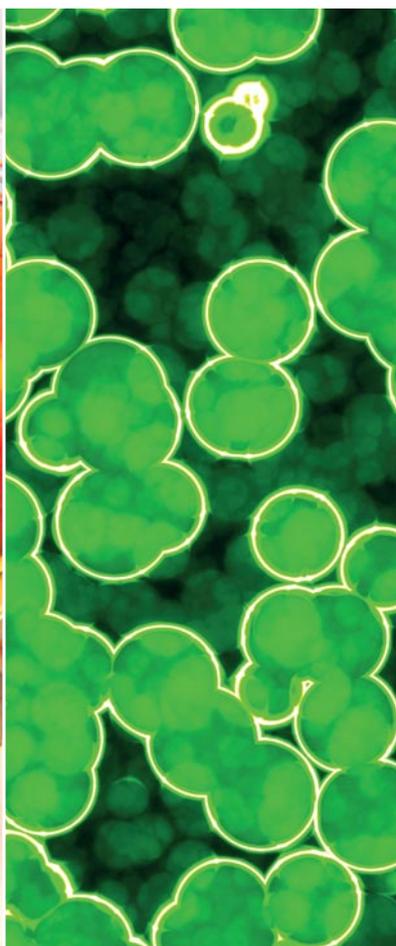
- Biodiesel
- Algae (biofuels)
- Fish oil
- Animal fats
- Olive oil
- Avocado oil
- Palm oil

### INDUSTRIAL OILS / MINERAL OILS

- Processing slop oil and oil residues after being processed via the Tricanter®
- Reservoir water

There are many more applications.

Just ask us – we will be happy to advise you.



# FUNCTIONAL PRINCIPLE OF THE CLARIFIER

## Separation of Very Fine Particles from Liquids

### CLARIFICATION TWO-PHASE SEPARATION (SOLID-LIQUID)

Flottweg Clarifiers separate solids from liquids thus enabling high efficient clarification, e.g. clarification of fruit and vegetable juices, beer,

wine, and must; processing of coffee and tea extract, clarification of solvents, and much more.

### FUNCTIONAL PRINCIPLE OF THE CLARIFIER

The product to be clarified enters the interior of the bowl through a stationary inlet pipe **1** and is gently accelerated by the distributor **2** to the bowl speed.

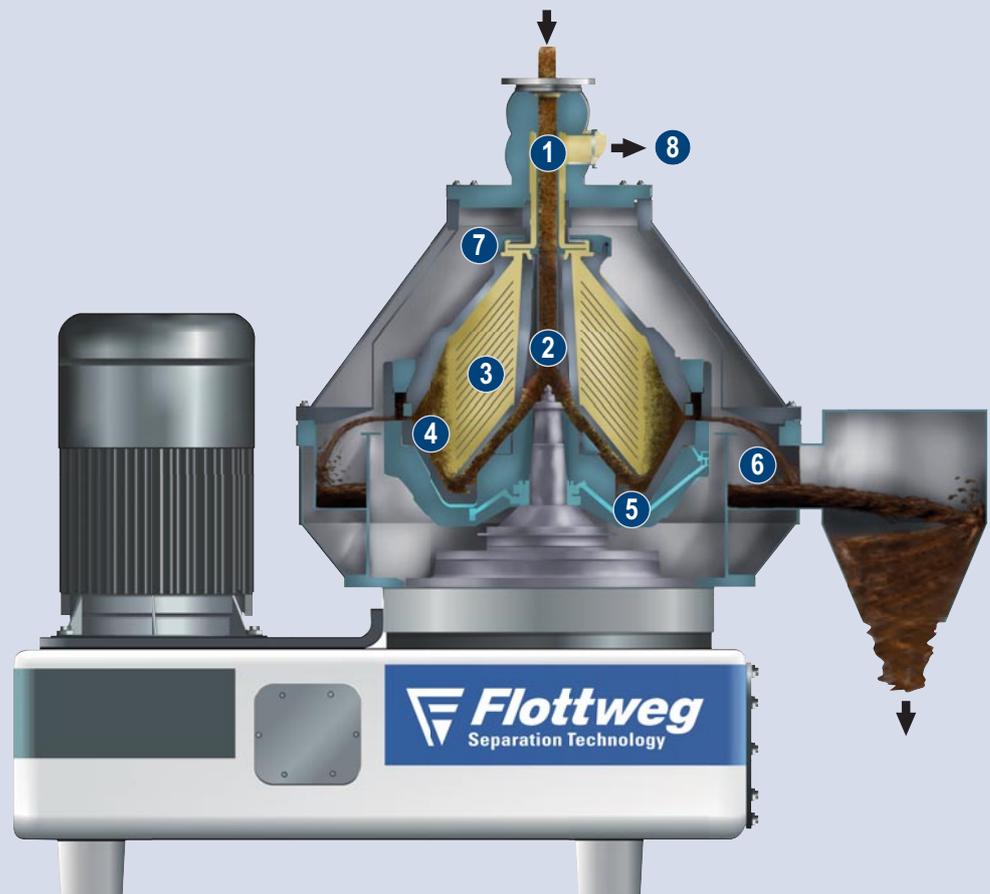
The disk stack **3** in the bowl causes the product stream to be divided up into many thin layers, creating a large clarifying area. The solids are separated from the liquid within the disk stack.

The high centrifugal force makes the solids that are separated out collect in the solids chamber of the bowl **4**.

A hydraulic system operates the sliding piston **5** and periodically ejects the separated solids at full speed of rotation via a solids cyclone **6** (optional).

The clarified liquid flows out of the disk pack to a centripetal pump **7** which discharges the liquid under pressure **8**.

TECHNICAL INFO



# FUNCTIONAL PRINCIPLE OF THE PURIFIER

## Efficient Separation of Liquid Mixtures

### SEPARATION: THREE-PHASE SEPARATION (LIQUID-LIQUID-SOLID)

A purifier enables the separation of liquid mixtures with different densities and solids at the same time, e.g. production of olive oil,

recovery of essential oils, cleaning of animal and vegetable fats and oils, and much more.

### FUNCTIONAL PRINCIPLE OF THE PURIFIER

In a purifier (three-phase disk stack centrifuge), the product to be separated enters the inside of the bowl through a stationary feed pipe **1** and is gently accelerated by the distributor **2** to the bowl speed.

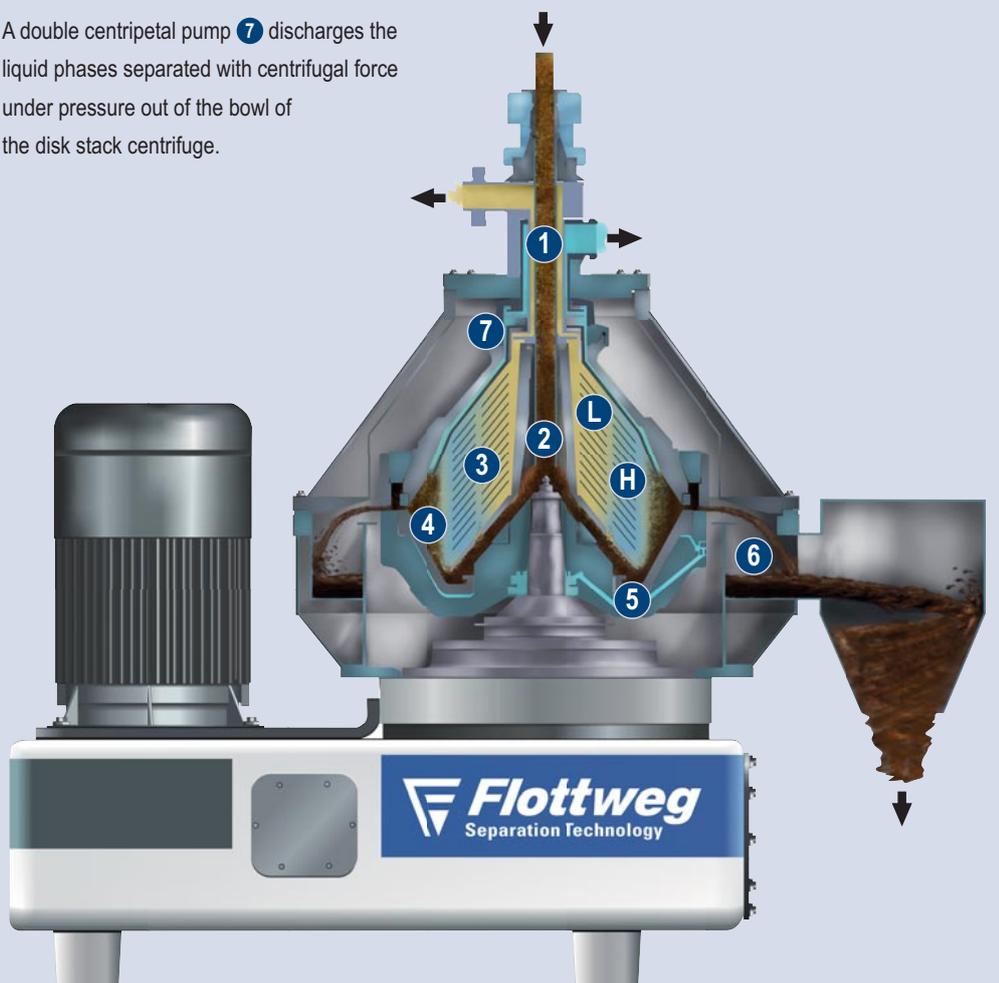
The disk pack **3** in the bowl causes the product stream to be divided up into many thin layers, creating a large clarifying area. The liquid mixture is separated in a light **L** and heavy liquid phase **H** within the disk stack. At the same time, the solids are separated.

The high centrifugal force makes the solids that are separated out collect in the solids chamber of the bowl **4**.

A hydraulic system operates the sliding piston **5** and periodically ejects the separated solids at full speed of rotation via a solids cyclone **6** (optional).

A double centripetal pump **7** discharges the liquid phases separated with centrifugal force under pressure out of the bowl of the disk stack centrifuge.

TECHNICAL INFO



# THE FLOTTWEG SOFT SHOT® SYSTEM

Precise, Silent and Economic

Flottweg Disk Stack Centrifuges are equipped as a standard with the hydraulic Soft Shot® discharge system. This bowl valve system offers various advantages for the customer:

The heart of the Soft Shot® discharge system consists of two bowl valves. The mass of these valves has deliberately been kept low. Thus system inertia is reduced and the system is triggered almost exclusively by the operation water pressure inside the bowl.

In contrast to other systems, these valves work at a very high speed. This permits flexible and very precise adjustment of the bowl opening times, which are between a hundredth and several tenths of a second. This short opening time minimizes the product content in the ejected solids, increasing product yields.

Due to the design characteristics of the Soft Shot® system, part of the control water always remains under the sliding piston. Therefore, during discharge, the sliding piston does not hit the bottom part of the bowl. Solids are discharged softly and silently.

Moreover, the Soft Shot® discharge system allows any combination of partial and total discharges. Depending on the products to be processed and the consistency of the solids, adjusting the discharge method ensures optimum operation.

## The Flottweg Soft Shot® Discharge System and its advantages

- Precise partial or total discharges in any combination for maximum product yield
- Reduced wear on the exposed components
- Solid discharge operations that make hardly any noise
- Reduced number of bowl seals, thus easy and efficient maintenance and operation



# THE FLOTTWEG SOFT SHOT® DISCHARGE SYSTEM

## Total and Partial Discharges

### WHAT DOES TOTAL AND PARTIAL DISCHARGE ACTUALLY MEAN?

The discharge method depends on the characteristics of the product to be processed.

Solids that glide easily (e.g. yeast, trub particles) can be discharged from the bowl in **partial discharges**.

In a partial discharge, only part of the content of the bowl volume is discharged. The product feed stream is not interrupted in this case. The discharge quantity can be varied simply by changing the parameters on the control unit.

Solids that do not glide well and which tend to compact (e.g. inorganic pigments, catalyst dust) can be discharged from the bowl using **total discharges**.

A total discharge involves emptying the entire content of the bowl. The feed is closed in this case. Use of suitable displacement liquids prior to the actual discharge makes it possible to avoid any loss of product fluid.

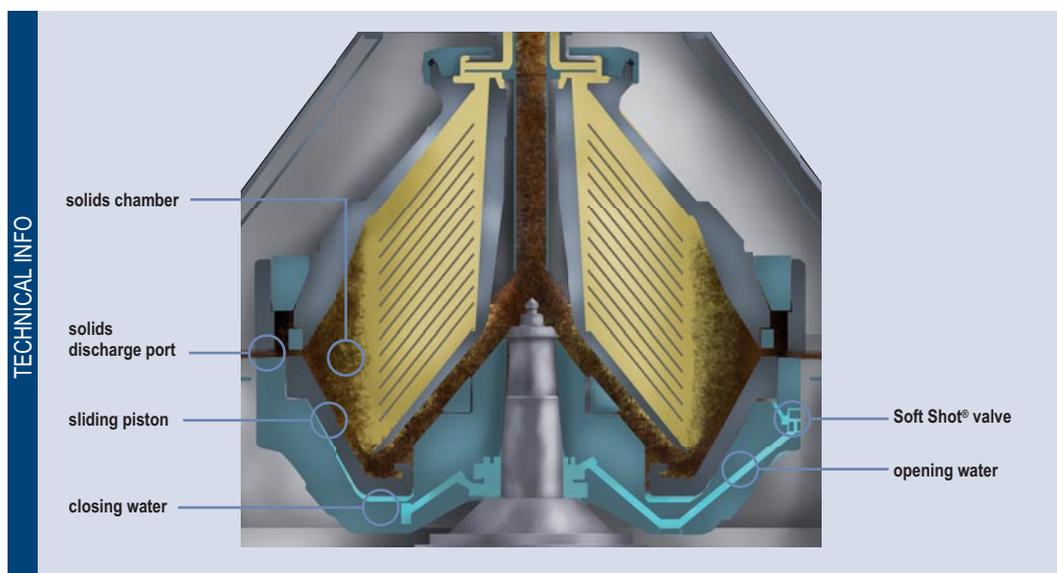
The Soft Shot® bowl discharge system also permits flushing discharges. This may be reasonable when processing strongly adhesive, sticky

### Solids discharge can be done:

- Based on a time program, precisely adjustable discharge times
- By means of a corresponding measuring device (e.g. turbidity meter) according to the product
- By the operator and independently from the program (manually by keyboard/control cabinet)

solids (e.g. coffee extract). The product is first displaced using process water in order to minimize product losses. A total discharge then takes place and the open bowl is flushed.

Depending on the characteristics of the products to be treated and on the process, a combination of both discharge methods may make sense. Discharge sequences take place automatically.



# THE FEATURES AT A GLANCE

## The Heart of the Centrifuge



### FLOTTWEG HYDROHERMETIC

(optional, e.g. series 420 for the brewing industry)

- Formation of a sealing water ring with deaerated water
- Oxygen pick-up is efficiently avoided
- No additional CO<sub>2</sub> blanketing required
- No mechanical wear  
(compared to mechanical seals)



### DISCHARGE OF THE CLARIFIED LIQUID USING AN IMPELLER

- Clarifier: Discharge of the clarified liquid under pressure; foaming is avoided
- Purifier: Discharge of the liquid phases with a centripetal pump; optional combination of single centripetal pump and free discharge (special types, e.g. for olive oil, animal fat, etc.)



### MATERIAL OF THE BOWL

#### Food industry:

- All product wetted parts are CIP capable
- High quality surfaces of the product-wetted parts for efficient CIP
- Automatic flushing programs for efficient CIP
- Seals available with FDA certification and conformity (optional)

#### Industry:

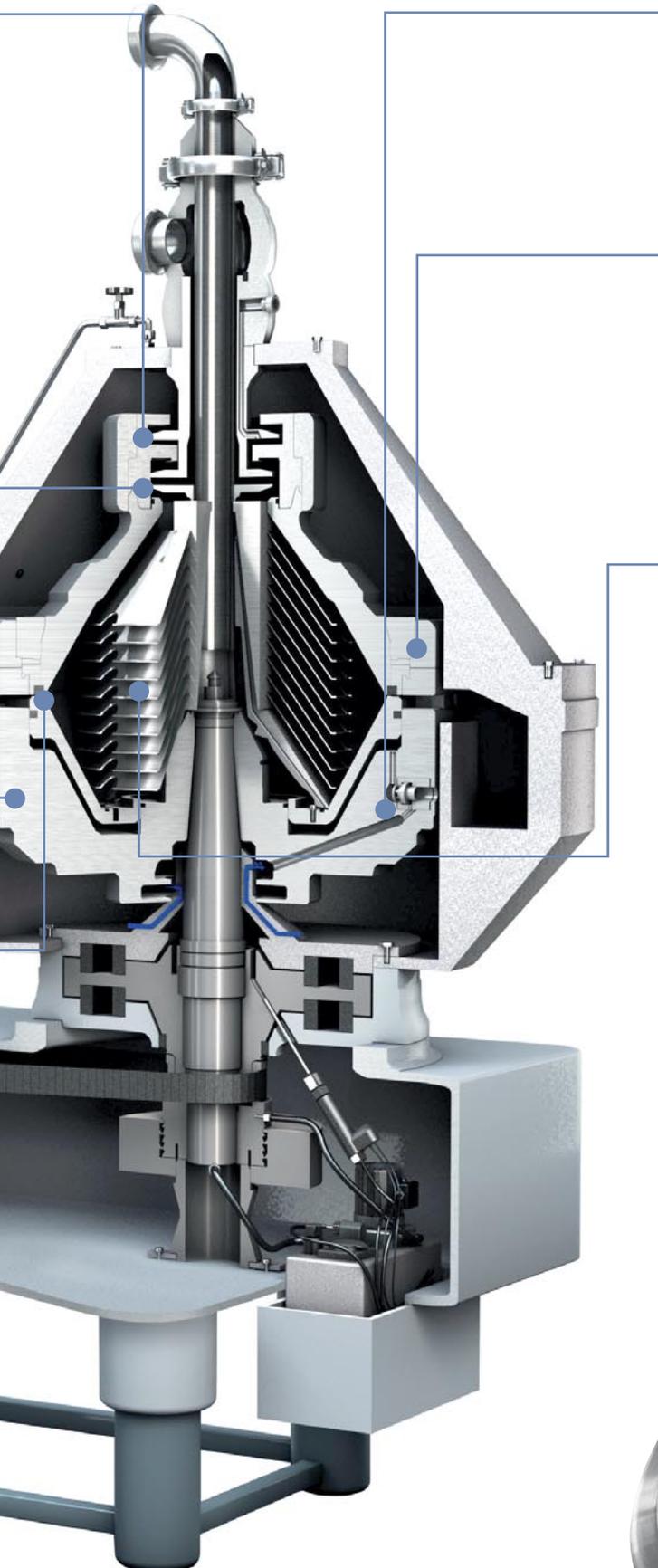
- Super duplex stainless steel for more resistance against chlorides



### WEAR PROTECTION

- Enhanced wear resistance
- Longer lifetime of the disk stack centrifuge
- Cost efficient because only wear parts are replaced





### THE FLOTTWEG SOFT SHOT® SYSTEM

- Accurate partial or total discharges in any combination for maximum product yield
- Material-friendly, silent, nearly inaudible solids discharge
- Discharge times can be precisely adjusted, thus highest yields



### THE BOWL OF THE DISK STACK CENTRIFUGE

#### Maintenance friendly

- Compact and robust design
- Easy mounting and dismantling

#### Reduced operating costs

- Reduced number of components and seals
- Quality Made in Germany



### DISK STACK AND DISTRIBUTOR – THE HEARTS OF THE BOWL

#### Gentle

- Gentle acceleration of the liquid thanks to an optimized design of the distributor, thus gentle product treatment

#### Efficient

- Highly efficient solids separation and maximum separation efficiency when separating two liquids, thanks to optimized flow conditions within the bowl



# THE FEATURES AT A GLANCE

## The Drive System



### THE FLOTTWEG BELT DRIVE

- Power is transmitted using a frequency inverter controlled drive motor via a flat belt (all models of the AC series)
- Easy and robust construction
- Easy maintenance, low wear
- Reduced vibrations, smooth running
- Standard drive motors, thus high availability

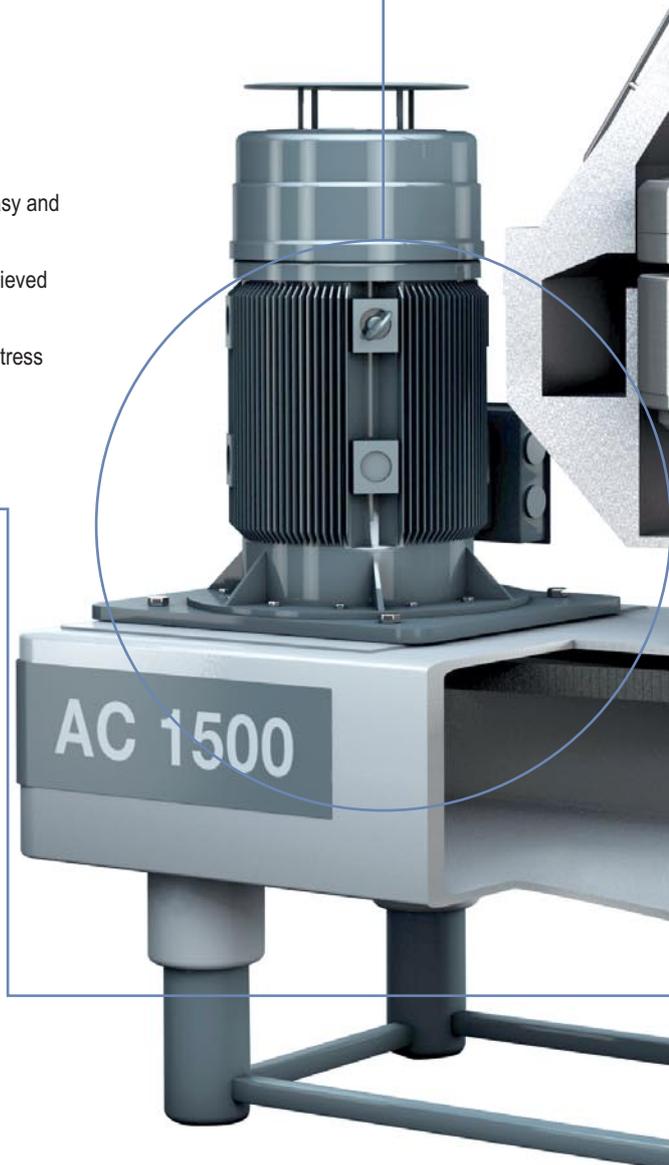
#### Advantages of Frequency Drive Control

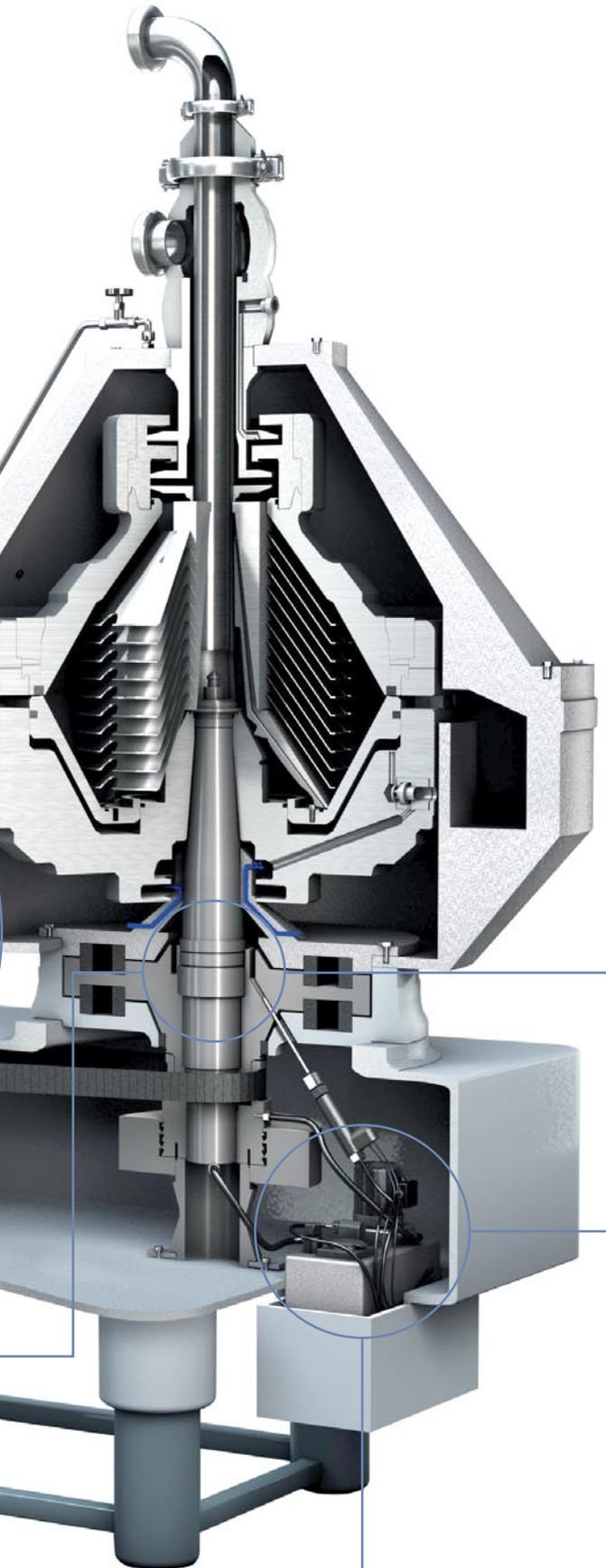
- Flexible adaptation to product requirements thanks to easy and variable adjustment of the bowl speed
- Reduced starting current, operation speed is quickly achieved
- Quick and gentle re-acceleration after solids discharge
- Reduced power consumption and reduced mechanical stress on the system



### THE COMPACT SPINDLE

- The spindle unit can be mounted/dismantled as one complete component.
- The bearings are pre-mounted on the spindle.
- Easy accessibility, thus quick replacement of the bushings is possible





### THE LUBRICATION SYSTEM OF THE DISK STACK CENTRIFUGE

- For all large machines of the AC series\*, lubrication of the spindle ball bearing takes place via a closed lubrication circuit
- Accurate and complete lubrication at any time, independent of the rotational speed (also while starting and shutting down the machine) for a long lifetime of the bowl bearing
- High availability and safety due to automatic control of lubrication
- Reduced quantity of grease
- Complete lubrication when starting from standstill
- Autonomous system for optimized lubrication



\*AC 1500, AC 2000, AC 2500



# PROCESS ENGINEERING AND EXPERTS

## Discover New Potential

### EVERY PROCESS IS DIFFERENT

The various parameters have a significant influence on separation efficiency. Knowing these parameters means increasing the efficiency and yield of your separation process.

We support our customers along the entire process chain from R&D raw material analyses to approval tests. Flottweg offers all necessary methods for analyzing your products and evaluating new potential.

Our worldwide locations and networks ensure support and service for our customers. With the help of our experience and testing capability we develop made-to-measure solutions to meet your individual requirements.



We offer mobile testing units with disk stack centrifuges for carrying out tests on site under real process conditions

As an option, pre-mounted platform solutions including a blanketing unit are available for processing toxic and inflammable materials.





## Our services

- Laboratory analysis – discover new options and performances
- Processing department – performance optimization of our separation solutions
- Project planning department – customized systems and solutions

Easy integration into existing product lines or complete systems



In case of separation processes consisting of several phases: Optimal adaptation to other separation devices, such as decanter centrifuges, belt presses, etc.



# GLOBAL AFTERMARKET SUPPORT NETWORK

No matter where you are in the world



## CUSTOMER SERVICE IS OUR STRENGTH

Application-based project planning, high-quality manufacturing, and professional after-sales service are vital for trouble-free operation. Experienced and reliable service engineers from our customer service department are ready to respond quickly if needed. The Flottweg Service Group is also available to perform preventive maintenance in order to avoid interruptions in production.

## QUALITY “MADE IN GERMANY”

Flottweg is ISO 9001 certified and manufactures its products in compliance with all of the latest technical standards.



## Flottweg Services include

- Experienced advice on separation processes
- Pilot tests on-site or at the Flottweg Laboratory and Test Bay
- Selection and sizing of appropriate equipment
- Customer-specific automation/control systems and process integration
- Design and construction of complete process systems
- Installation, commissioning, maintenance, repair, and spare parts service worldwide

## FLOTTWEG AFTER-SALES CUSTOMER SERVICE

Even the best machinery needs to be maintained and serviced. Flottweg has established a worldwide service network consisting of its own subsidiaries, branch offices and representatives to provide our customers with localized service and spare parts.

Our service engineers and technicians are qualified for any kind of installation, commissioning, repair, and maintenance.



## FLOTTWEG WORLDWIDE

Flottweg is headquartered in Vilsbiburg (near Munich), Germany, and has branch offices in Cologne and Leipzig as well as subsidiaries in Australia, Brazil, Canada, China, France, Italy, Mexico, Peru, Poland, Russia and the United States – plus representatives in nearly all countries worldwide.

Check out our website at [www.flottweg.com](http://www.flottweg.com) to find a competent contact person.

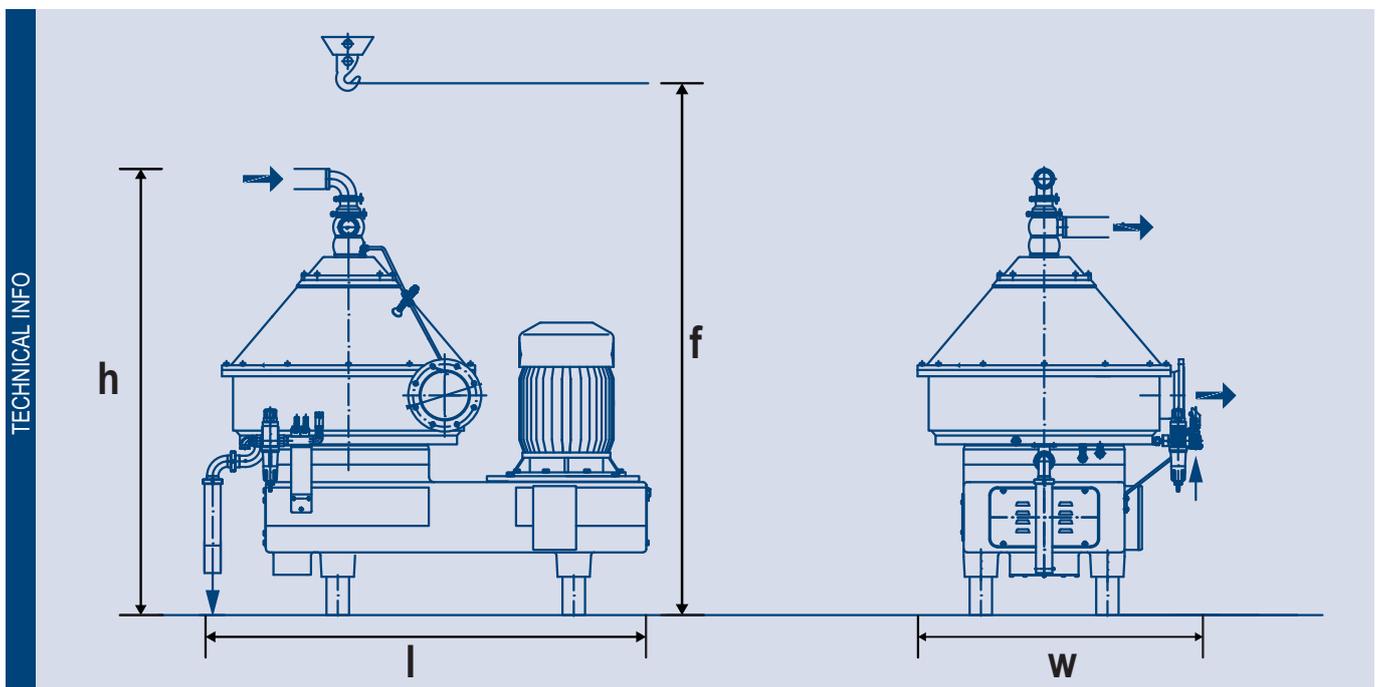
# THE FLOTTWEG AC SERIES

## Technical Data



TECHNICAL DATA OF THE FLOTTWEG AC SERIES				
Model	AC 1000	AC 1500	AC 2000	AC 2500
Max. bowl volume (liter)	4	14	25	58
Max. solids volume (liter)	1.5	7	11.5	22.5
Max. motor capacity (kW)	5.5	18.5	37	55
Dimensions* (l x w x h x f)	1 100 x 600 x 1 000 x 1 500 mm	1 500 x 1 000 x 1 700 x 2 400 mm	2 000 x 1 100 x 2 000 x 2 750 mm	2 100 x 1 300 x 2 100 x 2 800 mm
Gross weight**	390 kg	1 550 kg	2 900 kg	3 750 kg
Hydraulic capacity*	10 000 l/h	20 000 l/h	45 000 l/h	85 000 l/h

\* The listed figures are guidelines only.  
 \*\* Disk stack centrifuge with bowl and motor



# Flottweg Separation Technology – Engineered For Your Success



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