HAARSLEV
INDUSTRIES

ENGINEERING AND PROCESS TECHNOLOGY FOR

Municipal and Industrial Sludge

Our focus is on customised processing solutions based on the know-how, technology and products merged together from the former brands: Atlas-Stord Denmark A/S, Stord-Bartz and Haarslev A/S, brands that have been recognised world-wide for performance, reliability and high quality.

Haarslev Industries has built up a firm foundation of expertise within drying of sludge from wastewater treatment plants during the last 30 years. In 2006 Haarslev Industries acquired Atlas-Stord, a well-reputed supplier with decades of experience within drying of municipal and industrial sludge, as well as drying of residues from the pharmaceutical and chemical industries.

Haarslev Industries focus on equipment for environmental protection, energy conservation and optimal resource utilisation and we supply both single machines and complete plants designed to meet individual customer requirements.

We design and supply tailormade systems to handle sludge, which is a difficult product to dry. Our driers comprise a simple, compact solution with only one self-cleaning slow rotating component. Further, we can achieve high energy efficiency due to minimal heat loss and the possibility to recover heat for use in the process or for district heating. Output is formed as paste, powder, granules, pellets or briquettes allowing a great variety of applications.

Our systems are characterised by high efficiency, energy savings, reliability and less space requirements compared with other systems. Today major cities such as Hamburg, Los Angeles, Moscow, Copenhagen, Istanbul and Shenzhen rely on the performance of Haarslev sludge drying equipment.

In conventional solids processing, a series of volume reduction measures, including thickening, digestion, and mechanical dewatering are used before incineration. However, even after mechanical dewatering, wastewater solids still have too high moisture content to incinerate. Hence the need for further drying of the sludge before final disposal.

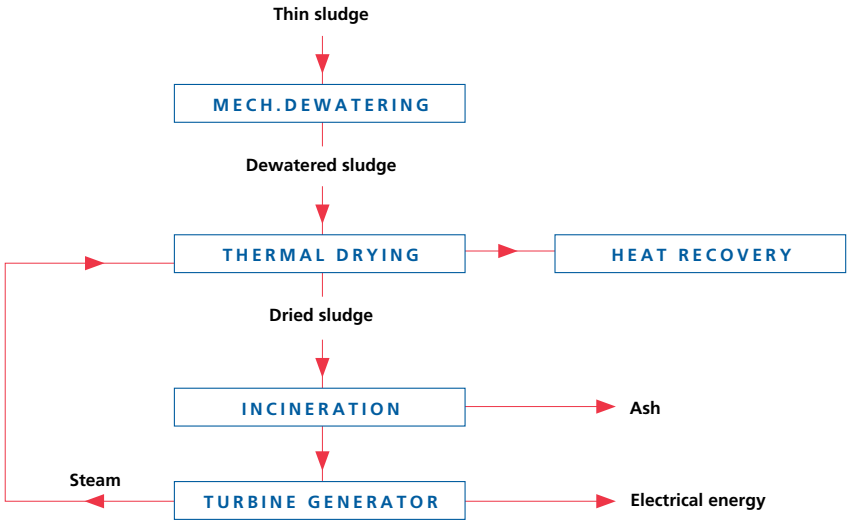
Our solutions are used both in municipal and industrial applications. The industrial applications are heavy-metal hydroxide sludge and physical-chemical sludge, penicillium mycelium waste slurry, reject fiber sludge from pulp and paper mills and combined primary and secondary sludge from petrochemical plants. In some instances, the process function includes stripping solvents, oils and other hydrocarbons.

Part Drying

Thermal drying is one of the technologies available for processing of solids produced at municipal wastewater treatment plants. Municipal sludge is typically liquid containing 2 to 6 per cent solids. In a thermal sludge treatment plant delivered from Haarslev Industries, the thin sludge enters the drying line and is first mechanically dewatered in a decanter centrifuge or belt press. This is a cost-efficient process that brings the dry substance of the sludge up to 25-30 per cent and accomplishes both weight and volume reductions.

The dewatered sludge is then fed to the Haarslev Rotadisc® drier, where indirect heat is used to evaporate water from the wastewater solids in order to bring the dry substance up to approximately 40 to 45 per cent. The heat value of the dried solids is thereby high enough to assure a correct incineration of the product. Steam from incineration of sludge can be utilised in the drier and heat recovered from the drier vapour can be used for preheating the sludge or for district heating.

The Haarslev Rotadisc® driers are indirectly heated using pressurised hot water, oil or steam. A thermal oxidiser for odour control can be added.



Full Drying

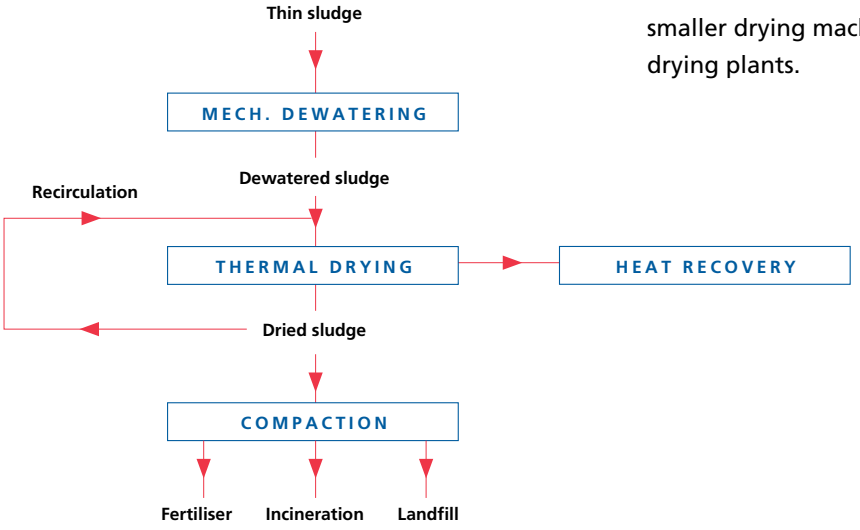
There is a wide range of applications for dried bio-products. It can be used as a fertiliser supplement, soil conditioner or as a sustainable fuel. Some dried sludge contains organic matter with nutrients of a commercial value, especially nitrogen and phosphorous. Drying of sludge results in a product with significantly less noticeable odour compared to other biofertilisers and the high temperatures during the drying process assures that the requirements to hygienisation are met without burning the organic matter.

In a full drying thermal wastewater treatment system the removal of water results in a product with 85 to 90 per cent dry substance.

The dried product has a substantially reduced weight and volume, which makes it easier and cheaper to handle, transport and store and it can be pelletised and used as fertiliser, or alternatively landfilled or incinerated if necessary.

TWO STAGE DRYING PROCESS

The two stage drying process combines the part drying and the full drying process and involves a pre-drier and a full drier. Large wastewater plants can benefit from this system, which results in smaller drying machines and more cost-efficient drying plants.



Heat Recovery

Drying of sludge produces an excess of thermal energy which can be recovered with up to 80 per cent and reused for various purposes. The energy for sludge drying is transferred during the drying process from the heat source (live steam, thermal oil or pressurised hot water) to the vapours emitted from the dryer. This heat can to a large extent be recovered due to the high temperature level and the low amount of false air which characterises the disc drying system.

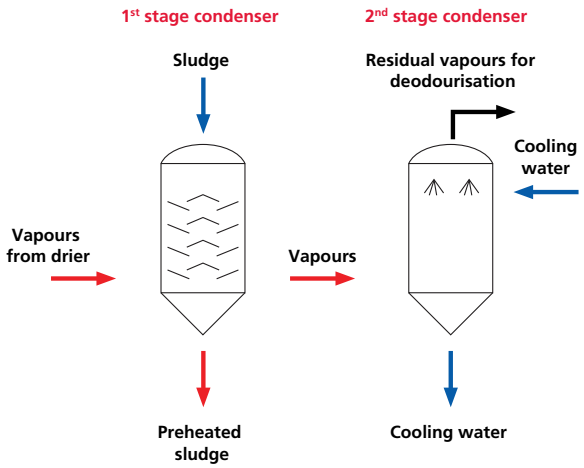
Preheating of wet sludge prior to mechanical dewatering results in a higher degree of dewatering and a reduced consumption of flocculation agent. The preheating of raw sludge also saves energy input to the digestor. The surplus of energy can alternatively be used for district heating if the wastewater treatment system is placed near consumers such as cities, large industrial areas, hospitals etc.

DIRECT ENERGY RECOVERY

By mixing thin sludge and vapours from the drying process in a condenser the temperature of the sludge is raised. The preheated sludge is led back to the digestor or the decanter and if further cooling of the vapours is needed, a second stage condenser with cooling water, which cools the vapours down to an acceptable temperature level, can be added. Deodorisation of the residual vapour may subsequently be required. Haarslev Industries designs and manufactures various solutions for eliminating odours.

INDIRECT ENERGY RECOVERY

Heat recovery for central heating must take place in an indirect condenser in which the circulation water is heated to the desired temperature. Shell and tube condensers are preferred. The process vapours flow through the tubes while circulation water is passing over the external surface in a counter flow arrangement. Haarslev Industries has designed a complete range of shell and tube surface condensers to suit a wide range of capacity requirements.



Haarslev Service

We are well aware that the perfect functioning of our machinery and equipment will contribute to maximum profitability for their users. Therefore we employ competent and experienced service engineers and supervisors working world-wide.

The Service Departments of Haarslev Industries take pride in supporting our customers in order to optimise the operation of our equipment. We are always in dialogue with the customers in order to establish a system for supplying spare parts securing the quality in the application of original parts. We also offer re-building of most of our products in one of our service centres. By renovating equipment, we increase the efficiency of the production line, and our customers avoid investing in completely new machinery.

All equipment is offered with a list of recommended original spare parts. Furthermore we offer periodic service inspections of the plants to ensure the necessary operation time.

Our files contain documentation for equipment supplied and can be used to confirm or identify the specifications for parts supplied more than 30 years ago.

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