Press release

BIBKO® INFRA*TEC* - Reduction of disposal costs through integrated recycling solution

Reduce disposal volume and Z-value with 4-stage process - Discharge process water

The length of the public sewer system for combined and wastewater in Germany is approx. 461,000 km. This corresponds to 37 times the linear air distance between Berlin and Sydney. Every year, 5.1 billion m³ of domestic and industrial wastewater is fed through this network to over 10,000 wastewater treatment plants.

Decentralized recycling

In the past, most of the sewer debris collected during preventive and on-demand cleaning was recycled or disposed of centrally, but decentralized recycling, directly at the sewer cleaning companies, is becoming increasingly important. The following goals are being pursued:

- Reduction of the disposal volume
- Reduction of the allocation value Z
- Reduction of disposal costs

Types of waste

In addition to waste from sewer cleaning (sewer clearing material/ AVV 200306), this also applies to:

Waste from street cleaning	AVV 200303
Waste from freshwater drilling	AVV 010504
Waste from rainwater retention	AVV 170506

and other wastes.

Recycling process

The process for recycling waste consists of at least 2 process stages:

- Process stage 1: Material feeding
- Process stage 2: Material recycling

Depending on the material to be recycled and the resulting process water, two additional process stages are used if required:

- Prozess stage 3: Fine particle separation
- Prozess stage 4: Process water recycling

Process stage 1: Material feeding

The material (waste) is usually fed from the vehicles into the recycling machine. Material can also be fed in via wheel loaders or conveyor belts.

A distinction is made between direct and indirect material feed.

- In the case of direct material feed, the material is fed directly to the recycling machine via the feed hopper.
- In the case of indirect material feed, the material is first fed into a buffer (dose buffer/feed bunker). From this buffer, the material is continuously fed to the recycling machines. This separates material feed and material recycling. A consistently high quality of the recycling material is thus ensured, regardless of the feed quantity and feed speed.

Discharge process at recycling machine

Process stage 2: Material recycling

The actual recycling process takes place in the BIBKO® INFRA*TEC* recycling machine as a wet-mechanical process. The material is first moved through a water bath in the pre-washing chamber. Unwanted components ≤200 µm (mineral components, impurities) are washed out and discharged from the machine with the process water.

A bucket elevator removes the prewashed material >200 µm from the prewash chamber and feeds it to the main wash chamber.

There, the material is again moved through a washing bath and removed by another bucket elevator. The attached spiral conveyor dewaters the material and conveys it to the material box. To ensure a uniformly high quality of the recycled material, water flows through the recycling system in countercurrent.

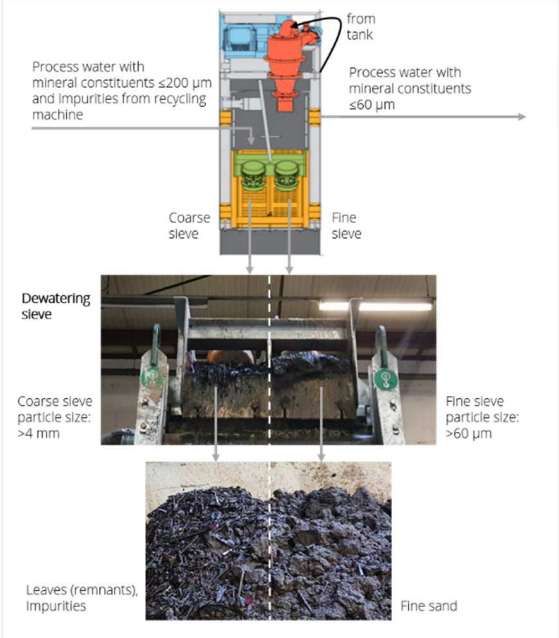
Recycled material >200 µm

Process stage 3: Fine particle separation

The process water discharged in process stage 2 contains, among other things, mineral components ≤200 µm. If this content is below the limit value or below the value accepted by the competent authority, the process water can be discharged into the sewage system. However, this discharge may only take place after appropriate analysis and approval.

However, if the proportion is above the limit value and direct discharge is therefore not possible, process stage 3 is added to the recycling process.

In the fine particle separation, mineral particles in the range of 60 - 200 µm as well as still contained impurities are separated from the discharged process water. For this purpose, the process water is passed through screens and a hydrocyclone. The resulting material is dewatered via a vibrating screen, conveyed to the material box and disposed of.



Fine particle separation

The process water with mineral components ≤60 µm is either discharged or fed to process stage 4: process water recycling. Process stage 4 is used in particular when the following criteria are present:

- The proportion of mineral components is still too high to obtain a permit for the discharge of the process water.
- Even with other measures (e.g. dewatering containers), the permissible limit value cannot be reached.

Process stage 4: Process water recycling

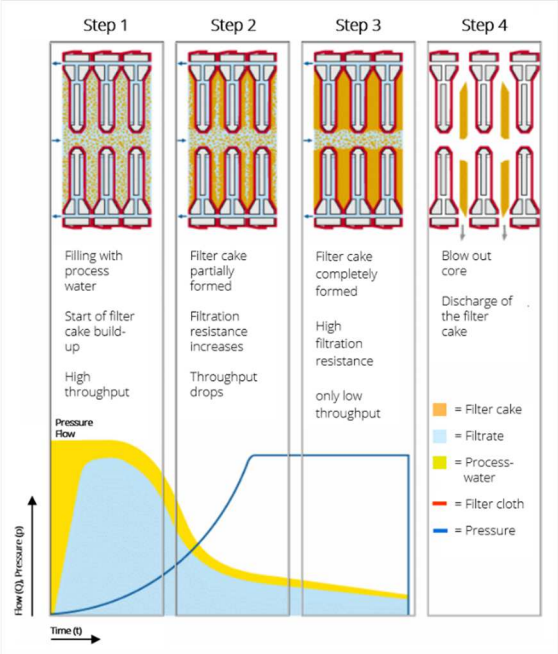
The process water from Process stage 3: Fine Particle Separation is first fed into an intermediate buffer. This contains an agitator to keep the mineral constituents ≤60 µm in suspension and thus prevent sedimentation.

This intermediate buffer serves as a feed tank for the chamber filter press.

Chamber filter press

In the chamber filter press, the mineral components are filtered off and pressed into filter cakes. These filter cakes are disposed of. The resulting filtered process water (filtrate) is discharged after analysis and release.

The filtration process in the chamber filter press takes place in 4 steps:



Filtration process chamber filter press

Quality criteria process water recycling

The quality of the process water recycling is mainly determined by the following two criteria:

- High TS content in the filter cake: Reduction of the volume of material to be disposed of.

Filter cake

- Low residual turbidity and no solids in the filtrate: discharge into the sewer system

Filtrate

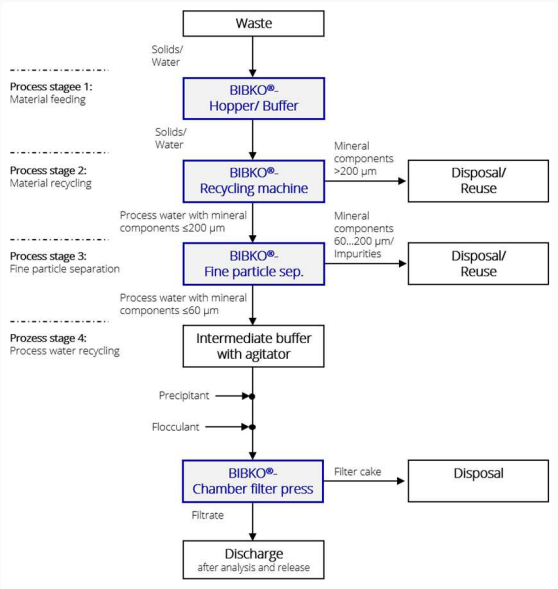
The quality criteria are achieved through the interaction of 3 factors:

Factor 1: Filter cloth properties
Factor 2: Precipitant/ flocculant
Factor 3: Dosage/ concentration

For the correct design of these factors, extensive tests and preliminary trials are carried out during the project planning phase.

Schematic of the overall process

The following diagram shows an overview of the overall process.



Schematic of the overall process

Conclusion

The described 4-stage process represents an integrated recycling solution for different types of waste. These include the following types of waste:

Waste from sewer cleaning	AVV 200306
Waste from street cleaning	AVV 200303
Waste from freshwater drilling	AVV 010504
Waste from rainwater retention	AVV 170506

With *process stage 1: Material feeding* and *process stage 2: Material recycling*, the disposal costs are reduced by the following measures:

- Reduction of the disposal volume
- Reduction of the allocation value

With process stage 3: Fines separation and process stage 4: Process water recycling, there is also the option of treating the process water produced in such a way that it can be discharged into the sewer system, if required. Approval for discharge is granted by the responsible authority.