

PRODUCED WATER TREATMENT WITH CENTRIFUGAL TECHNOLOGY

Treatment of main and side streams





3,500+
applications

Centrifugal separation is part of our daily life



10,000+
of patents

Highest level of know-how



650,000+ bwpd
installed treatment
capacity worldwide

50% of the installations are offshore



10,000+ installed
base worldwide

First installation 1955
Machines more than 50 years in operation



18,000+
employees

Full-time equivalents



50+ GEA sales and
service offices

International network, always close to the
customer

THE CENTRIFUGAL TECHNOLOGY

In touch with GEA every day

Considerable quantities of reservoir water are obtained as a by-product of oil and gas production processes. To protect both the environment and the reservoir formation, this water must be thoroughly processed. Untreated water cannot be returned directly into the sea nor can it be used for re-injection to boost reservoir pressure. The objective is to ensure that no hazardous traces of oil or suspended solids enter the environment or the formation.

GEA supports this critical process with state-of-the-art, reliable, cost-effective, and high performance centrifugal technology designed for use on drilling vessels, onshore facilities or on platforms.



130 years
GEA
Separation

130 years experience
Founded in 1893.
Still based in Germany.

DISK STACK CENTRIFUGES AND DECANTER CENTRIFUGES

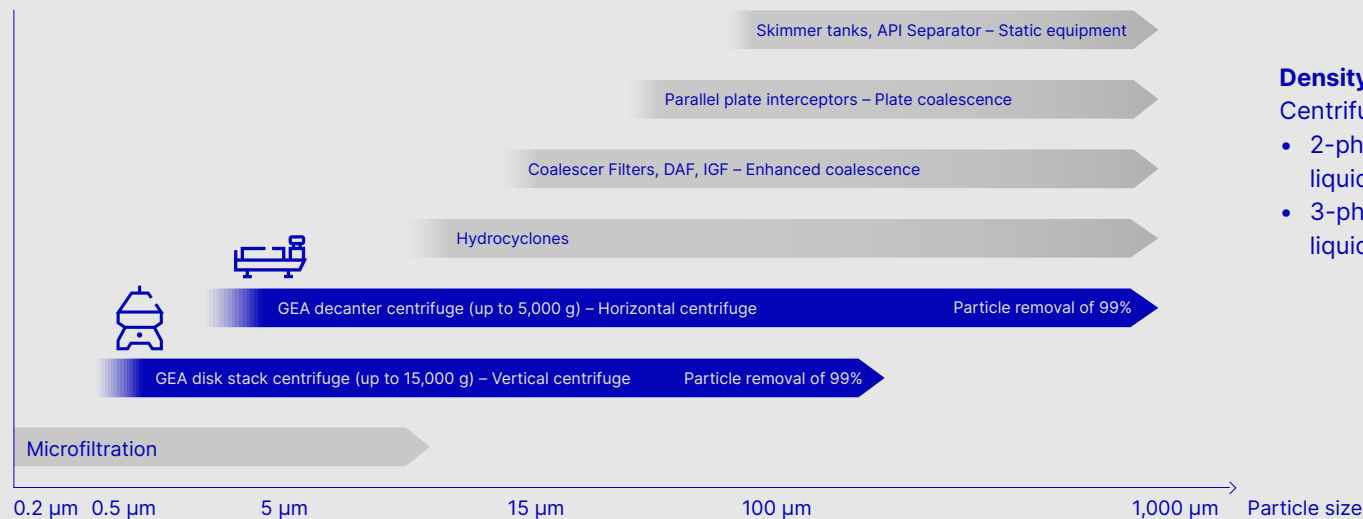
GEA disk stack centrifuges

GEA disk stack centrifuges are designed for liquid-based applications, excelling in separating suspensions with two or more phases of varying densities. Whether it is liquid-liquid, liquid-liquid-solid, or liquid-solid separation, GEA disk stack centrifuges deliver unparalleled efficiency. They are equally as effective at separating liquid mixtures at the same time as removing solids.



GEA decanter centrifuges

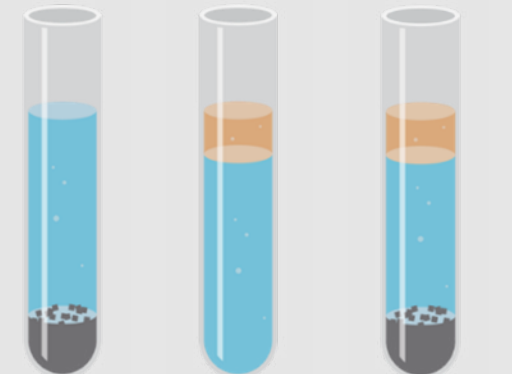
The GEA decanter centrifuges excel when the solids content in the suspension to be processed is particularly high. These machines provide the benefits of high clarifying efficiency, maximum dewatering, and simultaneous separation of liquids and solids. The main requirements in this respect include a high bowl speed, a powerful drive for the scroll, and a scroll speed that automatically adjusts to the solids loading in the feed.



Density difference

Centrifuge separation can be

- 2-phase:
liquid | liquid or liquid | solid
- 3-phase:
liquid | liquid | solid



Liquid | Solid

Liquid | Liquid

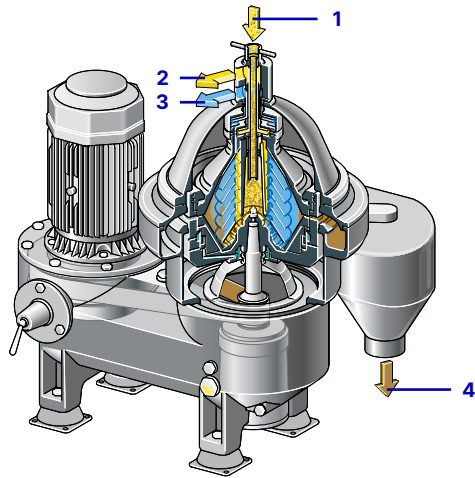
Liquid | Liquid | Solid

WORKING PRINCIPLE

Vertical centrifuge

- 2-phase disk stack centrifuge
- 3-phase disk stack centrifuge

The disk stack centrifuge can be configured with a self-cleaning disk-type bowl and is utilized for the simultaneous separation of two liquid phases along with the periodical removal of solids.

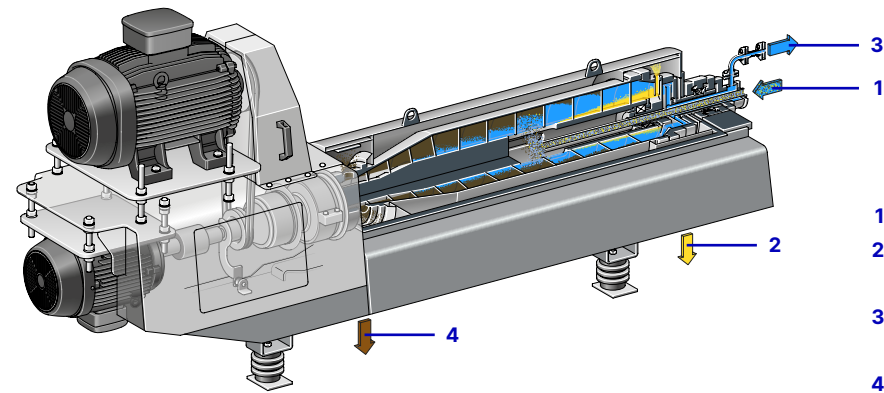


- 1 Product feed
- 2 Treated oil discharge
- 3 Separated water discharge
- 4 Solids discharge

Horizontal centrifuge

- 2-phase decanter centrifuge
- 3-phase decanter centrifuge

The 3-phase decanter centrifuge separates two liquids of different densities from each other. At the same time solids are separated and discharged.



- 1 Product feed
- 2 Light phase discharge
- 3 Heavy phase discharge
- 4 Solids discharge

Liquid-oriented

- With bowl diameters of 160 mm to 1,050 mm
- Particle size from 0.5 μm
- Hydraulic capacity: up to 45,000 bpd | 300 m^3/h



A disk stack centrifuge is like a parallel plate interceptor in a centrifugal field.

Solids-oriented

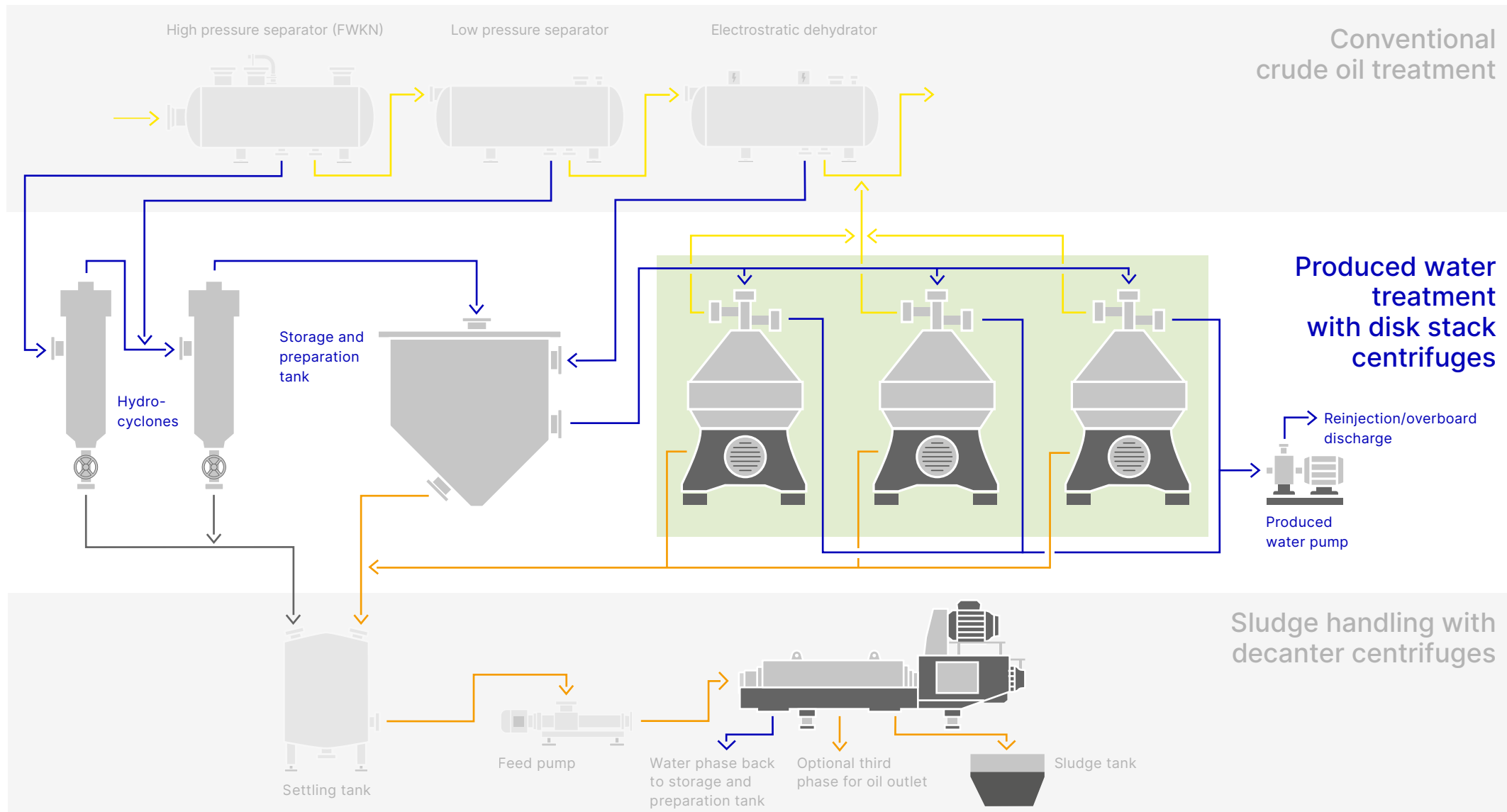
- With bowl diameters of 200 mm to 1,030 mm
- Particle size from 5 μm
- Hydraulic capacity: up to 27,000 bpd | 180 m^3/h



A solid bowl centrifuge (decanter) is like a sedimentation tank in a centrifugal field.

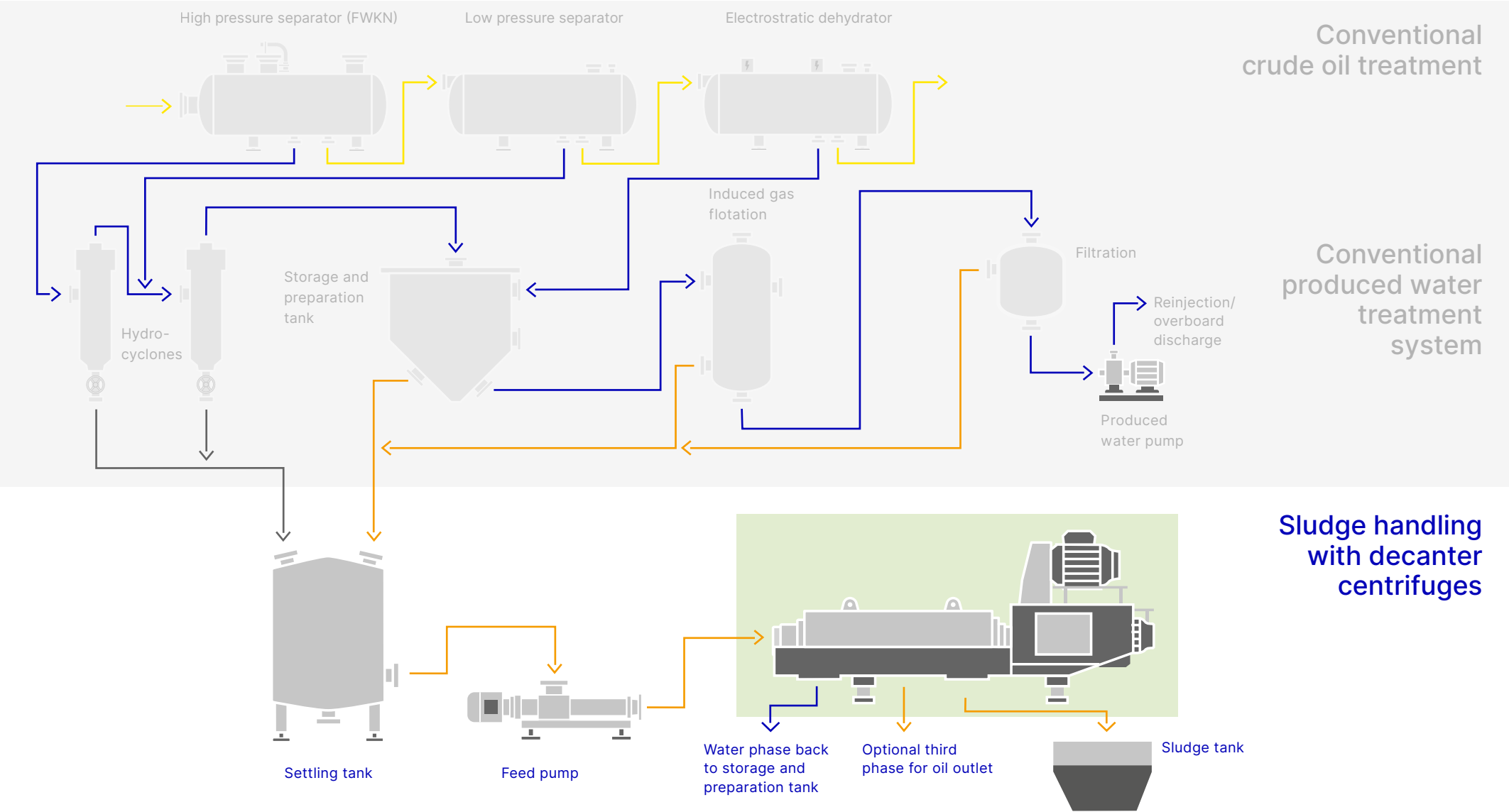
PROCESS MAIN STREAM

Integration of disk stack centrifuges in the produced water treatment system



PROCESS SIDE STREAM

Integration of decanter in the produced water treatment system



ENGINEERING CAPABILITIES

GEA – The specialist in produced water treatment



GEA's skid-mounted units are custom-engineered for the oil and gas sector, adhering to specific industry and client standards for peak performance in tough conditions. They can handle complex product requirements, including high chloride and H2S presence, showcasing GEA's dedication to robust, reliable solutions for critical applications. The centrifuges can also be installed into containers to act as a mobile unit. The versatile skids meet international safety standards like ATEX or IECEx as well as industry standards like DIN, NACE, API or ANSI/ASME.

Processing capacity of our centrifuges

The processing capacity of our centrifuges varies depending on factors such as the specific model and design, the characteristics of the produced water, and the desired treatment level. We offer a broad range of centrifuges with different processing capacities to meet the specific needs of our customers.

Feed capacity Main stream BPD	m³/h	Main stream (Disk stack centrifuge)
30,000	200	2 x WSD 200 / 3 x WSE 120
60,000	400	4 x WSD 200
120,000	800	8 x WSD 200
240,000	1,600	16 x WSD 200

Feed capacity Side stream BPD	m³/h	Side stream (Sludge handling)
1,500	10	1 x CF 4000
3,000	20	2 x CF 4000
6,000	40	4 x CF 4000 / 2 x CF 6000
12,000	80	5 x CF 5000 / 2 x CF 7000

CUSTOMER SPECIFIC SOLUTIONS

Separators and decaners are not always off-the-shelf products. In some cases, for optimum use, they must be selected and adjusted specifically for the process of the user. This is supported by the PTC (Process Test Center).

Customer demand / inquiry

>

Lab-scale analysis

>

Product investigation / site test

>

Process definition / machine sizing

>

Investment estimation



Product investigations by PTC

Through product investigations, the properties of the customer's product to be separated are specified. The PTC offers a comprehensive range of analysis methods for this purpose. These include test tube centrifuge tests, rheology, corrosion pattern analysis, measurement of various particle sizes, and stability characterization. The aim of these product investigations is to provide a substantiated statement regarding the principal options for processing the product and the feasibility of technical implementation. This serves to provide an initial estimate of the investment costs.

Feed stock product analysis basic parameters such as:

- Spin test with a heatable laboratory centrifuge
- Determination of viscosity and specific gravity of the oil phase
- Salt (chloride) measurement
- pH value of the water phase
- Simulation of emulsion breakers and de-emulsifiers
- Flash point and ash content measurement

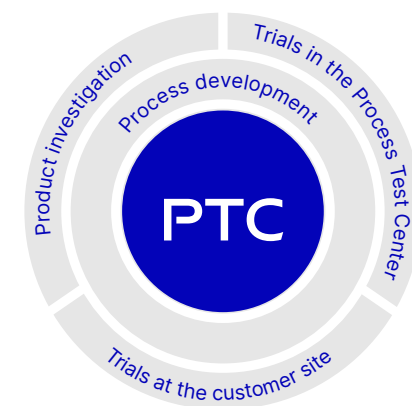


Trials in the PTC

A test trial at GEA's PTC furnishes all the essential data required for the final process engineering design of the centrifugal process on a production plant scale. Through this process, GEA, in close collaboration with the customer, defines the specifications of the machine type and size, along with the associated investment costs

Trials on the customer site

Alternatively, the customer can be provided with a loan machine on site. In this case, the trials are supervised and assisted by experienced GEA PTC engineers.



Process developments

As the world continues to evolve, new product developments stimulate demand. At the specific request of a customer or based on GEAs own market analyses, GEA's PTC supports the development of new processes. The innovative solutions designed in this manner undergo rigorous testing and validation, from laboratory experiments through internal pilot trials to machine or prototype testing on-site. Only after passing through these stages are they deemed market-ready.





Separation efficiency

Highest separation efficiency due to maximum rotation yield, particle size separated < 1µm



High corrosion resistances

Super Duplex and Hastelloy materials (NACE compliant)



Oxygen-free operation

Extreme low (<5ppb) oxygen pick-up during operation with GEA's patented hydrohermetic seal



Easy-to-operate

Fully automated, skid based easy to operate design suitable for remote location, integration into customers DCS



IECEx and ATEX

Suitable for installation in hazardous area



High uptime >99%

No manual cleaning required, continues operation

MAIN BENEFITS OF GEA CENTRIFUGES

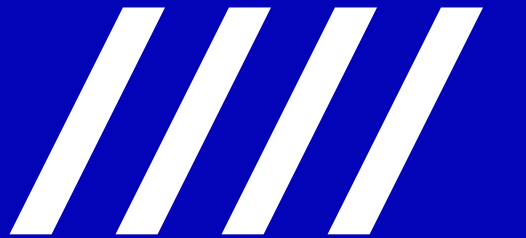
Produced water meets high performance centrifugal technology

Choosing GEA centrifuges for your produced water treatment applications in the oil and gas sector is a commitment to operational excellence and technological leadership. Our centrifuges are specifically designed to optimize the separation process and ensure a high degree of purity of the treated water ≤ 5 ppm residual oil in water.

Our equipment is known for its robust design that meets the stringent requirements of the oil and gas industry. The adaptability of GEA centrifuges allows for **seamless integration** into existing systems and provides a reliable solution for the treatment of produced water.

Our worldwide service coverage offers comprehensive support and service even in remote location. With the most modern monitoring/cloud system and sparring philosophy **continuous operation 24/7 365 days a year** is secured.

In summary, GEA centrifuges represent the leading forefront of separation technology, providing a reliable, efficient and high-performance solution for your produced water treatment needs. Rely on GEA for a partnership that brings both immediate and **long-term benefits** to your operation.



GEA – YOUR SERVICE PARTNER



Excellent equipment is one thing, the right service is another. With our global network of certified service engineers, Service Hubs in strategic locations and a network of Authorized Repair Workshops, our customers are optimally being supported. Our focus is to build, maintain, and improve customer performance throughout the entire life cycle of the plant and its equipment.

Fulfilling your performance targets				
Your partner from the start	Preventive support	Predictive support	Service level agreements	Digital solutions
Transparency	Availability	Productivity	Efficiency	Sustainability
Engineering expertise for installation, commissioning and training to achieve high performance right from the start.	Ensure that the equipment is always in a good condition and ready for production.	Established solutions and tools that ensure a reliable production environment and continuous uptime.	Optimize production processes in a long term partnership to enhance uptime and to minimize losses.	Be always one step ahead in line with the latest market inventions and regulations to stay competitive.
Mapping operating data for future process optimization	Worldwide repair network and remote support	In-situ disk cleaning for centrifuges	Product investigations, process developments and trials	Cloud-based service portal
Monitor, analyze and optimize your equipment	We are at your side, even when not at your site	Save maintenance time, increase your uptime	Specific optimization potential for your setup	Enhance your connectivity any time and everywhere



Contact us



Learn more
on our website

GEA Westfalia Separator Group GmbH

Werner-Habig-Straße 1
59302 Oelde, Germany

Tel +49 2522 77-0
gea.com/contact