Press release

BIBKO® INFRA*TEC* - With 3 criterias to the optimal recycling system for waste

Sewer flushing material, road sweepings, bentonite suspension – starting point for secondary raw material

In Germany, almost all households are connected to the public sewer system. Nevertheless, the sewage network continues to grow. The current total length of approx. 595,000 km (as of 2016) represents an increase of approx. 20,000 km compared to 2013. This is due, among other things, to the connection of residential areas and the conversion of the combined sewer system into separate sewers for wastewater and stormwater.
As the length of the sewage network increases, so does the importance of preventive and on-demand cleaning of the sewers. Especially in times of low wastewater volumes and high material concentrations, low flow velocities lead to sedimentations. Regular cleaning is the only way to prevent flooding caused by blocked sewers. The resulting material is collected and disposed of either by the company itself or by external disposal companies.

Recycling instead of disposal

The cost of disposing of the sewer flushing material is determined by the classification value Z according to the Technical Rules for Soil of the LAGA M20 or the determined landfill class DK of the Landfill Ordinance DepV. Higher classification values mean higher disposal costs.

Sewer cleaning vehicle - emptying at recycling machine

Recycling is an alternative to the direct disposal of sewer flushing material. The reduction of the disposal volume and the reduction of the classification value Z or the landfill class DK achieved in this way saves costs. In addition, the production and reuse of secondary raw materials actively protects the environment and complies with the Closed Substance Cycle Waste Management Act (KrWG - Level 3: Waste Hierarchy).

Waste – starting point for seconday raw materials

In addition to sewer flushing material, other wastes also represent a starting point for secondary raw materials. These include waste from street cleaning (sweepings) and waste from freshwater boreholes (bentonite suspension). Secondary raw materials obtained from these wastes can be used, for example, as cable sand, pipe bedding, frost protection layer or as soil mortar/liquid soil and thus be reused.


Recycled material - screened: 0...2/ 2...8 mm/ 8...16 mm

With 3 criteria to the optimal recycling system

Recycling machines for the above-mentioned wastes are individual solutions tailored to the respective company and the respective circumstances. But how is the optimal recycling system designed? This is shown below on the basis of 3 criteria.

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☑ Criterion 1: Waste chraracteristics

The basis for the design is first of all the characteristics of the waste to be recycled. On the one hand, the composition plays a major role (e.g. grain size distribution, impurities, organic matter), on the other hand, the solid/liquid ratio is decisive.

☑ Criterion 2: Waste quantity/ feed

In addition to the waste characteristics, the amount of waste to be recycled and the type of waste feed into the recycling machine play a major role. A distinction must be made as to whether the waste is fed into the recycling system intermittently or uniformly. If the waste is fed intermittently, the feed must be designed differently than if the feed is continuous.

☑ Criterion 3: Recycling quality

Finally, it must be determined which recycling quality is to be achieved with the recycling system. This includes the quality of the recycled mineral components and the requirements for the quality of the recycled process water.

After these 3 criteria have been determined, all relevant design criteria for the recycling system are available:

- Waste composition
- Waste quantity/ feed
- Recycling quality

Material example: Bentonite suspension

Design

Based on the design criteria, the first step is to design the recycling machine as the central component. This involves selecting the appropriate recycling machine and the necessary additional components on the basis of the waste quantity, the type of waste feed and the recycling quality.

The next step is to design the components for recycling the process water. Here, too, the appropriate components must be selected on the basis of the quantities produced and the required quality.

Project example

The following project example shows the step-by-step process of designing a recycling system based on the three criteria presented.

Waste from street cleaning (street sweepings)

Criterion 1: Waste characteristics

In this project, waste from street cleaning (street sweepings) is recycled. The waste is composed as follows:

Mineral components 0...22 mm	67%
Impurities (wood, plastics, etc.)	3%
Water	30%

Criterion 3: Waste quantity/ feed

The recycling system is based on the following input quantities:

Waste quantity	15 t/h
Operating time	8 h/day
Working days	200 days/year
Waste quantity	24.000 t/year

The waste is fed in intermittently via an excavator.

<u>Criterion 3 3: Recycling quality</u>

After the recycling process, the mineral components should be available in such a way that they can be reused as secondary raw materials. On the other hand, the resulting process water should be treated in such a way that it can be reused for the recycling process or discharged after analysis and approval. The resulting filter cake should have as high a dry matter content as possible (dry matter content >70%).

<u>Design of the recycling system</u>

Since the waste is fed in intermittently via an excavator, a dosing buffer with a length of 5 m s connected upstream of the recycling system. This first buffers the waste and then continuously feeds it to the recycling machine. A 2-chamber unit with a capacity of 30 m³/h is planned as the recycling machine. The separation of material feed and material recycling ensures a constant high quality of the recycled material, independent of the feed quantity and speed.

Filter cake/ filtrate after filtration

Mineral components in the range of 60...250 µm are first separated from the resulting process water in the fine particle separator. The process water is then buffered in an agitator tank and fed from there to a filter press. In order to achieve the required dry matter content, a membrane filter press is used as the filter press. Through chem. Optimum filtration is achieved by chemical precipitation and flocculation of the process water.

<u>Diagram of the recycling system</u>

The following illustration shows a schematic diagram of the recycling system.

Summary

Despite the high connection rate of 97% to the public sewage system, the sewage network in Germany is growing.

This also increases the importance of preventive and on-demand cleaning of the sewers to ensure proper operation.
The disposal of the sewer flushing material produced during sewer cleaning is a major cost factor for sewer cleaning companies. One way to reduce these costs is to recycle the sewer flushing material. This reduces the disposal volume as well as the classification value Z or the landfill class DK. In addition, the production and reuse of secondary raw materials actively protects the environment and complies with the Closed Substance Cycle Economy Act.
In addition to sewer flushing material, other wastes also represent a starting point for secondary raw materials. These include waste from street cleaning (sweepings) and waste from freshwater boreholes (bentonite suspension).

Secondary raw material - screened

In order to design a recycling system, three criteria are necessary:

- Waste composition
- Waste quantity/ feed
- Recycling quality

With these 3 criteria, all relevant information for the design of the optimal recycling system is available.

The investment in a recycling system is a beneficial investment in the economic efficiency of the company, the protection of the environment and the fulfilment of legal requirements.