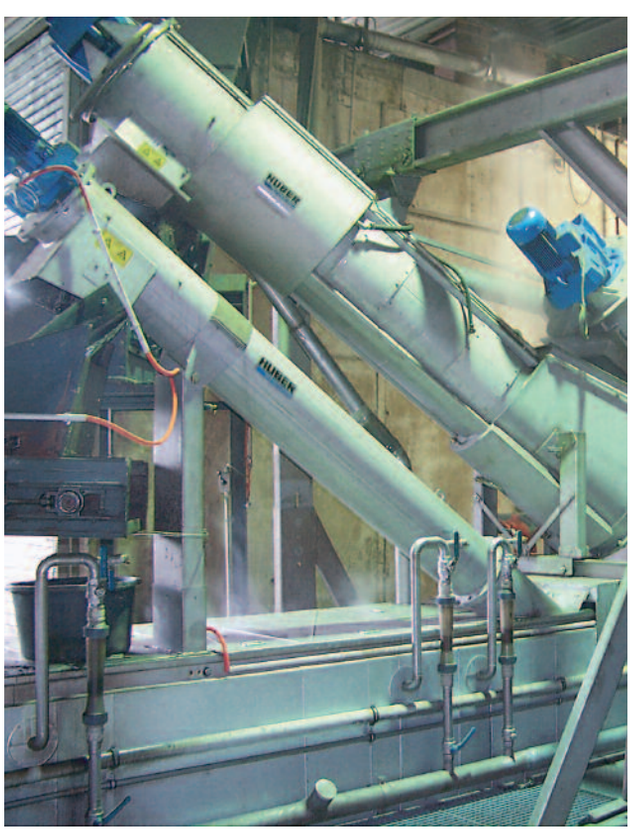
Coarse material and grit separation in a biowaste fermentation plant – the beginning of a success story

Active environmental protection today: Up to 45,000 t solid biowaste per year can be processed in the fermentation plant built in 1999 at the waste management enterprise RECYBELL Umweltschutzanlagen GmbH & Co KG, a subsidiary of Bellersheim GmbH in Boden, Germany. By means of the Bio-Stab process, the plant produces biogas and Bio-Stab soil from the collected organic waste. The whole process is CO2 neutral.

The first work step after mixing of the delivered biowaste is pre-sorting (e.g. with a metal separator) and primary crushing. In the second work step, the biowaste is mashed in a pulper to approx. 12 % DR and further comminuted. To achieve this, the waste is mixed with hot water (e.g. the HUBER Dissolved Air Flotation Plant being used for service water processing). The approximately 70 °C hot effluent from the downstream hygienisation unit flows into the HUBER ROTAMAT® Complete Plant Ro5 Bio to remove coarse material and grit. The HUBER ROTAMAT® Complete Plant Ro5 Bio is an enormously reinforced version of the standard HUBER ROTAMAT® Complete Plant Ro5 and was especially developed for this specific application. The HUBER ROTAMAT® Complete Plant Ro5 is fed in batches. Each of the 20 m³ batches is passes through the plant in approximately 20 minutes. A total of 16 batches are processed during the 12 hours biowaste recycling process, with the Ro5 Bio plant being operated continuously. The first step of coarse material separation is achieved with a special, very sturdy HUBER ROTAMAT® Fine Screen Ro1 Bio 1600 that is equipped with a double rake arm. The screen has a bar spacing of 15 mm and rising pipe diameter of 711 mm (!). Approximately 1.5 – 2.0 m³ coarse material is removed per batch.

The pre-dewatered material separated by the HUBER ROTAMAT® Ro1 Bio plant (pieces of wood, plastic foils, bones, etc.) are discharged into the downstream HUBER ROTAMAT® Screenings Compactor Ro7 with a rising pipe diameter of 711 mm (!) and dewatered to approx. 30-35 % DR prior to being passed on to a composting facility.

Settleable solids, such as grit, glass, bone fragments, etc. are separated in the aerated grit trap of the HUBER ROTAMAT® Complete Plant Ro5 Bio. Also this grit trap was especially optimized for this specific application. The grit trap achieves a degree of separation from the viscous biosuspension (approx. 8 % DR!) of approx. 90 % > 1.5 mm. Like the screenings, the discharged grit is passed on to a composting plant.



HUBER ROTAMAT® Complete Plant Ro 5 Bio and HUBER ROTAMAT® Screenings Compactor Ro 7 installed at RECYBELL, Boden

The not separated minerals remain within the suspension and eventually end up in the fraction of the Bio-Stab soil. The Bio-Stab soil, a high quality fertilizer, is applied onto the surrounding farmland. The special version of the HUBER ROTAMAT® Complete Plant Ro5 for biowaste treatment was optimized during the run-in phase of the fermentation plant and has been operating without problems since the end of 2000.

It has definitely been worthwhile investing great efforts in the development of the special bio-version of the HUBER ROTAMAT® Complete Plant Ro5 in the fermentation plant at Boden. Any doubts that may have existed initially concerning the feasibility of this project in view of the high requirements and lack of experience could be eliminated owing to the excellent cooperation between HUBER and BELLERSHEIM.

The HUBER ROTAMAT® Complete Plant Ro5 Bio is a special class development that is unique on the solids/liquid separation market. The success story that began at Boden has meanwhile continued on the European market. The plant is available in three sizes and successfully operated on 16 European biogas plants and 13 biowaste fermentation plants.

Furthermore, the special HUBER ROTAMAT® Ro1 Bio plant is used for coarse material separation on three biowaste fermentation plants with a total of four installed HUBER ROTAMAT® machines. In two of the systems the sturdy HUBER ROTAMAT® plant Ro1 Bio was even used to replace the previous coarse material separator. Since then, also these biogas plants provide a trouble-free operation of this treatment stage.

Bernhard Ortwein
Business Unit Industry

HUBER ROTAMAT® Fine Screen Ro 1 Bio / 1600 / 15 mm with double rake arm and discharge pipe (711 mm dia.)