GEA Westfalia Separator seaprotectsolutions
For the oil and gas industry
Protection for the Marine Environment and Your Investment

GEA Westfalia Separator seaprotectsolutions

Protecting the ecosystem of the oceans and the investments of rig owners and operators

Water is the source of all life on our planet. If the balance of the extremely sensitive ecosystem of the oceans is exposed to any danger, all other ecosystems are also in great danger. This asset, which cannot be reproduced, accordingly requires the most effective protection that modern technology can offer. For this purpose, the International Maritime Organisation (IMO) and national legislative authorities have issued strict laws and directives involving fines running into eight digits in the event of failure to comply even in minor cases. These justified regulations mean that mobile rigs have to cope with considerable costs and risks that cannot be managed cost-effectively with conventional separating systems. The new GEA Westfalia Separator BilgeMaster® systems from GEA Westfalia Separator secure the oceans’ sensitive ecosystems extremely effectively and also provide protection for the value of the operators investment.

The main benefits of the systems are the high separating efficiency, continuous unmanned operation combined with pronounced service friendliness and, of course, the significantly reduced disposal costs associated with the method.

The systems meet the prevailing statutory regulations of the IMO with a residual oil content of much less than 15 ppm. The systems have been awarded type approval according to the IMO Resolution MEPC 107(49). With an additional facility, the BilgeMaster® can even achieve a residual oil content of less than 5 ppm.
GEA Westfalia Separator seaprotect solutions

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GEA Westfalia Separator offers leading technologies and individual systems for use within the oil industry. Be it system engineering from one source, high quality of workmanship or the unrivalled worldwide service – GEA Westfalia Separator provides a system to rely on.

**Product range overview**
- Diesel oil dewatering
- Crude oil dewatering
- Lube oil treatment
- Sludge treatment
- Bilgewater treatment
- Central cooling system
- Lube oil cooling system
- Water desalination system
- Hydraulic oil treatment plants
- Drain water treatment
- Produced water treatment
- Drilling mud decanter centrifuges
- Slop oil treatment
The treatment of bilgewater on board offshore facilities is strictly controlled by national and international laws.

Bilgewater may only be discharged into the sea after prior de-oiling with specially approved treatment systems. The maximum oil content must not exceed 15 ppm. The limit has even been reduced to 5 ppm in special areas.

15 ppm is too much
Oily water from rig operations may only be discharged into the sea if the residual oil content in the effluent is below 15 ppm. 15 parts of oil to one million parts of water seems small but GEA Westfalia Separator believes this is still too high. Moreover, practice has shown that this value is not attained in many conventional installations. The further we can reduce this value, the greater the benefit for our oceans.

Bilgewater is a mixture of the following constituents
- Sea and cooling water leakages
- Oil leaks, crude, diesel and lube
- Drainages from settling and sludge tanks
- Effluent from various cleaning processes
- Soot and dirt particles
- Mud
So that Our Water Stays as Nature Made it – Clean

The product (i.e. oily water) is sucked up from the oily water tank drain system and fed by the feed pump through the filter and preheater via the feed valve to the separator. During the start-up or ejection program it is led back into the oily water tank. The product flows from above into the centre of the separator bowl. The heavy water phase is separated from the finest oil particles and then conveyed under pressure by a centripetal pump to the discharge.

The separated impurities accumulated in the sludge space are discharged into the sludge tank periodically.

The clean water discharge is supervised by an oil monitor and discharged into the environment. If the oil content exceeds 15 or 5 ppm the water is recirculated into the oily water tank. An intelligent process control adapts the capacity of the system to the changes of the product.
The bilgewater treatment system is designed for use on rigs and ships.

The system is supplied as a complete, self-contained GEA Westfalia Separator centripack incorporating all auxiliaries necessary for trouble-free operation.

The main components of the system are:
- Self-cleaning centrifugal separator
- Feed pump
- Filter
- Preheater
- Control panel
- Oil monitor for 5/15 ppm bilge alarms
- Base frame with small sludge tank or sludge transfer unit
- Demulsifier plant (optional)
- Adsorption filter

Benefits of the centrifuge
- High separation efficiency due to large clarification area
- Controlled de-sludging with high solid content due to the Westfalia Separator® hydrostop system
- Gentle treatment due to the Westfalia Separator® softstream system
- Continuous separation of oil and water phase
- Self-cleaning effect of disc stack due to total ejection
- No impact of the rig movement on the separation efficiency
- Option: System suitable for zone 1/2 – class 1 DIV 1 or 2
The Flexible Compact Unit Design is Suitable Both for Newbuildings or Retrofit

Separation results oily water treatment
With normal feed conditions, i.e.
solids content: < 0.1 %
chloride content: < 10,000 ppm
pH: 6 - 9
and no excessive oil emulsions in the water phase, the residual oil content in the clean water discharge is 10 – 12 ppm. By varying the pump output, it is possible to even further reduce the oil content. In the case of high oil and solids contents, it is prudent to separate the bilgewater in tank cleaning mode before discharging overboard.

GEA Westfalia Separator expands the GEA Westfalia Separator BilgeMaster® system from three to nine sizes. The bilgewater treatment system is hence now even more precisely tailored to actual needs. The figure shows GEA Westfalia Separator BilgeMaster®-D 3000.

### Technical data

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GEA Westfalia Separator mini\textsuperscript{maXx\textcopyright} – Manual Cleaning Centrifugal System

GEA Westfalia Separator \textit{BilgeMaster\textcopyright} systems for hull drain

Plant concept

The bilgewater treatment system will be supplied as a 'Compact Unit' (CU). The CU consists of four main components:

- GEA Westfalia Separator mini\textsuperscript{maXx\textcopyright} separator
- Pump/pre-filter
- Preheater
- Adsorption filter
- Control unit

All the components are small and lightweight to make them easy to transport and to fit into any space. The components are installed on a common base frame. The modular concept can be incorporated in an existing system.
The clever solution

The new bilgewater treatment system with the GEA Westfalia Separator minax™ separator type WTC was specially designed for the rough conditions offshore.

The product is fed by the feed pump via the preheater into the centre of the separator bowl. Within the rotating bowl, the product is separated into a heavy and light phase.

The heavy water phase is separated from the finest oil droplets and dirt particles and then conveyed under pressure by the centripetal pump to the discharge. If the oil concentration on the clean water outlet of the centrifuge exceeds 15 ppm the water is led through an adsorption filter. The lighter oil phase flows to the centre of the bowl and is discharged by gravity.

The separated sludge is collected in the solids holding space and must be removed by hand.

An intelligent control and monitoring system assures problem-free, round-the-clock unmanned operation. It also ensures that only water with an oil content lower than 15 ppm is released into the environment.
GEA Westfalia Separator mini\textsuperscript{maXx®} – Clean and Compact

GEA Westfalia Separator \textit{BilgeMaster®} systems for hull drain
Separation results oily water treatment

With normal feed conditions, i.e.
- solids content: < 0.1 %
- chloride content: < 30,000 ppm
- pH: 6 – 9

and no excessive oil emulsions in the water phase, the residual oil content in the clean water discharge is 10 – 12 ppm. By using the adsorption filter in the clean water discharge the residual oil content can be dropped down below 5 ppm.

Benefits
- Water outlet less than 5/15 ppm
- Reliable
- Easy handling
- Low maintenance cost
- Small dimensions
- Low weight
- Quick return on investment

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Drain Waters from Drill Deck with High Solids Content

Cleaning highly contaminated drainage waters with the combination of a decanter and a disk stack centrifuge

On the drill deck of platforms, drilling ships, and rigs all kinds of drain fluids are produced. They come from drainages, residues, cleaning processes, drilling cuttings, rain and seawater. Most of these drain liquids contain a high percentage of oil and solids. If this drain water is treated, not only disposal costs can be reduced, but profit can also be generated with the oil phase recovered from the drain water.

As the oil as well as water content can vary from 10 to 90% and the solid content can vary from 1 to 10%, either disk stack centrifuges or decanters can be used for treatment of the drain water. Decanters are normally used in feed with a solid content of more than approx. 5% (by vol.) A disk stack self-cleaning centrifuge can be used downstream of the decanter to polish either oil or water phase or both. For the final water phase treatment GEA Westfalia Separator applies the IMO certified system as described on page 7. This way the whole process can be considered as certified in accordance to IMO Resolution MEPC 107 (49).
The Effective Combination

For drain water GEA Westfalia Separator recommends the combination of decanters and disk stack centrifuges

- Two-phase decanter to separate solids from liquid phases
- Disk stack self-cleaning separator to separate the two liquid phases
- Normally, the water phase is treated further downstream to avoid disposal costs for oily water
-optionally the oil phase can be polished to burn it in gen sets or propulsion engines
- Oily water treatment systems from GEA Westfalia Separator can reduce the free oil content in water down to 5 ppm
- Option: second decanter for barite recovery

Decanter unit with a chemical dosing unit in explosion-proof design upstream the GEA Westfalia Separator BilgeMaster®
Systems to Protect the Sensitive Marine Ecosystem and the Value of Your Investment

GEA Westfalia Separator seaprotect solutions for your payback

GEA Westfalia Separator provides reliable and future-proofed separating technology with the 
GEA Westfalia Separator BilgeMaster®.

The powerful processing systems protect not only endangered ecosystems in the oceans, they also assure the sustainability of your investments.

The benefits are as follows:

**Reduced operating costs**
- Oil recycled from the separating process can be used as fuel oil. Recovered lubricating oil can be recycled as fuel for generating heat.
- Reduced quantity of sludge means lower disposal costs thanks to separating technology.
- The sludge processing system quickly pays for itself.
- Legal certainty as the machines operate with values lower than defined limits.
- Space-saving design.

**High separating efficiency**
- Large equivalent clarification area (up to 25,000 m²) due to centrifugal forces of up to 8000 g (times of gravity).
- Compared with static separating systems, separators in bilgewater systems have a theoretical separating limit for oil droplets that has been reduced by a factor of 10 (1 – 2 µm).
- Continuous separation of oil and water phase. Self-cleaning effect of disk stack due to total ejection.
- Adaptation of the flow rate to the changing product conditions.
- Improvement of the separation efficiency by combination with other equipment like dosing unit for emulsion breaker.
- Reduction of oil residues in the bilgewater system.
We live our values.
Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 Index.