Press release

BIBKO® INFRA*TEC* - Recycling systems for waste

Possibilities of material feeding of sewer flushing material, drilling fluid and other wastes

The *principle of proximity* is firmly anchored in the European Waste Framework Directive. This stipulates that waste should be disposed of or recycled as close as possible to the place of origin.
For an environmentally sound handling of waste, the Closed Substance Cycle Waste Management Act additionally stipulates in the 5-level waste hierarchy that waste must be recycled (hierarchy level 3), as far as this is possible. Only if this is not possible may the waste be disposed of (hierarchy level 5). The aim of this approach is the reprocessing of materials so that they can be used as a substitute for primary raw materials (material recycling).

Solution

With a BIBKO® INFRA*TEC*-Recycling system for waste in the company, both the European Waste Framework Directive and the Closed Substance Cycle Waste Management Act is complied to.

Suction vehicle with trailer during emptying

Recycling process

Depending on the individual requirements and objectives, the recycling process consists of up to 4 process stages:

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

Process stage 1: Material feed

The material feed is the central topic in the following and is therefore dealt with in detail below.

Further process stages

Process stage 2: Material recycling

The actual recycling process takes place in the BIBKO® INFRA*TEC* - Recycling machine as a wet-mechanical-process. The waste (water-solid-mixture) is moved through a washing bath.
Unwanted components ≤250 µm (mineral components, impurities) are washed out and discharged from the machine with the process water.
The washed material is then removed by a bucket elevator and fed to the screw conveyor. The material is then dewatered and conveyed into the material box.

Process stagee 3: Fine particle separation

The process water discharged in process stage 2 contains, among other things, mineral components ≤250 µm. With the fine particle separation, additional mineral components in the range of 60...250 µm as well as still contained impurities are separated from the discharged process water.
The process water with mineral components ≤60 µm is then either discharged after analysis or fed to *process stage 4: process water recycling*.

Prozess 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 particles ≤60 µm in suspension and thus prevent sedimentation.
This intermediate buffer serves as a holding tank for the subsequent filtration.
Either filter presses or centrifuges are used for filtration. This produces solids as well as filtered water (filtrate/ centrate).

Filtrate/ filter cake after filtration with a filter press

Material feed

The material is fed into the recycling machine from the suction/ rinsing vehicles, sweepers, suction trailers or skips. Three solutions are available for this:

- Solution 1: Feed hopper
- Solution 2: Dosing buffer
- Solution 3: Feed bunker

Direct/ indirect material feed

For material feeding, a distinction is also made between direct and indirect material feeding.

In the case of direct material feed, the material is fed directly into the recycling machine via the *feed hopper* (solution 1).

In the case of indirect material feed, the material is first fed into a *dosing buffer/ feed bunker* (solution 2/ 3) which serves as a buffer. From this buffer, the material is continuously fed into the recycling machine.
This separates the material feed from the material recycling. A constantly high quality of the recycled material is thus ensured, independent of the feed quantity and feed speed.

Solution 1: Feed hopper

The function of the feed hopper is to feed the material from the vehicles directly into the recycling machine.
For this purpose, the feed hopper is directly attached to the recycling machine. The material is not buffered. The feed from the vehicle must therefore be uniform to ensure a consistently high quality of the recycled material.

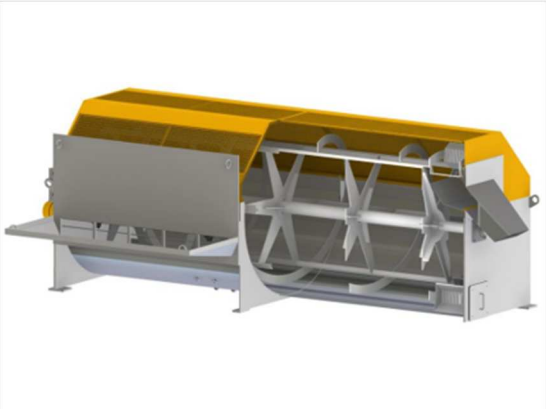
Vehicle being emptied into the feed hopper

The size and shape of the feed hoppers can be adapted to suit individual requirements.
Compared to material feed via *dosing buffers* or *feed bunkers*, material feed via a feed hopper is the simplest and most cost-effective method of material feed.

Solution 2: Dosing buffer

In addition to feeding the material into the recycling machine, the dosing buffer has the function of initially buffering larger quantities of material.
While the solids are continuously fed to the recycling machine via a rotating spiral with bucket elevator, the process water runs in free fall from the dosing buffer into the recycling machine.

Dosing buffers are used in particular for intermittent feeding of the material.

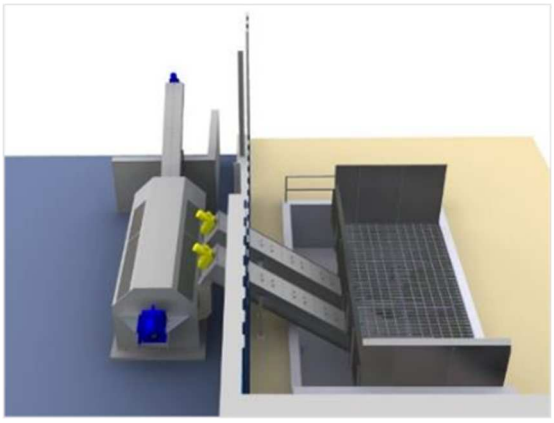


Schematic: Dosing buffer

Compared to the material feed via the *feed hopper*, the material feed via the dosing buffer is the more expensive solution. However, the possibility of intermittent emptying reduces the emptying time and thus the downtime of the vehicle. This in turn increases the economic efficiency of the system.

Solution 3: Feed bunker

The feed hopper is an alternative to the dosing buffer. Here, too, larger quantities of material are first buffered and then continuously fed into the recycling machine.



Schematic: Feed bunker with recycling machine

Compared to the material feed via the *dosing buffer*, in this solution both the water and the solids are fed into the recycling machine with a screw conveyor (Archimedes screw).

Emptying skip at the feed bunker

Comparison of the solutions

The 3 solutions - *feed hopper*, *dosing buffer* and *feed bunker* - are compared again in the following table.

Solution	1	2	3
Desription	Feed hopper	Dosing buffer	Feed bunker
Material feed/ -recycling	not separated	separated	separated
Material feed	uniform	intermittent	intermittent
Material buffering	no	yes	yes
Buffer volume	-	5 m³	9 m³
Material feed	direct	indirect	indirect
Solids feed	direct	bucket elevator	screw
Water feed	direct	overflow	screw
Individually adaptable	yes	yes	yes

Summary

With the solutions presented, three possibilities are available for optimally adapting BIBKO® INFRA-*TEC*-Recycling systems to the individual, project-specific conditions. The selection is based on the following criteria:

- What are the total quantities of waste to be recycled (t/h or t/year)?
- How many vehicles are to be emptied at the same time (feed hopper ↔ dosing buffer/ feed bunker)?
- What are the local conditions on site?
- What budget is available for the total investment?

Based on these criteria, the economically and technically optimal recycling system is selected.