

**Take the Best - Separate the Rest**

**Decanters**

**CDforce**  
Technology Makes the Difference

A Wide Range of Solutions – One Partner

# In use for you throughout the world



*Head Office and Oelde plant*



*Niederahr plant*



*Plant in Château-Thierry/France*



What started in a small village in Westphalia in 1893 with the patent for a milk centrifuge has now become a powerful global company: Westfalia Separator. At that time, more than 100 years ago, the company's operations were characterized by visionary ideas, a strong will to achieve expansion as well as excellent quality. These are principles which are still valid today. Nowadays, Westfalia Separator belongs to the GEA group, and is one of the world market leaders in the field of centrifugal separation technology. The latest production installations in the company's main works in Oelde as well as in Niederahr and Château-Thierry (France) at all times guarantee a high level of production technology "made in Germany". More than 50 sales and service companies as well as 60 sales partners also guarantee an excellent quality standard with individual customized customer service on site.



## More than just machines

The chemical, pharmaceutical, biotechnology, oils and fats recovery, environmental technology, food, beverage and mineral oil industries: High-performance decanters are used in an extremely wide range of industrial sectors. Westfalia Separator provides products and services to every one of these customers. Not only with highly developed machines, but also with customized complete solutions. Ranging from the design and installation of decanters and separators right through to the construction of complete installations for special areas. Thanks to decades of experience and extensive research, the former engineering company has now become a globally operating problem solver and expert for more than 100 processes.

## Mastering new challenges

Westfalia Separator is confronted with new tasks every single day. Intensive cooperation with our customers as well as with research institutions and universities enables us to provide a constant stream of new and future-oriented developments in the field of separation technology which have revolutionized entire production processes in the past. The design and production of decanters for a wide range of applications, always with the aim of optimizing the overall production process, has a key role to play in this respect. We intend to use the next few pages as an opportunity for demonstrating what is possible in this field.

At Home in All Areas

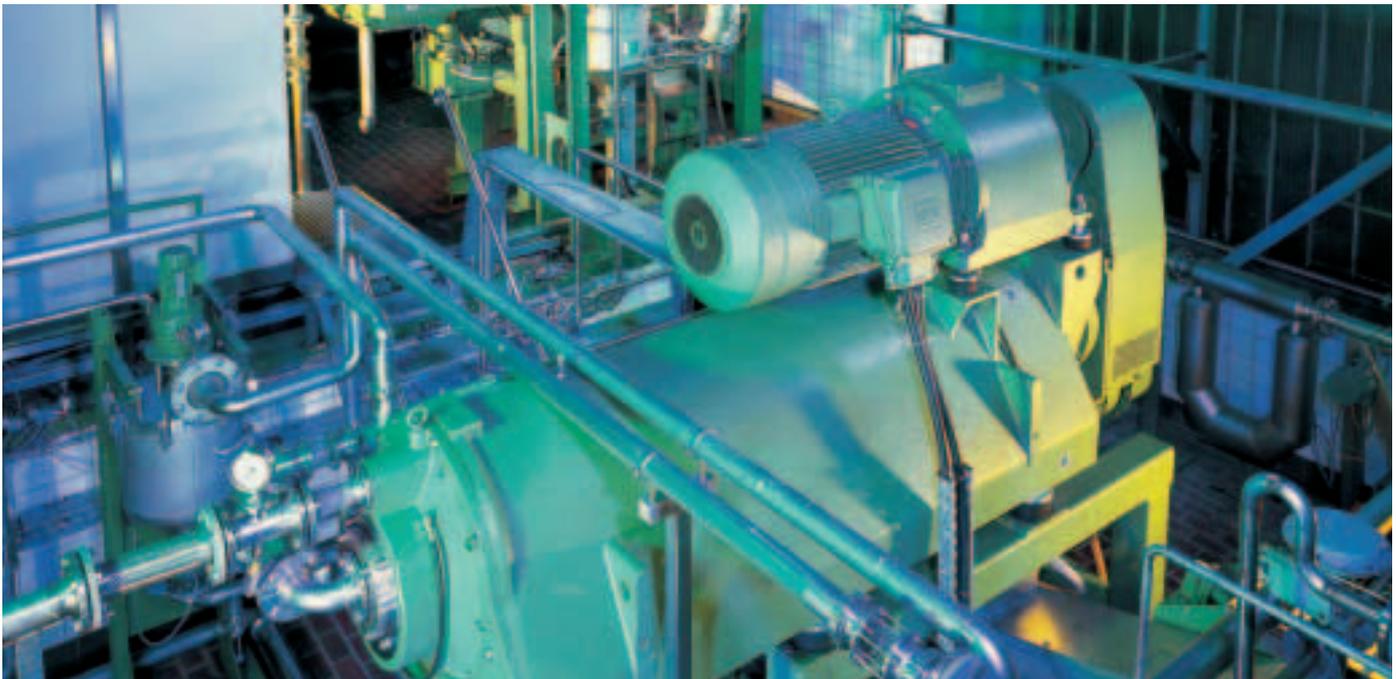
# The markets

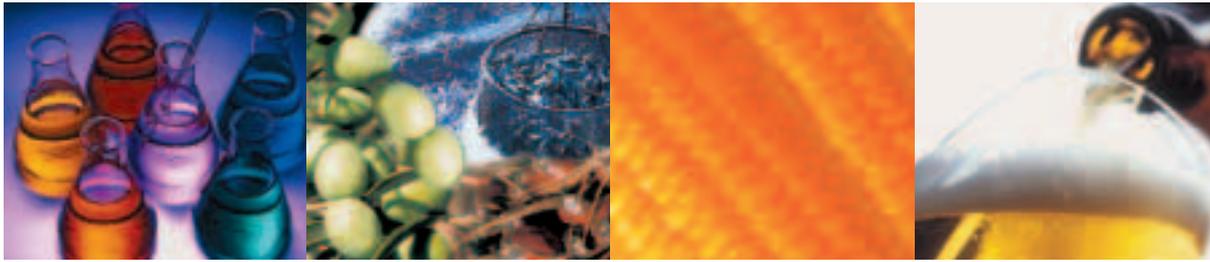
**It all started with the milk centrifuge. This was followed by the agriculture division. Nowadays, Westfalia Separator decanters have a key role to play in a wide range of industrial sectors. This is not without reason. Because the quality of the separating process is of vital importance for the quality of the end products and the cost-effectiveness of a process. More and more companies are therefore relying on the many years of know-how and the innovative machine and process solutions of Westfalia Separator.**

## **Uncompromising quality**

Since the start of the year 2000, the production facilities as well as all domestic and foreign subsidiaries throughout the world have been certified in accordance

with the DIN EN ISO 9001 standard. Westfalia Separator is accordingly one of the few globally operating companies which have a quality certificate with world-wide validity. For us, this has been a further important step in the direction of implementing our aim of total quality management which is designed to assure the satisfaction of our customers. This is because consistent quality management is not an end in itself; instead, it always focusses on the benefit of the customer. Only by constantly improving our processes in conjunction with machine and process know-how which has been gained in the course of many decades are we able to provide our customers with optimum production procedures and conditions. This is also applicable for the chemical and pharmaceutical industries, where mechanical separation processes are used in a large number of process stages. Specifically



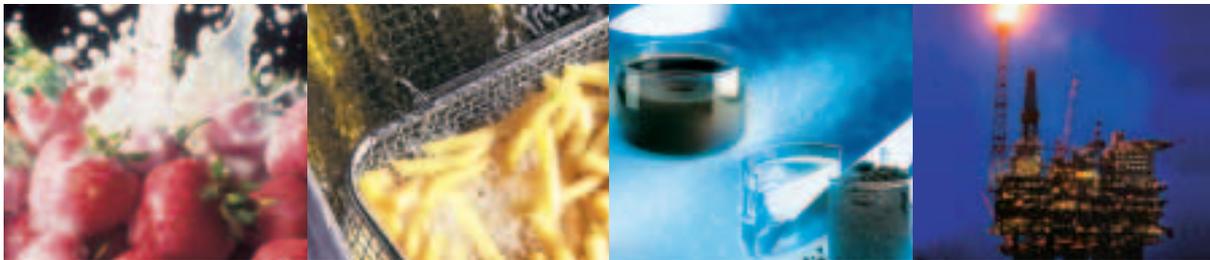


**Chemicals, Pharmaceuticals,  
Biotechnology**

**Oils and Fats  
Recovery**

**Starch Technology,  
Industrial  
Biotechnology**

**Beverage Technology**



**Dairy Technology**

**Oils and Fats  
Processing**

**Environmental Technology**

**Mineraloil**

for the process of extracting active substances, Westfalia Separator has developed a direct extraction decanter which combines the two key process stages for extraction, namely mixing and separating, in a single machine.

### **Strong in all processes**

We are technology leaders in the field of starch recovery. Cost-effective and environmentally friendly process technologies have been developed in close co-operation with the starch industry. These technologies ensure that optimum use is made of raw materials.

The dairy industry uses decanters for making dairy products and dairy by-products. The DPL and DCP process (calcium phosphate separation) has been developed specially by Westfalia Separator for further defatting of whey.

In the field of oils and fats recovery, decanters are used either as stand-alone

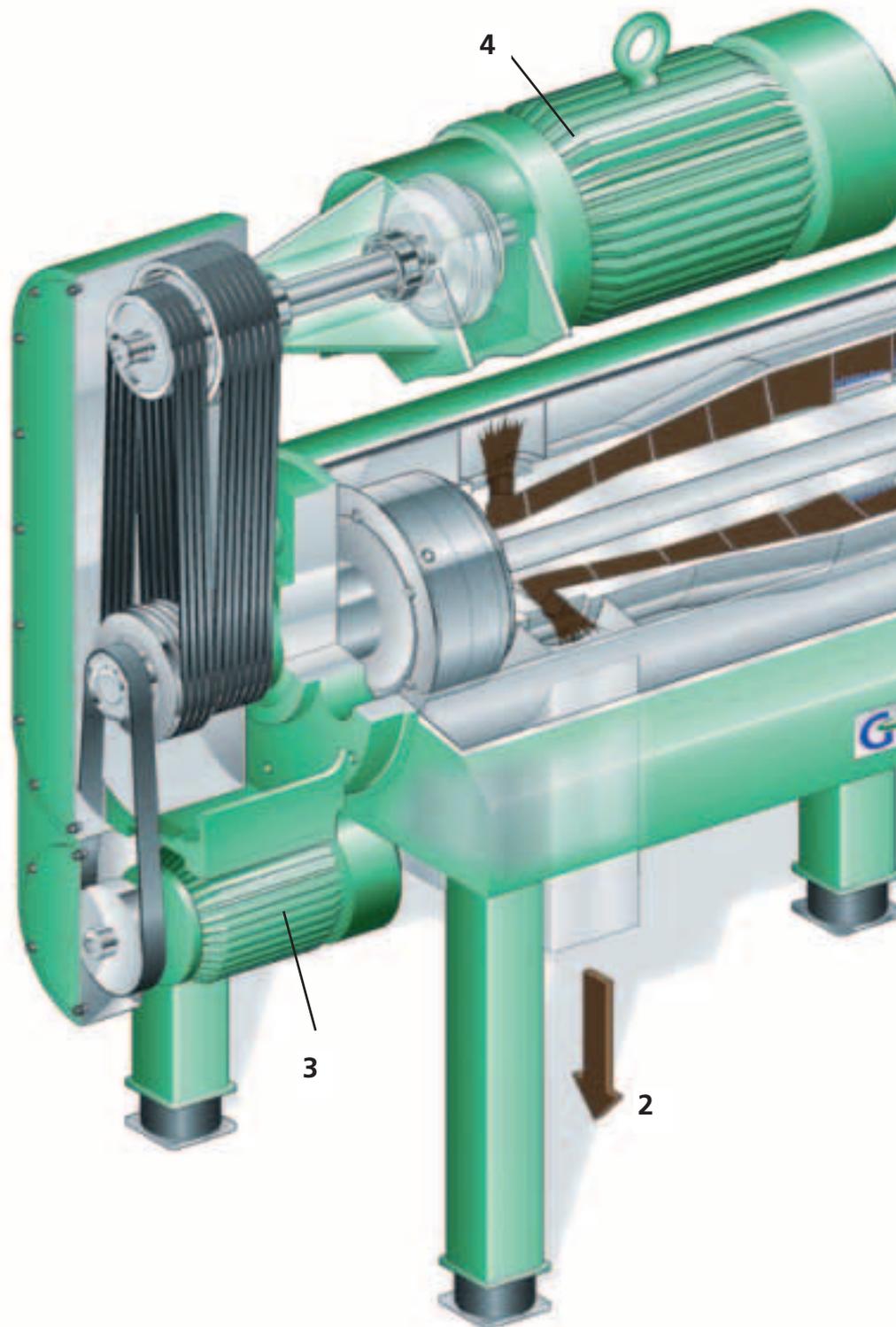
machines or as an integrated solution in complete process lines for recovering and processing olive oil, palm oil and avocado oil, etc. The two-phase separating decanter, developed by Westfalia Separator specifically for recovering olive oil, is nowadays the standard solution used for recovering olive oil in Spain. With the introduction of the new **CETEC®** technology, yields of olive oil have again been considerably boosted.

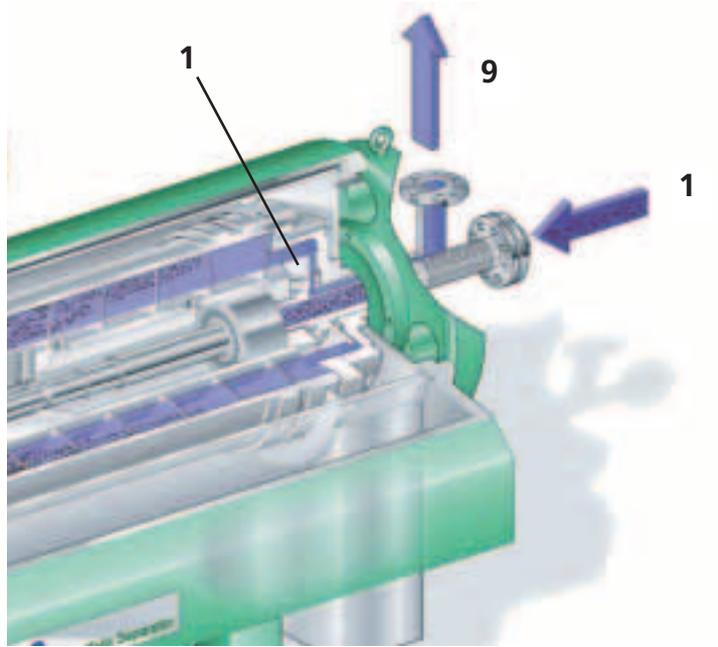
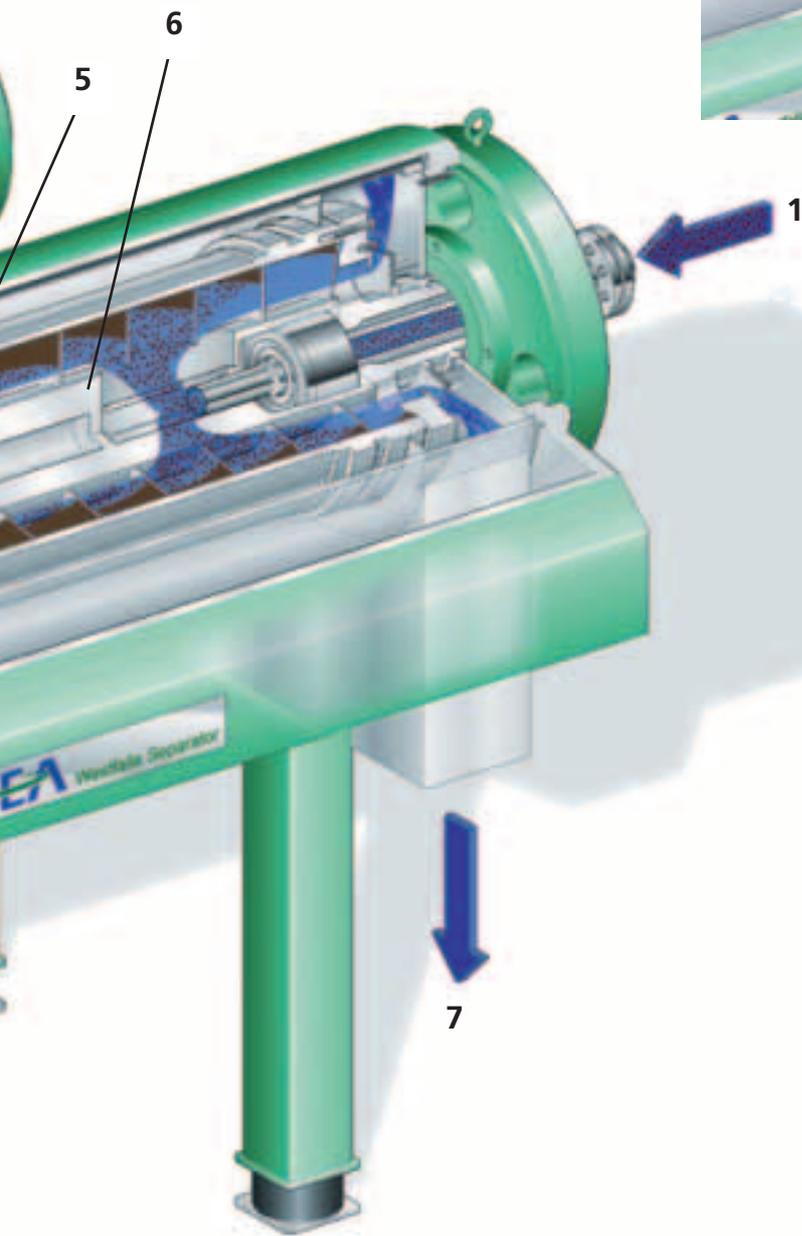
For many decades, decanters have been essential components used in the production of beer, wine, fruit and vegetable juices. This is a demanding task, as fruit and vegetables in particular are extremely sensitive and have to be treated very carefully. Accordingly, Westfalia Separator has developed a process which is extremely gentle and adaptable for treating the product, namely the **FRUPEX®** decanter. The end product is obtained within a few seconds after the fruit has been fed into the processing installation.

# This is how it works

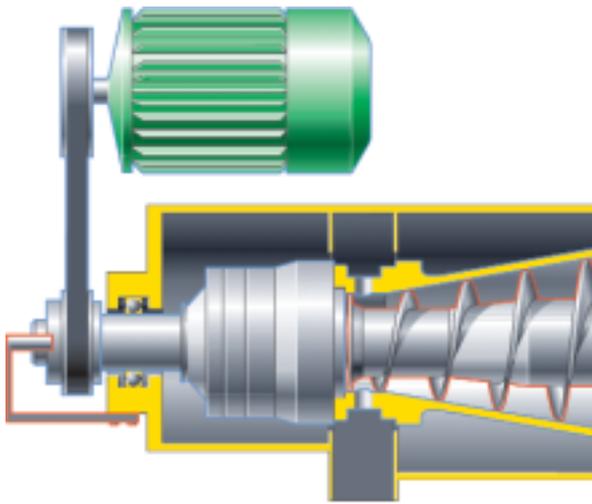
The decanter's time has come as soon as the solids content in the suspension to be processed is particularly high. These machines provide the benefits of high clarifying efficiency and maximum dewatering of solids. The main requirements in this respect are a high bowl speed and a very high scroll torque in conjunction with a regulating facility for the differential speed which operates as a function of the solids load.

Westfalia Separator supplies decanters with a 2-phase or 3-phase design for clarifying, separating, dewatering, classifying, thickening and extracting. The design of the decanters is based on many decades of experience in the field of centrifugal separation technology as well as extensive research and development.



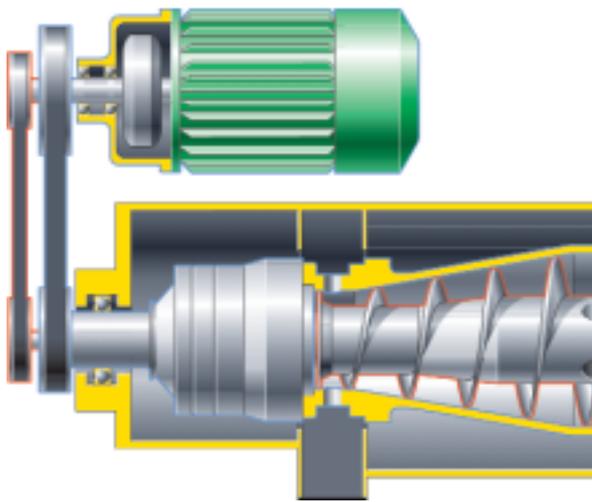


- 1 Product feed
- 2 Solids discharge
- 3 Control motor
- 4 Main motor
- 5 Bowl
- 6 Scroll
- 7 Gravity discharge of clarified liquid
- 8 Centripetal pump
- 9 Discharge of clarified liquid under pressure



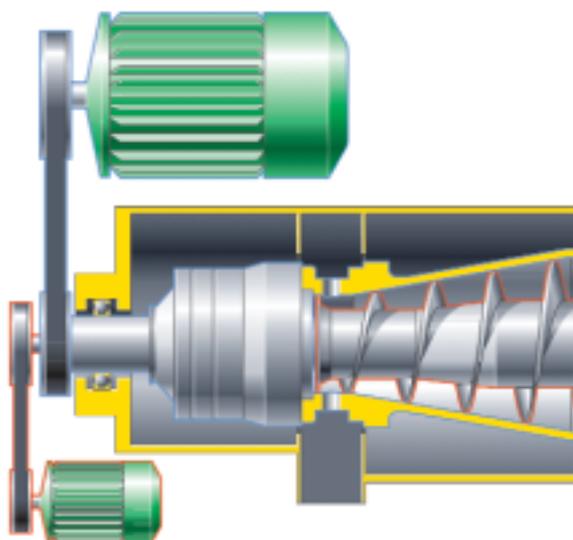
### Zero-point drive

Zero-point drives are part of the standard program. They feature a very simple design and are therefore cheap to purchase and operate. Zero-point drives are used when the solids volume is constant, the solids are easy to convey and the requirements regarding the residual water content of the solids are not very stringent, in other words, bowl and differential speed regulating facilities are not necessary. This is because regulation can only be achieved by changing the gear transmission or the bowl speed.



### Exchangeable pulley drive

Exchangeable pulley drives are also part of the standard program. They are also very cheap to purchase and feature a simple design. The input shaft of the drive is set in motion by the main motor via a second belt drive. This generates the differential speed as a function of bowl speed and gear transmission. This can only be changed by replacing the belt pulleys.

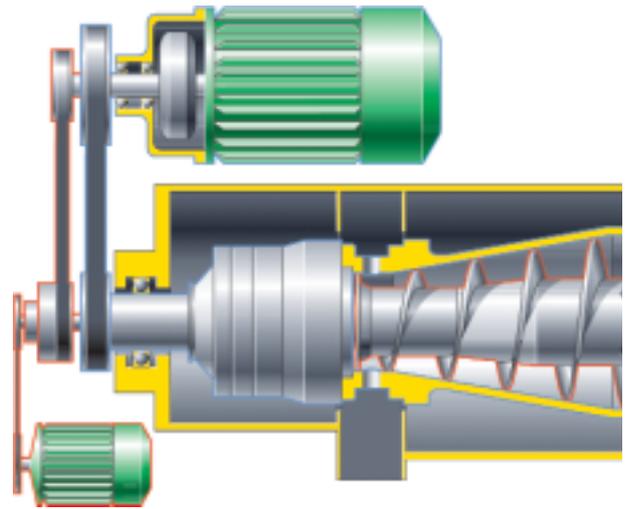


### Two-motor drive

The two-motor drive enables the differential speed to be regulated cost-effectively under good operating conditions; wide regulating ranges are possible. The secondary motor sets the input shaft of the gear in motion and generates the differential speed as a function of bowl speed and gear transmission. The differential speed can easily be regulated by changing the motor speed. Two-motor drives are used whenever solid volumes fluctuate significantly, when solids are conveyed under difficult conditions and when particularly stringent requirements are applicable with regard to residual water content.

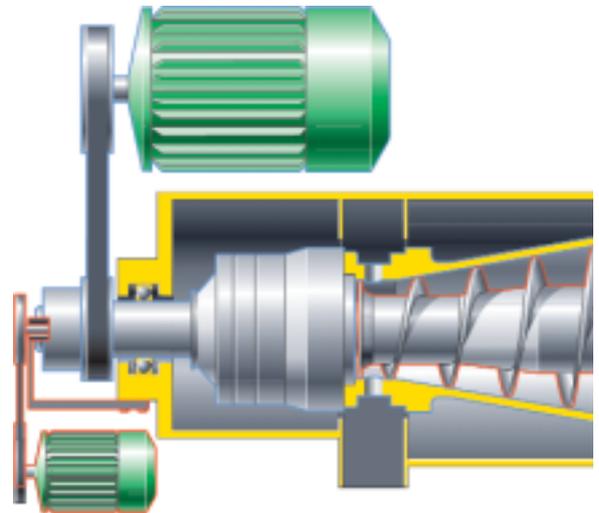
## Two-gear drive

The advantage of the two-gear drive which has been developed and patented by Westfalia Separator is the facility for regulating the scroll drive. The differential speed is adapted automatically and extremely precisely as a function of the scroll torque – and thus as a function of the solids content in the bowl. Accordingly, the solids are discharged from the bowl with a constant concentration and in an extremely dry state. Two-gear drives are used whenever the volume of solids is not constant, when the solids are difficult to convey and when very high requirements are applicable with regard to the residual water content of the solids.



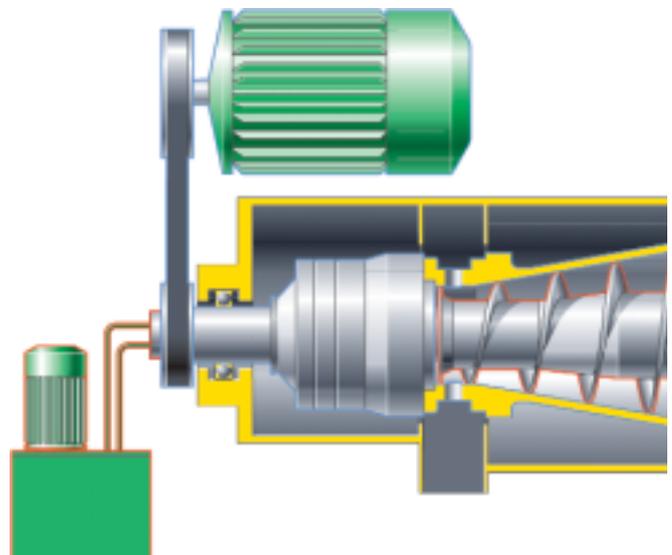
## Differential gear drive

The differential gear drive is recommended whenever it is necessary to automatically regulate the scroll speed in addition to regulating the bowl speed. This can be achieved by means of two gears. The secondary motor drives the central input shaft and generates the differential speed as a function of the gear transmission. A second input shaft without any speed is connected to the housing. This means that the differential speed is not dependent on the bowl speed. Differential gear drives are used primarily in the lower range of the differential speeds.



## Hydro-drive

The hydrostatic drive works in a way which is similar to that of the differential gear drive. The difference is to be seen in the design. Instead of the mechanical gear, a rotating hydromotor is installed; this is supplied with hydraulic regulation by a pump unit. Because the differential speed is proportionate to the conveyed quantity of oil, automatic regulation can be provided without any problem.



Quick and Reliable

# Investments with prospects

Decanters are nowadays an integral part of modern industry. They are synonymous with quality, performance and cost-effectiveness, and operate quickly and reliably. Irrespective of the field in which they are used. Decanters perform key functions in the clarification of liquids, separating liquid mixtures, concentrating and dewatering solids and extracting constituents.

The decades of experience which Westfalia Separator has gained in the design and production of decanters, and particularly in process technology, ensures that every decanter is adapted in an optimum manner to the requirements of the specific product to be processed. Only in this way can maximum yields be achieved in conjunction with minimum costs. Advantages which are impressive:

- Maximum dewatering with maximum separating efficiencies
- High level of operating reliability, availability and low wear
- Machine parameters adapt rapidly in response to changes in product and processes
- Low personnel costs and low operating costs
- Ease of operation, assembly and dismantling





- High accuracy in production enables almost all components to be readily replaced on site
- Operating costs lower compared with filter presses, as it is not necessary for the filters to be replaced/renewed
- Much lower space requirement compared with filter presses
- Consistent design in terms of few wearing parts and ease of access to the remaining wearing parts (“keep it simple”)
- High throughput capacities for high speed and efficient production processes
- Minimum consumption of consumables
- Minimum energy consumption depending on the necessary drive concept and liquid discharge
- Facility for remote monitoring **WEWATCH®** for maximum availability and optimum service intervals depending on the actual status of wearing parts
- World-wide presence and extensive service network enables spare parts to be supplied at short notice

Always Up-To-Date

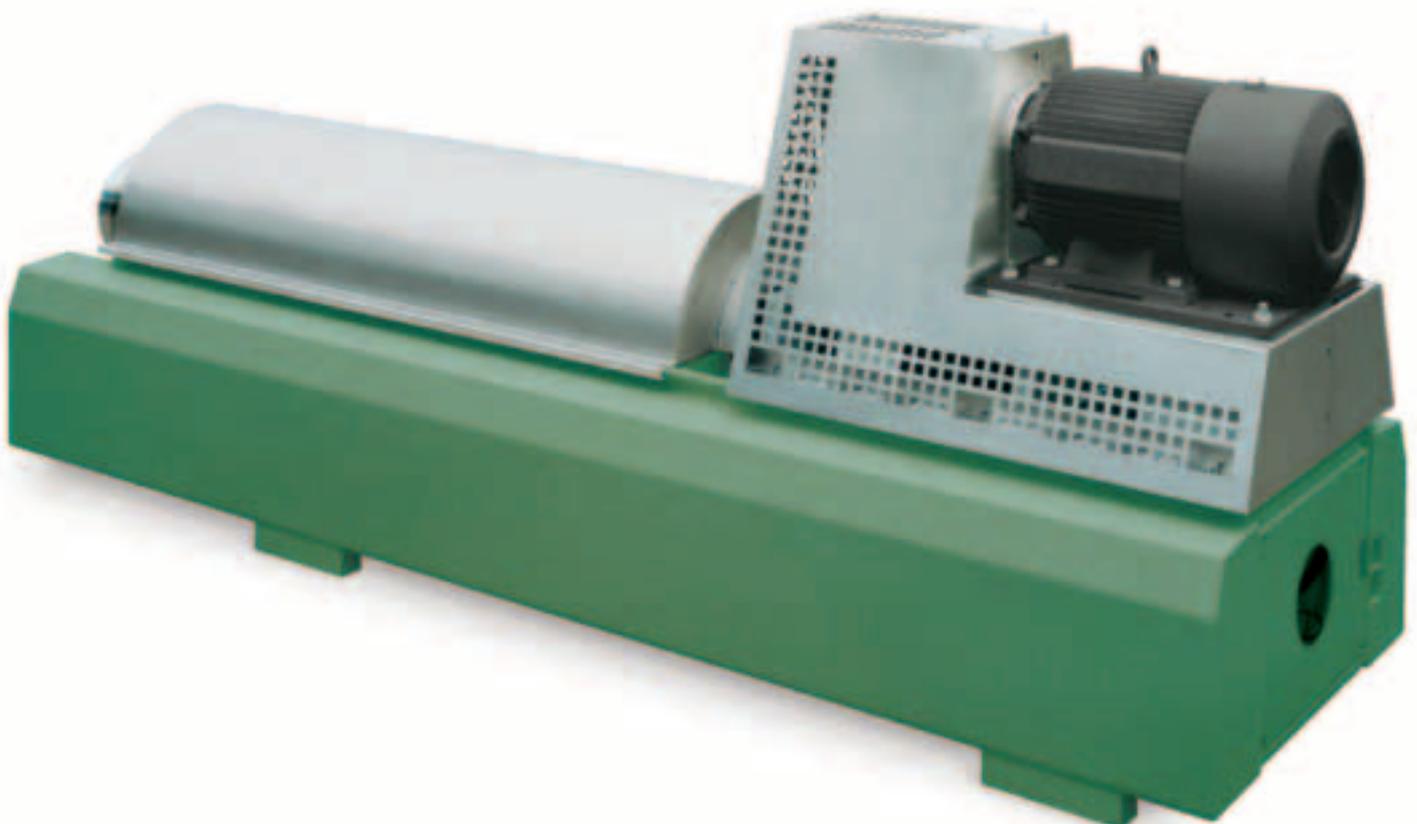
# Innovations with a future

As one of the most important technology leaders in the field of centrifugal separation technology, we of course have a major responsibility towards our customers. Our customers demand maximum performance from us in all areas. And they are right to do so. Whether we consider service, spare parts, machine and process innovations, research and development: We are constantly in motion and are attempting to find even better future-oriented solutions.

Listening is an important task in this respect. For our engineers, the need to identify the problems of our customers and to develop and implement proposals are essential requirements. Only in this way will we be able to survive in a competitive environment – and this is also the case for our customers.

## Small box – major impact

Without our company, state-of-the-art would have a different appearance.





The best example of this is the **VariPond®** system for use in waste water treatment plants and other areas. **VariPond®** stands for "variable pond depth" in a machine which is running. Previously, decanters used for thickening sludge had to be shut down and modified in order to achieve a constant discharge concentration. Nowadays, **VariPond®** enables such a constant concentration to be easily and reliably achieved while the machine is still running. The machine fully automatically adapts to changed feed conditions. This is a tremendous benefit which guarantees optimum thickening and which therefore saves a lot of time and reduces costs. Nowadays, all decanters with capacities of up to 350 m<sup>3</sup>/h can be equipped with **VariPond®**. The areas of application for these machines range from thickening of primary sludge and surplus activated sludge in waste water treatment plants right through to the specific concentration of liquid streams in the

starch and beverage industries. We are very proud that we received the innovation price at the WEFTEC 1999 in New Orleans for this innovation.

We were also the first company to develop the three-phase technology. This is a method for separating two liquids of different densities and simultaneously removing solids. This tried-and-tested technology with which Westfalia Separator has now become the leading supplier for the starch industry can for instance be used for separating wheat meal into A-starch, vital gluten and by-products. Decanters, separators and hydrocyclones are used for the process stages of classification, concentration and washing. Optimized protein and starch recovery is combined with low consumption of fresh water. This consequently leads to a much lower volume of waste water. However, we can provide even more: For instance, the **FRUPEX®** decanters or **WEWATCH®** ... Please read on.

# Technological Leader



## VariPond®

The **VariPond®** system stands for “variation of pond depth” while the machine is still running. Previously, it was necessary for decanters to be shut down if the pond depth had to be changed for thickening sludge in order to guarantee a constant discharge concentration under different operating conditions. Nowadays, thanks to **VariPond®**, the settings can be made while the machine is still running. This is a tremendous benefit which saves a lot of time and money.



## WEWATCH®

Modern technology and communications mean that machines are able to “think” and be maintained over distances of many thousands of kilometers. The remote monitoring system **WEWATCH®** supports operating personnel when they are looking for and remedying faults and prepares a remote diagnosis of hardware and software. In addition, the computer-based system is the ideal solution for permanent monitoring of installations and for assessing the production process on the basis of reports and statistics. Ask us for details and save valuable seconds.



## Three-phase technology

The three-phase separating technology in the starch industry has been developed by our design and process engineers specifically for separating solids and liquids of different densities. Westfalia Separator has accordingly become the leading supplier in this field for the starch industry. This technology is for instance used for separating wheat meal into A-starch, vital gluten and by-products. A special modern measuring and regulating facility enables the solids to be measured online and the process to be optimized.



## Extraction decanters

Aseptic processes are becoming more and more important. For instance for recovering antibiotics from fermentation broths. A key stage in the overall process is phase separation. For this process stage, Westfalia Separator has developed and patented a decanter which combines the processes of mixing and separating in a single machine. The process of filtration is not required in continuous direct extraction. Losses of valuable substances, risk of infection as well as solvent requirement are minimized. The process is continuous and the space requirement is reduced to a minimum. The specially designed decanters are hermetically sealed, which avoids the formation of highly explosive mixtures.



### VINEX®/FRUPEX®

The innovative **VINEX®** method permits gentle and continuous juicing of grapes with decanters. The advantages of this method: Homogeneous must quality, flexible and hygienic processing, optimum yield, lower costs, high wine quality. The new process is also simple: The separating process no longer uses the principle of pressure difference but rather the principle of centrifugal force.

The **FRUPEX®** method is used for recovering vegetable and fruit juices. It provides the advantages of extremely rapid and continuous processing with short throughput times. Thanks to this extremely gentle process, the enzyme changes to the product are very low and there are absolutely no microbiological changes to the product. The juice tastes just as it should taste.

### FRIOLEX®

With this patented method, high-quality oil and fat can be extracted extremely efficiently from vegetable and animal raw materials which contain oil. It is not necessary for solvents to be used for extraction purposes. **FRIOLEX®** is a physical oil recovery process based on water. A water-soluble agent which is perfectly safe for food applications is used as an agent in the process. The oil is separated from the raw material mixture by means of a special decanter centrifuge. The remaining impurities are removed by means of a separator.

### CETEC®

**CETEC®** technology is used for recovering olive oil. Even in conjunction with high throughput capacities, it achieves approx. 1-2 % more oil yield than is the case with equivalent machines, and it also achieves 10-20 % more capacity and absolute reliability even with extremely different types of olive. At the Expoliva 2001, the olive oil exhibition in Spain, the **CETEC®** technology of Westfalia Separator won the second prize in the innovation competition. In only one year, this technology has established itself as the standard in Spain.

### Mobile installations

For many decades, Westfalia Separator has been successfully manufacturing mobile installations equipped with centrifuge systems. All key process stages are combined on a truck trailer. Relatively small capacities, high speed and reliable operation with optimum costs and greater flexibility are required in the industry; these requirements are satisfied with these systems. This is applicable for transportation as well as the space requirement of the centrifuge system. Westfalia Separator has taken account of these requirements with its container solution. This solution also features all key process stages such as the decanter, pumps and control system in the form of a compact unit. All pipework is in place, and everything has been tested and is ready for immediate use. This solution is more simple in terms of logistics and is cheap to produce due to the use of standard components.

# Direct extraction decanter

Extraction is a separating stage which is characterized by low energy requirements. It is the technology of the future in many technical applications, for instance biotechnology, the pharmaceutical and food industries as well as environmental protection, all of which are key areas of life sciences. With the decanter for continuous direct extraction, Westfalia Separator has succeeded in developing a centrifuge which combines two essential process stages and which thus completely satisfies the extremely stringent requirements of life sciences.

### Efficiency due to concentration

Life sciences methods are characterized by particularly gentle processes. In biotech production systems, the process in which the valuable substances are removed from the bio-suspension and subsequently purified by means of extraction has a key role to play. The pH value, temperature and the structure of the valuable substance have to be set precisely in the extraction process.

The extraction process always consists of mixing and separating, procedures which have to be viewed as a single process. Specifically for the process of extracting active agents, Westfalia Separator has developed an extraction decanter which combines the two process stages of mixing and separating in a single machine.

### Always an advantage

The extraction of antibiotics from fermentation broths means that the pharmaceutical industry is one of the main areas of application for extraction decanters. And there are good reasons why this is the case: The use of extraction decanters is not only more cost-effective, it also results in significant process changes. It is ideal for processing suspensions with high solid contents. The decanter is ideal for directly extracting antibiotics from the culture solution with a high mycelium content. Filtration is no longer necessary when decanters are used for continuous direct extraction.



## Optimum yields with minimum space requirement

The main advantages of direct extraction are to be seen in the minimum space requirement and the improvement in the continuity of the overall process. No valuable substances are lost as a result of filtration, resulting in higher overall yields of up to 98 %. Operating costs are considerably lower compared with counter-stream extraction, as filter aids are no longer necessary. The fermentation broth is not diluted by the filter wash water. This results in better protection against infections, and the solvent requirement is reduced. And of course, the waste water load and the volume of waste water are also reduced. To summarize: The wide

range of process advantages illustrates that this intelligent solution maximizes the effectiveness of the process for the customer.

For recovering penicillin with the direct extraction method, the traditional solution uses two decanters and one separator for polishing the solvent. The yield is determined by the number of stages. In order to further optimize efficiency, high-end applications are now also starting to use a solution involving four decanters connected in series. The extraction decanters feature gas-tight design in order to guarantee explosion protection for the solvents. This closed system is a further advantage compared with filtration methods and provides additional safety with regard to infections.



The Right Solution for Everybody

# From the smallest right up to the largest



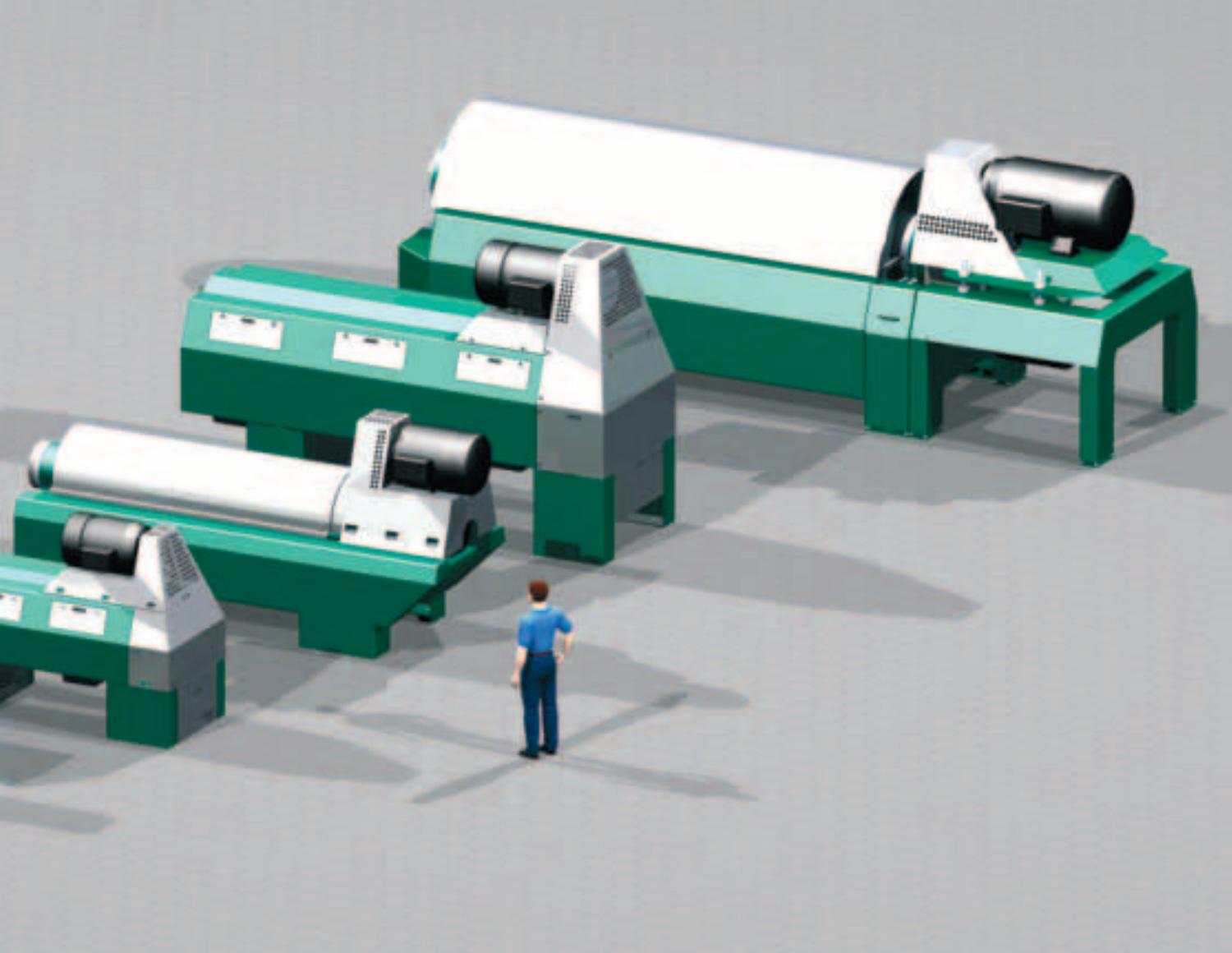
**The key to our success is fundamental knowledge of the market as well as broad and extensive know-how relating to machines and processes. This is the foundation which enables us to serve so many market segments. The result is a comprehensive range of high-quality machines, in numerous sizes and types, equipped with a wide range of state-of-the-art drive systems.**

## **Our range of products and services**

Decanters are solids-oriented solid-wall scroll-type centrifuges which rest in horizontal bearings. They are used mainly for clarifying suspensions and sludges with a relatively high sludge content, and are also used for separating liquids and simultaneously removing solids. Decanters remove solids from suspensions. In terms of consistency or behavior, such solids can be amorphous, granular, crystalline,

fibrous, viscous, soft, hard or extremely erosive. Because the decanter uses the centrifugal principle, the components to be separated must have different densities. This density difference may be very slight or relatively large. Westfalia Separator provides high-quality decanter designs for all process stages of separating technology.

Westfalia Separator supplies decanters with bowl diameters of between 200 and 1,000 millimeters, corresponding to a capacity of 12,000 to 210,000 liters of water per hour. The size of the decanter is one criterion, and the corresponding design is another. Consider our versatility: Clarifying decanters are used for separating the solids out of suspensions so that a virtually solids-free clarified liquid is obtained. Dewatering decanters ensure maximum concentration of the solids in the suspension, and the solids obtained in this way are as dry as possible. Because a suspension is a mixture of a

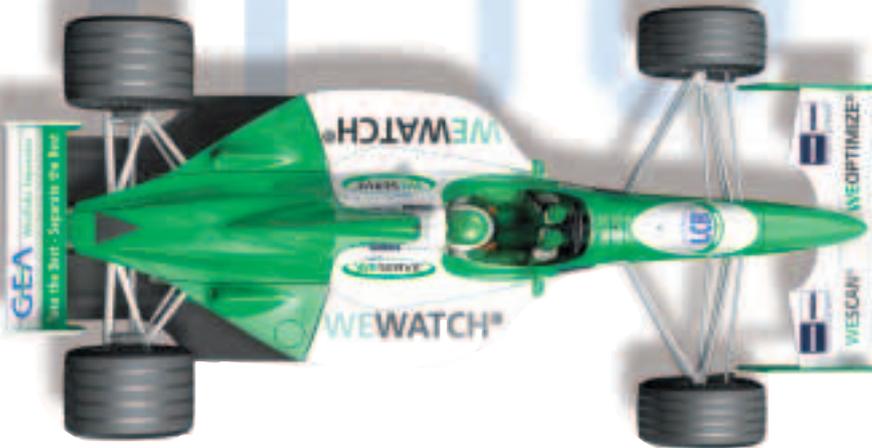


solid and at least two liquids which are chemically immiscible (e.g. water, oil, sand), separating decanters handle the task of breaking this suspension down into “solids”, a “light liquid phase” and a “heavy liquid phase”. Classifying decanters break down the solids mixture in the suspension into a fine particle fraction (small particles) and a coarse particle fraction (large particles). The extraction decanter mixes a liquid which contains a solid or an extract with a liquid agent which, after the mixing process has been completed, contains the solid or extract. We also supply gas-tight decanters. These machines are operated in excess of atmospheric pressure in order to prevent oxygen from the surroundings penetrating the centrifuge and reacting with the explosive mixture. And finally, it is also possible for a direct current, counter-current or dilution washing facility for the suspended solids to be integrated in the decanter.



# Service online

100%



**Machine failure, red alert – what now? No problem. With a comprehensive service network, rapid fault analysis and prompt delivery of genuine spare parts, the experienced service team of Westfalia Separator is available for you as quickly as possible. World-wide round-the-clock after-sales service is guaranteed by more than 50 sales and service companies and additional sales partners in more than 60 countries throughout the world.**

## **Possible due to online facility**

A fault has occurred, is reported and precisely located very quickly. The latest communication channels and high-tech programs mean that this is possible. With its modular teleservice facility **WEWATCH®**, Westfalia Separator is



already using the possibilities of the world-wide data network. Consistently for the benefit of the customer and on the basis of the life cycle benefit strategy. For optimum operating statuses combined with low costs and short down-times. Process data can be reliably recorded via an online link between the machines and our service centers. Special diagnostics programs permit precise fault analysis. The corresponding remedies are of course initiated immediately by the relevant service team.

As an additional benefit, Westfalia Separator combines teleservice with service contracts which are tailored precisely to meet the requirements of the customer. The major benefit for the customer is that the entire service process does not involve any administrative effort and is in principle automatic. And of course, the

customer is notified at an early stage of every action. This means that maintenance can be planned both in terms of costs and time.

### **A genuine original**

Even if your machine has been used for many years, it is no problem for the original spare parts to be obtained when necessary. Our intelligent and world-wide storage system is extremely well stocked, right down to the smallest screw. The corresponding logistics system ensures delivery times which are as quick as possible. All original parts can be installed in your machine without any problems. Top-quality and a long life are of course guaranteed. Nothing can beat the original.

Think Globally – Act Locally

# The whole is more than the sum of its parts



*Oelde, Headquarters of the international operations of Westfalia Separator*



*Niederahr, decanter production plant*

When you are choosing a business partner, not only the quality of the product is important. The parameters associated with the machine must also be right. This is the Westfalia Separator philosophy for an optimum life cycle benefit. This includes individual solutions tailored to your requirements as well as intelligent service packages, the availability of genuine spare parts and economical operation throughout the entire service life of the machine. Comprehensive service starts with the first discussions. In close co-operation with you, qualified specialists from Westfalia Separator will demonstrate solutions customised specifically for your requirements. This starts with the project planning and extends to the production and installation of the machines.

## **Optimum customer support guaranteed**

Your employees will be familiarised with the handling of the machines in training



programmes and training on site or in the modern Westfalia Separator training center. If rapid aid should unexpectedly become necessary or if a spare part is needed at short notice, Westfalia Separator is at your service immediately. This is ensured by the global presence of around 50 subsidiaries and service companies as well as agents in over 60 countries. Your satisfaction is our objective.

### Quality is our programme

As the world-wide leading company in mechanical separation technology, Westfalia Separator is active in many branches. If you have a requirement, ask us about solutions with innovative separating technology for applications in the beverage industry, edible oil processing, dairy technology, chemicals, pharmaceuticals, biotechnology, oils and fats recovery, the starch industry, industrial biotechnology, marine technology, oil field technology, power generation, industrial technology and our range of engineering services and used machines from the manufacturer as the best alternative.

**Subsidiaries and service companies are present in the following countries:**



### Europe

- Austria
- Bulgaria
- Belgium
- The Czech Republic
- Denmark
- Finland
- France
- Germany
- Great Britain
- Greece
- Hungary
- Ireland
- Italy
- Lithuania
- The Netherlands
- Norway
- Poland
- Portugal
- Rumania
- Russia (CIS)
- Slovakia
- Slovenia
- Spain
- Sweden
- Switzerland
- Turkey



### North America

- USA
- Canada



### South America

- Argentina
- Brazil
- Chile
- Mexico



### Africa

- South Africa



### Asia

- China
- India
- Indonesia
- Japan
- Korea
- Malaysia
- The Philippines
- Singapore
- Thailand
- United Arab Emirates



### Australia

- Australia
- New Zealand

Beverage Technology   Environmental Technology

Dairy Technology   Marine

Oils and Fats Processing   Energy

Chemicals  
Pharmaceuticals  
Biotechnology   Oilfield

Oils and Fats Recovery   Industry

Starch Technology   Engineering

Industrial Biotechnology   Factory rebuilt centrifuges

Service   Global Presence

# GEA Westfalia Separator AG

Take the Best - Separate the Rest

A company of mg technologies group

Westfalia Separator AG · Werner-Habig-Straße 1 · D-59302 Oelde (Germany)

Tel.: +49 (0) 25 22/77-0 · Fax: +49 (0) 25 22/77-24 88 · Internet: [www.westfalia-separator.com](http://www.westfalia-separator.com) · E-Mail: [info@gea-westfalia.de](mailto:info@gea-westfalia.de)