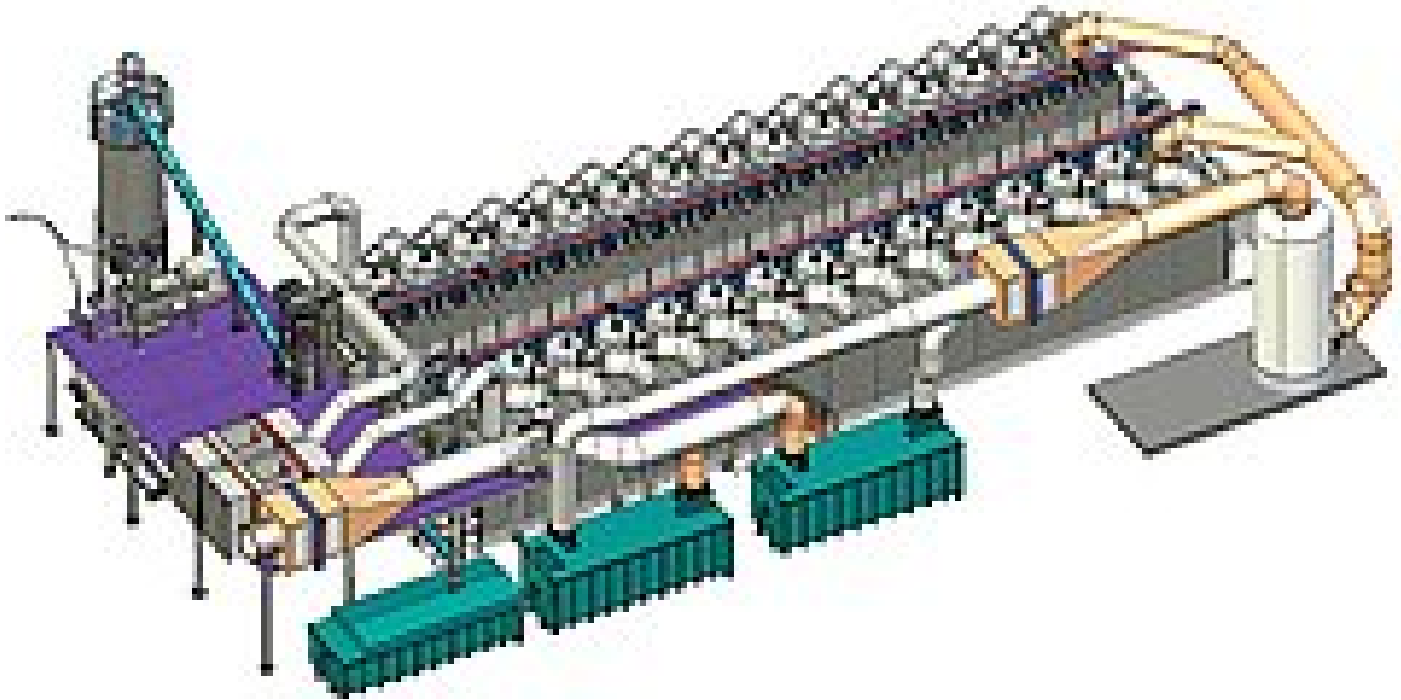


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Sewage sludge drying on Kassel district heating power plant



Construction drawing of HUBER's scope of delivery of the Belt Dryer plant - the new belt drying plant sets the course for coal-free operation of the power plant until 2025.

Commissioning of the plant as the starting signal for the early coal phase-out at the power plant until 2025

Städtische Werke Energie + Wärme GmbH supplies the City of Kassel with environmentally friendly district heat and electrical energy and, for this purpose, operates highly efficient power plant facilities based on the principle of combined heat and power generation (CHP). The customer's generation facilities include the Kassel district heating power plant, which was commissioned in 1988 and has a thermal capacity of 150 MW. The power plant generates approx. 40 MW of electrical power via a steam turbine. About 80 MW are delivered as district heat to the municipal district heating network. In addition to brown coal, hard coal and petroleum coke, also dewatered sewage sludge is currently used as a regular fuel up to a share of 25% of the thermal output. Extensive optimisation and expansion measures are planned for the existing plant, which will increase the efficiency of the power plant and broaden the range of fuels. One of these measures includes the construction of a new sewage sludge drying plant.

In March 2019, HUBER SE received an order from Städtische Werke Energie + Wärme GmbH for the design and construction of two belt drying plants size BT 30. The order was placed in two phases – planning phase and execution phase. The services to be provided in the planning phase were the basic and detail engineering, the preparatory work within the scope of the preparation of the permit application, as well as the complete project engineering of the plant in continuous exchange with the customer. In the execution phase, the mechanical and electrical installation of the entire plant, including commissioning, is carried out so that the plant can be operated fully automatically. At present, both the mechanical and electrical assembly work has been completed.

Focus on the minimizing wastewater volume

The technical design of the entire equipment has been adapted to the needs of the customer. Top priority has been given to minimizing the amount of generated wastewater. By dispensing with vapour condensation and selecting the so-called fresh air/exhaust air system, the volume of wastewater is reduced to a minimum. The water evaporated from the sewage sludge remains completely in the gas phase in the process steps after the dryer and leaves the plant with the exhaust air. Targeted heating of the exhaust air via several heat exchangers avoids condensation effects and prevents the formation of a steam plume at the stack outlet.

In order to guarantee full drying performance continuously, the proven intelligent, fully automatic HUBER throughput control system is also used in Kassel. Despite fluctuations in the input DR, it ensures constant water evaporation and constantly maximum plant capacity. The throughput control system has been further extended especially for this project. The control system now also reacts to the



A part of the drying plant, view from intermediate storage tank



The installation work shortly before completion

fluctuating inlet temperatures in the district heating network, to which the dryers are directly connected without hydraulic separation. The direct connection to the district heating network gives the power plant operator the option of using the dryer as a heat sink. In the

future, in conjunction with an extraction condensing turbine, this will enable the previously seasonal operation of the power plant to be converted to year-round operation. The possibility of partial load operation of the individual lines independently of each other further increases the usefulness of the plant.

A sewage sludge acceptance system was already installed at the site a few years ago. Via this system, the sewage sludge is now delivered with a piston pump both directly into the fluidised bed boiler and to the drying plant. The quantity is regulated via two control valves. In normal operation (total throughput 30 t/h) the quantity ratio of combustion to drying is 2:1.

HUBER scope of supply completely fills new building

In autumn 2019, Städtische Werke Energie + Wärme GmbH erected a hall in concrete frame construction especially for the drying plant. The challenge for HUBER here was to fit the entire plant periphery into the specified dimensions of the hall. This was achieved by arranging the aggregates as compactly as possible, some on several levels above each other.

In addition to the two HUBER Belt Dryers BT 30 and the associated ventilation system, HUBER also planned and supplied the entire wet and dry sludge conveying system as well as the exhaust air treatment in close cooperation with the customer.

Integrated in the wet sludge conveying system is a contaminant separator that removes foreign matter contained in the sludge and thus protects the downstream equipment and instruments from damage. After the contaminant separator, the sludge is conveyed via a distribution screw to two pump sumps from where the pelletizer of the respective belt dryer is fed by eccentric screw pumps.

After drying, the granular sludge is conveyed to an intermediate storage by various conveying units. By means of dosing into a pneumatic conveyor, it is then transported directly to the incinerator.

In case of maintenance, the dried sludge can be conveyed from the two belt dryers into a container with a capacity of approx. 20 m³. This container can be transported away directly afterwards with a hook lift vehicle.



Official start of commissioning on 23 April 2020 by the management and the Lord Mayor began during a press meeting on site [(C) Andreas Berthel]

HUBER's exhaust air treatment system meets the requirement for lowest possible wastewater volumes by recirculation, concentration and fully automatic discharge of the wash water in combination with mobile activated carbon filters. These are roll-off containers that can be changed easily and, above all, allow very short change times after expired service life. Due to the individual cleaning stages, the limit values of the standard TA-Luft are maintained at the outlet of the chimney of the power plant at a height of approx. 105 m.

Official start of commissioning by Lord Mayor and management

The plant designed and delivered by HUBER SE will increase the capacity of the sewage sludge reception at the power plant by approx. 80,000 t/a. By substituting fossil fuels with sewage sludge, Städtische Werke Energie + Wärme GmbH obtains an economic advantage and can also take an important step towards CO₂ reduction.

On 23 April 2020, the official start of the commissioning of the drying plant began during a press meeting on site. The Lord Mayor of the

City of Kassel, Christian Geselle, together with the Chairman of the Board of Management of Städtische Werke, Dr. Michael Maxelon, and Power Plant Manager Dr. Gudrun Stieglitz, symbolically pressed the start button of the plant.

In addition to other projects currently being planned or implemented at the Dennhäuser Strasse location, the new belt drying plant sets the course for coal-free operation of the power plant until 2025.

Related Products:

- [HUBER Belt Dryer BT](#)

Related Solutions:

- [HUBER Solutions for Sludge Drying](#)
- [HUBER Solution for On-Site Sludge Incineration](#)

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