

## Press release

### BIBKO® INFRA7EC – High dry substance content reduces disposal costs

Recycling of bentonite - Chamber filter press and membrane filter press in comparison

The integrated **BIBKO® INFRA7EC** – recycling solution for waste from sewer cleaning (AVV 200306), freshwater drilling (AVV 010504) etc. consists of a total of 4 process stages.

Process stage 1: Material feeding
Process stage 2: Material recycling
Process stage 3: Fine particle separation
Process stage 4: Process water recycling

An essential component of process stage 4 is the filter press. The filter press is a discontinuously operating pressure filter for separating solids from process water.

#### Filtration process

A feed pump pumps the process water to be filtered through the filter cloths of the filter chambers.



Chamber filter press - mounted in container

While the (filtered) water passes through the filter cloth and is discharged via drainage channels, the solids remain in the filter cloth and form the filter cake.



Filtered water (filtrate)

After completion of the filtration process, the press is opened and the filter cake is ejected.



Filter cake

#### Filter press types

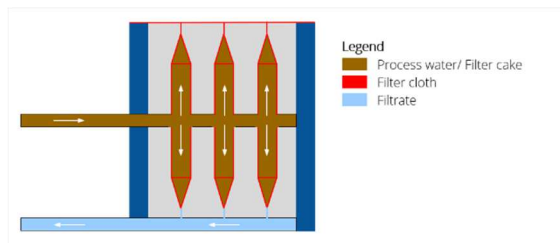
In *Process stage 4: Process water recycling*, two types of filter presses are usually used:

- Type 1: Chamber filter press
- Type 2: Membrane filter press

#### Chamber filter press

The dry substance content (DS-content) of the filter cake in the chamber filter press is mainly determined by the pressure of the feed pump.

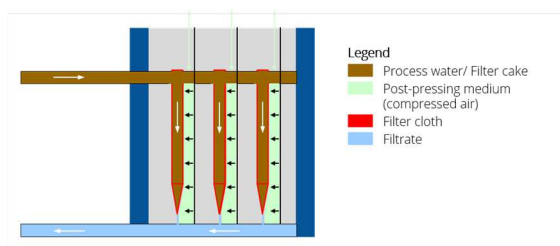
The filter cake is only re-pressed by means of a corresponding pressure holding time at the end of the filtration process.



Function Chamber filter press

### Membrane filter press

In the membrane filter press, the filter cake is additionally compressed by a flexible, impermeable membrane after the feeding process. This makes it possible to achieve a significantly higher degree of dewatering and thus a significantly higher dry substance content of the filter cake.



Function Membrane filter press

### DS-content and disposal costs

The higher dewatering of the membrane filter press leads to an increase in the dry substance content and thus to an increase in the density of the filter cake.

This reduces the total disposal quantity and thus the disposal costs.

### Factors of filtration

High filtrate quality and high dry substance content depend not only on the type of filter press but also on the following factors:

- Factor 1: Cloth type
- Factor 2: Precipitant/ Flocculant
- Factor 3: Dosage/ Concentration

Extensive tests and preliminary trials are carried out during the project planning phase to ensure the correct design of these factors.

### Filtration of process water from bentonite recycling

Using the example of the filtration of process water from the recycling process of bentonite, the results of the filtration with chamber filter press and membrane filter press are compared.

#### Factor 1: Filter cloth type

A filter cloth with a high permeability is chosen for the filtration of the process water. Permeability is the air permeability of the filter material. The higher the permeability, the larger the openings (meshes) in the filter material (filter cloth).

#### Factor 2/ 3: Precipitant/ Flocculant

To determine the optimal precipitant and flocculant, as well as the corresponding concentration and dosage, various preliminary tests are carried out. The best results were achieved with the following agents:

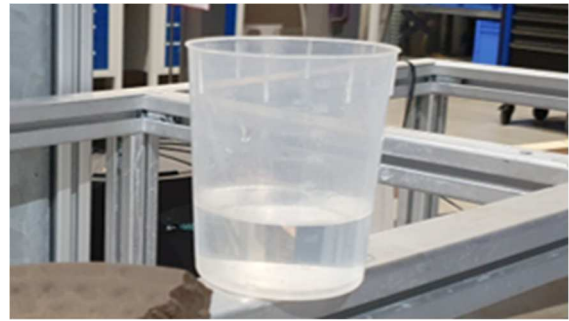
- Precipitant                      Poly solution
- Flocculant                        Anionic polymer



Flocs after precipitation/ flocculation

### Filtration test

After the type of the filter cloth has been determined and the precipitant/ flocculant with the appropriate concentration and dosage has been selected, the next step is the filtration test. For this purpose, the flocculated process water is filtered through the respective filter press.



Filtrate with low residual turbidity

### Result filter cake

The following photos show a comparison of the filter cakes obtained.

#### Chamber filter press



DS-content filter cake: 51,0 %

#### Membrane filter press



DS-content filter cake: 70,9 %

### Result filtrate

With both filter presses, a high filtrate quality with low residual turbidity is achieved.

### Conclusion

The direct comparison of the two filter presses shows that the achievable filtrate quality is almost identical. However, the dry substance content differs significantly between the two presses.

While a dry substance content of 51.0 % is achieved with the chamber filter press, the dry substance content of 70.9 % is approx. 39 % higher with the processed process water in the membrane filter press.



Membrane filter press

As already described above, the achievable dry substance content depends on the factors:

- Filter cloth quality
- Precipitant/ Flocculant
- Dosage/ Concentration

However, these factors only influence the processing of the process water in the filter press.

The decisive factor, however, is the process water to be processed with the specific chemical-physical properties of the ingredients.

Tests and preliminary trials on a pilot plant scale ensure the optimum interaction of all factors. This ensures the economical operation of the press with optimal results in terms of dry substance content and filtrate.

#### Selection of the filter press

The final selection of the filter press is made on the basis of an economic evaluation. For this purpose, the disposal costs (€/t) of the two filter press types are compared.

Both the purchase price and the disposal quantity play a decisive role. While the purchase price for the membrane filter press is higher than for the chamber filter press, the disposal quantity is reduced due to the higher dry substance content.