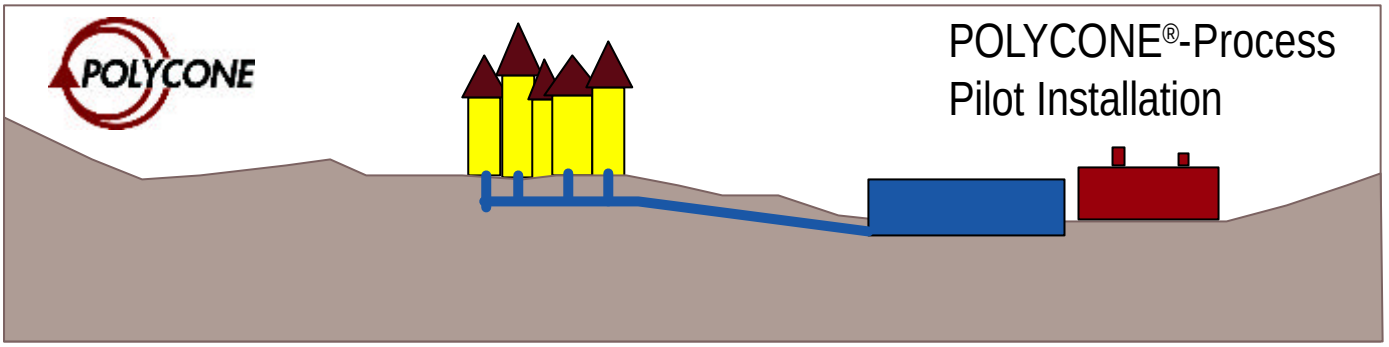


New solutions for municipal sewage sludge

Sewage-sludge recycling in future

Sewage sludge, a material produced constantly in every sewage-treatment plant, can be used less and less as a fertiliser in agriculture owing to the increasing shares of noxious matter it contains. Wholesalers in the food industry and new regulations are having an impact on this trend. In future, recycling without separating off the noxious matter will no longer be conceivable. Consequently, the newly developed solution presented below which affords advantages equally both economically and ecologically is all the more interesting.

Objectives

The sewage sludge should be recycled as near as possible to the location at which it is produced. This will allow avoidance of trucks permanently transporting over 75 % water. In addition, it is intended to achieve minimum residual noxious matter and utilise the energy potential in the sewage sludge for the process. Moreover, it is intended to comply with the limit values pursuant to Swiss regulation CH-LRV 92 / Clause 7.1 and German regulation „D-TA Luft / 17. BImSchV“ (German Air-Pollution Regulations / 17th Federal Environmental Impact Protection Ordinance (BImSchV)).

POLYCONE® - process

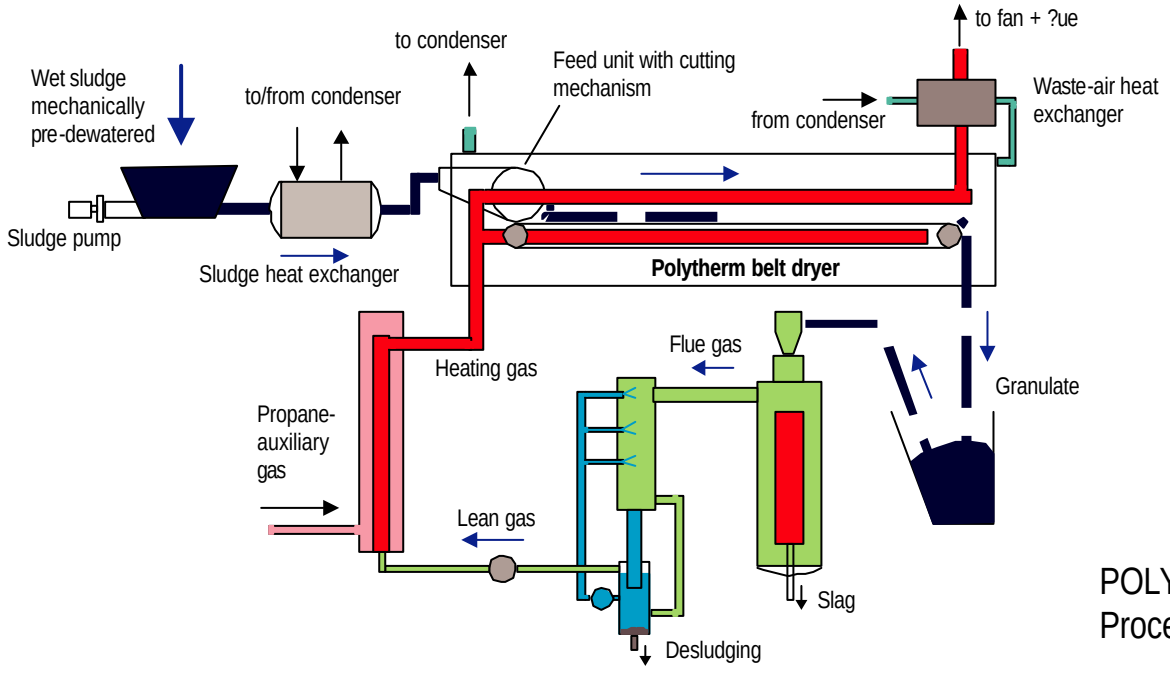
The mechanically pre-dewatered wet sludge is passed at high pressure through a heat exchanger and then conveyed, crushed, on a stainless-steel belt through a drying chamber. This dried granulate is converted to lean gas in a high-temperature gasi?er (HTG) during the downstream steps. This gas, after scrubbing, is then routed into the high-temperature ?are. This closes the circuit. The gas emerging at this point provides the heating energy for the drying chamber mentioned at the start. What by-products are produced?

Dead steam and vapour may be produced during the drying process. These are routed into the high-temperature ?are (HTF). The unused ?ue gas is discharged into the environment. Owing to the very high temperatures in the HTF, this gas is free of noxious matter and does thus not pollute the environment. Inert slag in which any heavy metals are bound is produced in the HTG. The slag cannot be scrubbed. Its weight corresponds to the share of mineral substances in the original sewage sludge.

Know-how united

This newly developed solution incorporates the many years of know-how of the following companies specialising in the sewage-sludge sector:

ROMAG AG in Düdingen and **ProCone Gasi?cation Systems GmbH** in Gunzgen. These two companies, together with the **Terra Nova GmbH** trading company in Breitenbach, have set up the new company **POLYCONE® GmbH**, Gesellschaft für rationelle Verwertung von Klärschlamm, with its headquarters in Düdingen. It deals solely with development and marketing of the POLYCONE® high-temperature process.



From the operator`s point of view

Every process requires a minimum processing quantity in order to be able to operate ef?ciently and economically. The economically minimum size of a POLYCONE® plant is a capacity of 600 metric tons dry sludge per annum and an availability of approx. 6,000 operating hours per annum.

Ef?ciency and economy are still guaranteed if several sewage-treatment plants within a radius of less than < 20 km merge to form an association and operate the plant jointly.

Main components

of the POLYCONE®-Process:

•POLYTHERM®-belt dryer

On the modular POLYTHERM® belt drying installation manufactured by the ROMAG AG company, all installation sections are incorporated in compact manner in two containers. The process controller with a database and a knowledge base and an automatic operator are integrated.

The containers are insulated to prevent heat loss and all the circuits are closed. The noise and odour emissions are thus well below the limits of what can be reasonably expected.

•POLYCONE®-high-temperature gasi?er HTG

The ProCone company has further-developed high-temperature gasi?cation technology through its own research and development work. The PROMETHEUS multi-fuel gasi?er, patented by ProCone, and the licensed JUCH wood gasi?er will be familiar to those in the ?eld. ProCone has done groundbreaking work in the sector of sewage-sludge gasi?cation with the POLYCONE® gasi?er.

•HOFGAS®-high-temperature flare HTF

This operates on the basis of the „Hofstetter“ system. The process involves combusting the lean gases produced by the HTG in environment-friendly manner and converting them to heating energy. In addition, the dead steam and vapours produced in the sludge-drying process can also be combusted.

Pilot installation in Hindelbank

Technical data

All technical data in respect of the requirements met by the process and the composition of the sewage sludges suitable for processing are listed in detail in Technical Bulletin „ POLYCONE® Process“, No. 1/12. This document also contains detailed descriptions and drawings of the main components.

Pilot plant

A pilot plant was set up in order to re?ne all details of the POLYCONE® process and, above all, to determine the required fundamentals for environmental impact reports and environmental impact reviews.

The Düdingen plant was tested and re?ned over a period of two months in an initial phase. During the second phase (as of January 2003), it commenced practical pilot operation at Hindelbank sewage-treatment plant near Berne, Switzerland. Of course, it will be presented there to a broader group of interested users.

The pilot installation has a capacity of approx. 60 kg dry sludge per hour and takes up an area of 25 x 12 m.

Bene?ts

From a municipal point of view, this solution allows a product burdened with noxious matter to be disposed of or recycled in a manner which does not result in economical or ecological problems. One of the outstanding features is the minimum amount of external energy required. Depending on quality of the sewage sludge, it is possible for up to 95 % of the required drying energy to be saved. In addition, excess energy is available in the form of heat for other applications.

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