

Press release

BIBKO® INFRA TEC - Mobile recycling system for drilling fluid

Pre-assembled system enables flexible and economical use

Drilling fluids are mixtures of bentonite (clay mineral), mineral components and water, which are processed into a suspension. Bentonite is a swellable clay mineral that swells significantly when it comes into contact with water, developing a gel-like consistency. The suspension is produced using high-speed special mixers. Additives (e.g. polymers) are often added to control the properties.



Emptying drilling fluid (liquid phase) from vehicle

Areas of application

Drilling fluids are used in various drilling techniques. The main area of application is horizontal directional drilling (HDD), especially for the near-surface laying of supply lines. Another area of application is deep drilling, such as oil and gas drilling, geothermal drilling and exploration drilling. Drilling fluids are also used in special civil engineering and groundwater drilling.

The most important functions here include stabilising the borehole, transporting the drill cuttings to the surface, compensating for rock pressure, and cooling and lubricating the drilling tools.

End of service life

Due to its versatile applications, large quantities of used drilling fluids are produced that have lost their relevant structural properties.

Further use is no longer possible, so they must be disposed of. However, as they are stable and do not separate on their own, or only very slowly, disposal is difficult. Due to the high liquid content, disposal in landfills is not possible without prior treatment for technical reasons.



Delivery of drilling fluid

Used drilling fluid - recyclable material

Regardless of whether disposal in landfills is not possible for technical reasons, disposal would also represent a waste of valuable materials. Recycling drilling fluid is one way of returning the recyclable materials contained in the drilling fluid in the form of mineral components and water back into the economic cycle. Recyclable materials are a central component of the circular economy and offer the following advantages:

- » Conservation of natural resources (water, primary raw material)
- » Production of new raw material (secondary raw materials/ substitute building material)
- » Compliance with legal requirements (Circular Economy Act §6)



Extraction of recyclable materials -
after recycling process

Recycling system – stationary or mobile

Recycling systems are available as both stationary and mobile plants. The choice between a stationary and a mobile recycling plant for drilling fluids depends on various operational and economic factors. Both systems have their specific characteristics, which are compared below.

Stationary recycling system

Advantages

- Larger capacities
- Designed for large quantities of material

Disadvantages

- Higher initial investment
- No flexibility in terms of location

Mobile recycling system

Advantages

- High flexibility in terms of location
- Lower initial investment

Disadvantages

- Lower capacities
- Designed for smaller quantities of material

Ultimately, the following factors are decisive when choosing between the two systems:

- For drilling projects with a continuously high volume of drilling fluid at a fixed location over longer periods of time, a stationary system is more economical.

- For projects with changing locations, the mobile solution offers advantages.



Stationary recycling system

The mobile **BIBKO® INFRA TEC** – Recycling system is presented below. The stationary solution is not considered further here.



Substitute building material –
after recycling process

Recycling system for drilling fluid - mobile version

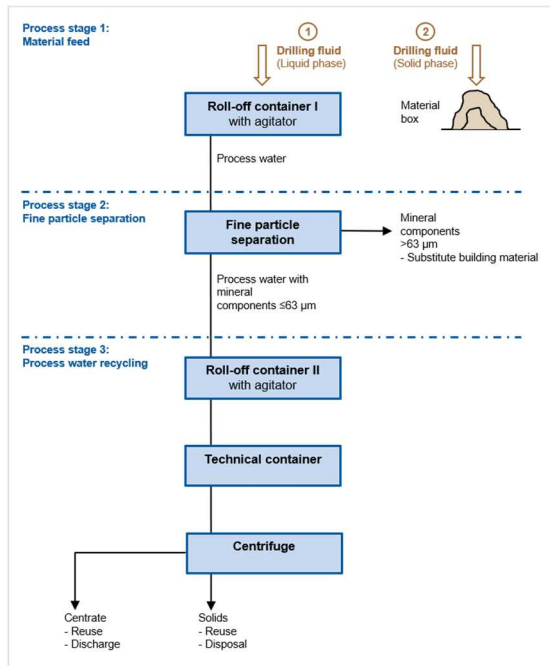
With this recycling solution, the recycling process consists of a total of 3 process stages.

Process stage 1: Material feed

Process stage 2: Fine particle separation

Process stage 3: Process water recycling

The following diagram provides an overview of the recycling process.



Graphic process diagram

Process stage 1: Material feed

First, the liquid phase is fed from the vehicle into the feed chamber of roll-off container I. The feed chamber with perforated plate serves to retain large particles. From this chamber, the liquid phase enters the buffer area. This area contains a discontinuous agitator that prevents the mineral components contained in the liquid from settling.

Once the liquid phase has been emptied from the vehicle, the solid phase remaining in the vehicle is emptied into a separate material box. This solid phase is then reused or disposed of.

In the next step, the liquid phase in roll-off container I is extracted via a feed pump and fed into the fine particle separation system.

Process stage 2: Fine particle separation

In the fine particle separation, the mineral components $>63 \mu\text{m}$ are separated. This stage recovers mineral components on the one hand and reduces the necessary addition of precipitating and flocculating agents for the treatment of the liquid phase in process stage 3: process water recycling on the other.



Fine particle separation

From the fine particle separation, the remaining process water with mineral components $\leq 63 \mu\text{m}$ enters roll-off container II. This also has an agitator.

Process stage 3: Process water recycling

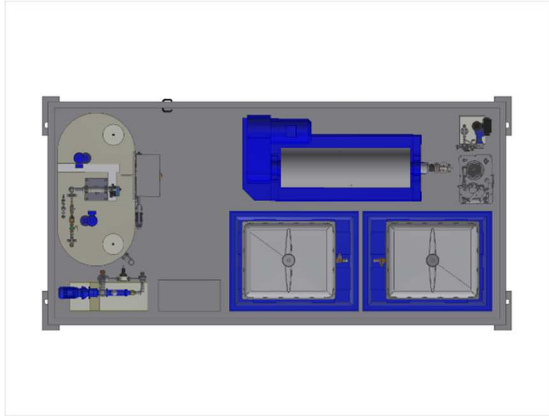
The process water is fed from roll-off container II to the centrifuge via a pump. The process water is conditioned by the addition of precipitating and flocculating agents.

Heart of the system: the technical container

The heart of process stage 3: process water recycling is the technical container. This contains the essential system components. These include:

- IBC containers for precipitation and flocculants, with collection trays
- Precipitant dosing station
- Flocculant preparation and dosing station
- Centrifuge
- Control cabinet for the entire system

These system components are pre-assembled electrically and mechanically in the technical container at the factory so that the recycling system is ready for operation on site within a very short time.



System components in technical container

The technical container consists of a sturdy steel frame construction with a reinforced, galvanized steel sheet floor. Sandwich panels with a thickness of 60 mm are used for insulation in the wall and ceiling areas. In addition, the container has a heating system and an exhaust fan for ventilation.



Technical container

Several double-wing, insulated steel and service doors ensure optimum accessibility to the system components.

The insulated double-glazed window measuring 2.540 x 1.000 mm (H x W) also ensures maximum natural light.

Core component: Centrifuge

The core component of this recycling solution is the centrifuge. Centrifuges use the centrifugal force generated by rapid rotation. This force is many times stronger than the force of gravity and separates materials with different densities.



Centrifuge - Decanter centrifuge type

The centrifuge consists of a rapidly rotating drum and a screw conveyor. The rapidly rotating drum generates the centrifugal force required for separation. This causes heavy particles (solids) to be deposited on the drum wall and discharged via the screw conveyor. These solids are either reused or disposed of. The purified process water (centrate) is also reused or discharged.

The separation and discharge of solids takes place simultaneously in the centrifuge as a continuous process. This enables high throughputs and easy process integration.

Summary

Compared to a stationary recycling system for drilling fluid, the mobile recycling system offers the following advantages:

- Simplified approval procedure due to mobility
§ 25 BimSchG
- Flexibility
Plug-and-play pre-assembled, enabling quick installation/relocation
- Lower investment costs
No construction work is required as roll-off containers are used to buffer the process water. A substructure (e.g. concrete Lego blocks) is only required for fine particle separation and technical containers.

The mobile, pre-assembled recycling system provides a flexible and economical recycling solution for drilling fluid, particularly for drilling projects at changing locations.

Further information

The following QR-Code will take you to the
BIBKO® INFRA TEC - YouTube channel.



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