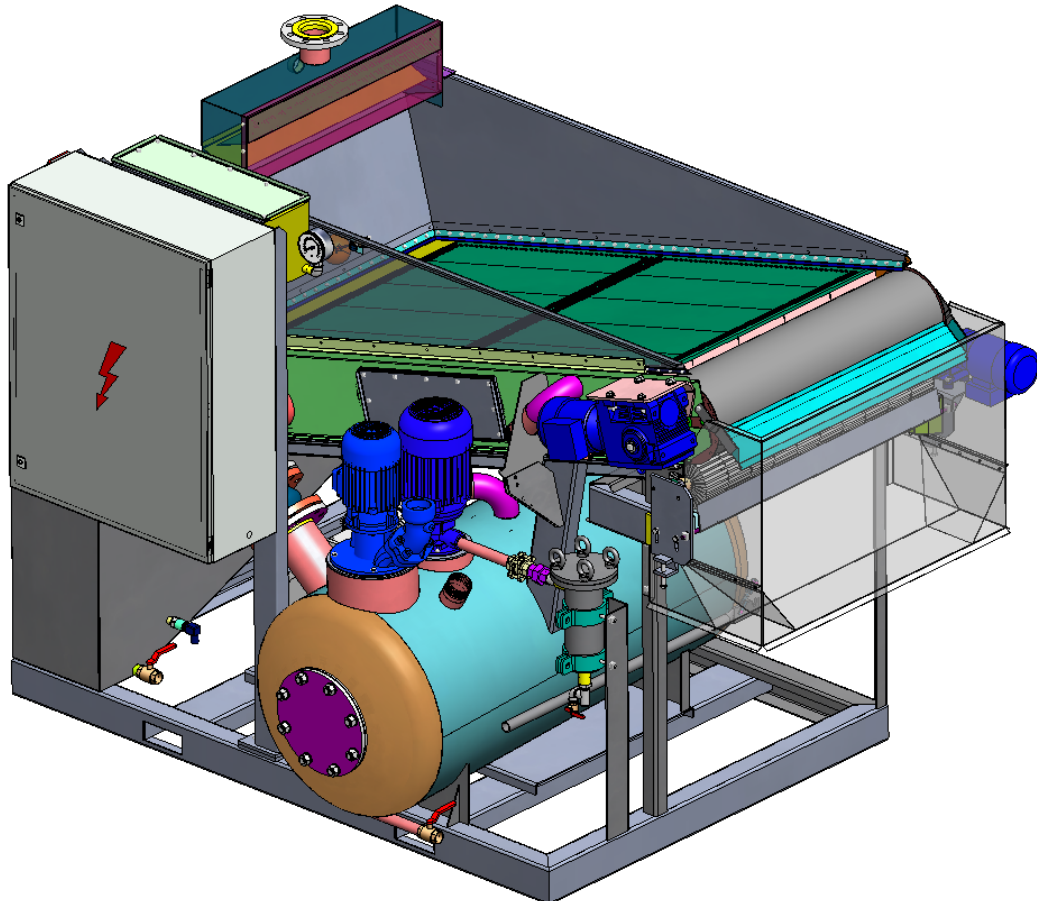


## Examples of use Vacuum belt filter for sludge dewatering



symbol photo

Leiblein develops devices and plants for process and wastewater treatment. This also includes the manufacturing of a wide range of different types of filters, such as our vacuum belt filter on which you will find further information below.

In the beginning the vacuum belt filter was used for the filtration of cooling lubricants and various other washing waters. However, it was seen early that the filter was suitable for sludge dewatering as well.

Exemplarily we show three applications in which the vacuum belt filter brought convincing results. Furthermore there are a functional description and a brief comparison of other (conventional) techniques for sludge dewatering.

## Dewatering oversized grains lime production

During wet processing of calcium carbonate oversized grains accumulate. Those were disposed of as waste before (costs about 150 EUR/t). The dewatering with a vacuum belt filter of Leiblein now enables the return of this substance into the production process. Thus costs for raw materials and disposal are saved.



inlet



filter cake

feed material  
inlet flow rate  
dewatering with

: about 45 - 500  $\mu\text{m}$  at 10 – 20 % DS  
: about 15 - 20  $\text{m}^3/\text{h}$   
: vacuum belt filter VBF 1400 E,  
special design: inverted sides,  
filter belt about 80  $\mu\text{m}$  stainless steel fabric

possible filter cake thickness  
solids content filter cake

: 5 - 9 cm  
: up to 80 % DS



vacuum belt filter in operation

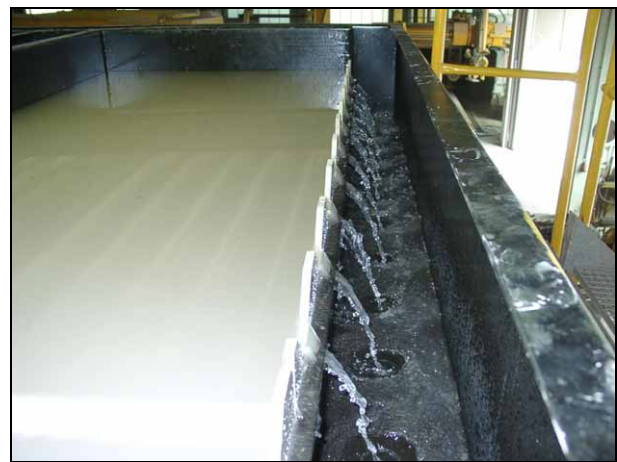
## Treatment of cooling water from a natural stone works

During the processing of natural stone (sawing, grinding, polishing) water is used for tool cooling. Simultaneously the water flushes away the abraded material. In order to use the water several times the particles are sedimented in a lamella separator. The solids content of the settled sludge is about 30 %. The sludge is then pumped onto the vacuum belt filter and dewatered.

The recovered water is recirculated whereas the compact sludge is disposed of or integrated into overburden pits.



inlet sawing water into lamella separator



clear water outlet from lamella separator



inlet sludge onto vacuum belt filter



filter cake from vacuum belt filter

flow rate cooling water  
clarification surface lamella separator  
sludge dewatering via

: about 25 m<sup>3</sup>/h  
: 60 m<sup>2</sup>  
: vacuum belt filter VBF 1000 LE,  
usually without flocculants



## Floor restoration

A floor restoring company grinds floors in DIY stores. Since the sales activities cannot be disturbed the works may only be done at night. Only separate sections are cleared and treated, the sales area has to be available again the following morning. The floor covering is wet-grinded which avoids dust formation. Afterwards the sludge is sucked off and dewatered via a vacuum belt filter. The whole plant is mobile thus it can be transported with a fork-lift truck or even pushed by hand. At the same time the plant is equipped with all required pumps, tanks, hoses etc.



sludge inlet



filter cake



filter trolley

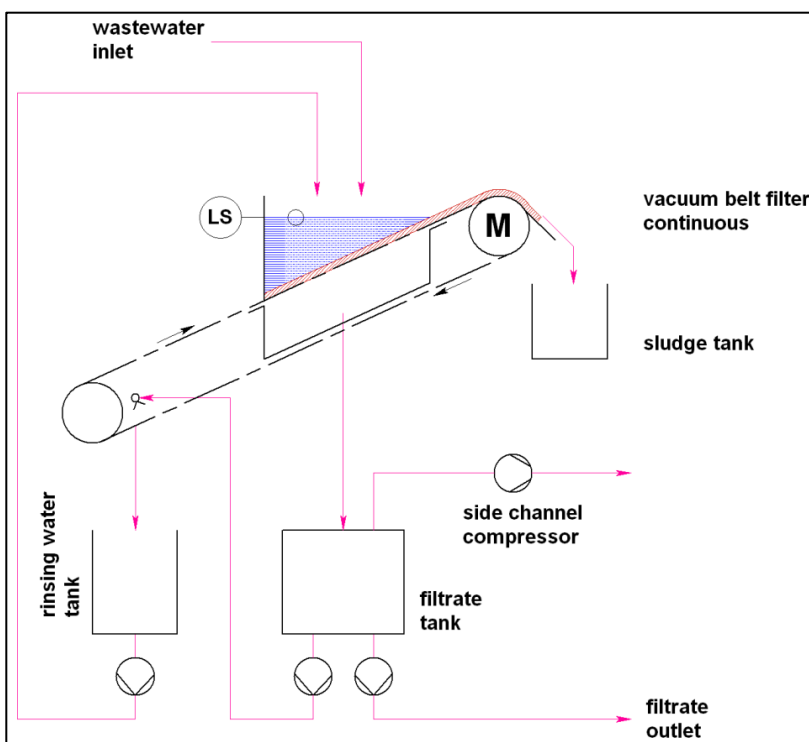
## Description vacuum belt filter

The vacuum belt filter (VBF-E) separates filterable solids out of lots of different media such as cooling lubricants, process water and many others. A further application is the sludge dewatering.

For filtration endless filter fleeces made of stainless steel or plastic (fineness from about 80 µm) are used. The filter is made of stainless steel so there is a wide range of applications.

Due to the exclusively mechanical cleaning no chemical changes of the medium are caused. Therefore the unit is particularly appropriate for media, which are run in a closed cycle. Moreover the medium feed and the filtration occurs very carefully thus the flocs are not destroyed.

Unlike hydrostatic filters (e. g. inclined filters) the advantage of a vacuum belt filter is that it works with the aid of vacuum. So a higher flow rate as well as a better dewatering of the filter cake can be reached.



flow sheet functional description

### Advantages vacuum belt filter continuous:

- *endless filter belt, so no consumable material*
- *feed filter belt from below, at first the belt is charged with sediment*
- *due to additional vacuum on the filtrate side there is a higher filtrate flow rate and a better dewatering of the filter cake*
- *inclined surface, therefore a well drained filter cake*
- *plant made from stainless steel, long life, wide range of applications*

## Comparison of different techniques for sludge dewatering

	<b>chamber filter press</b>	<b>decanter centrifuge</b>	<b>belt filter press</b>	<b>vacuum belt filter</b>	<b>filter bed</b>
<b>feed</b>	in batches sludge buffer required	continuous	continuous	continuous	continuous or in batches
<b>DS content achievable</b>	very high	moderate	moderate to high	moderate to high	moderate to high
<b>costs acquisition</b>	moderate to high	high	high	moderate	moderate
<b>energy consumption</b>	moderate	very high	high	moderate	very low
<b>maintenance required</b>	moderate	very high	moderate to high	moderate	none
<b>operating workload</b>	disturbances cleaning	flocculation consistence	flocculation consistence	low	only for discharge
<b>flocculants</b>	possible without any in the main	only with some	only with some	possible without any in the main	none
<b>behaviour at fluctuations in consistence</b>	good-natured	good-natured to delicate	very delicate	good-natured	good-natured
<b>particularly suitable for</b>	mineral sludges, large amounts of sludge	biological sludges	biological sludges, paper industry	mineral sludges, medium-sized amounts of sludges, filtration of liquids	mineral sludges, large areas available

In summary, it can be stated that the vacuum belt filter provides essential advantages in many applications with small and medium-sized sludge amounts compared to conventional methods.