

KULT® Medium- Temperature Belt Dryer BT^{plus}



- Dry, granular, disinfected (Class A), easy and safe to handle biosolids product
- Exhaust air deodorization
- Minimal dust generation
- In compliance with European and international standards



Drying of wastewater sludge minimizes its mass, volume and disposal costs. The produced dry and disinfected (Class A) biosolids are a valuable product that is well suited for its beneficial use.

The excellent product quality and process reliability of our belt dryers are the result of our outstanding sludge screening and feeding technology, as proven during our ten years experience with belt drying .

Sludge Feeding

HUBER BT^{plus} belt dryers are fed with dewatered sludge that has a dry solids concentration between 16 % and 32 %. To prevent coarse solids from clogging the belt dryer's sludge feeding system, the sludge must be well screened. The sludge is then dewatered in HUBER screw presses, belt filter presses or centrifuges. The sludge consistency depends on the used type of sludge dewatering machine. The dewatered sludge can be a more or less granular sludge cake, or it can have a paste-like consistency.

Depending on the operating schedule of the sludge dewatering system, intermediate sludge storage may be necessary to permit continuous feeding of the dryer. We provide a sludge bunker with a bottom scraper for intermediate sludge storage.

Selection of the type sludge feed pump depends on the solids concentration and consistency of the dewatered sludge. We provide piston pumps or

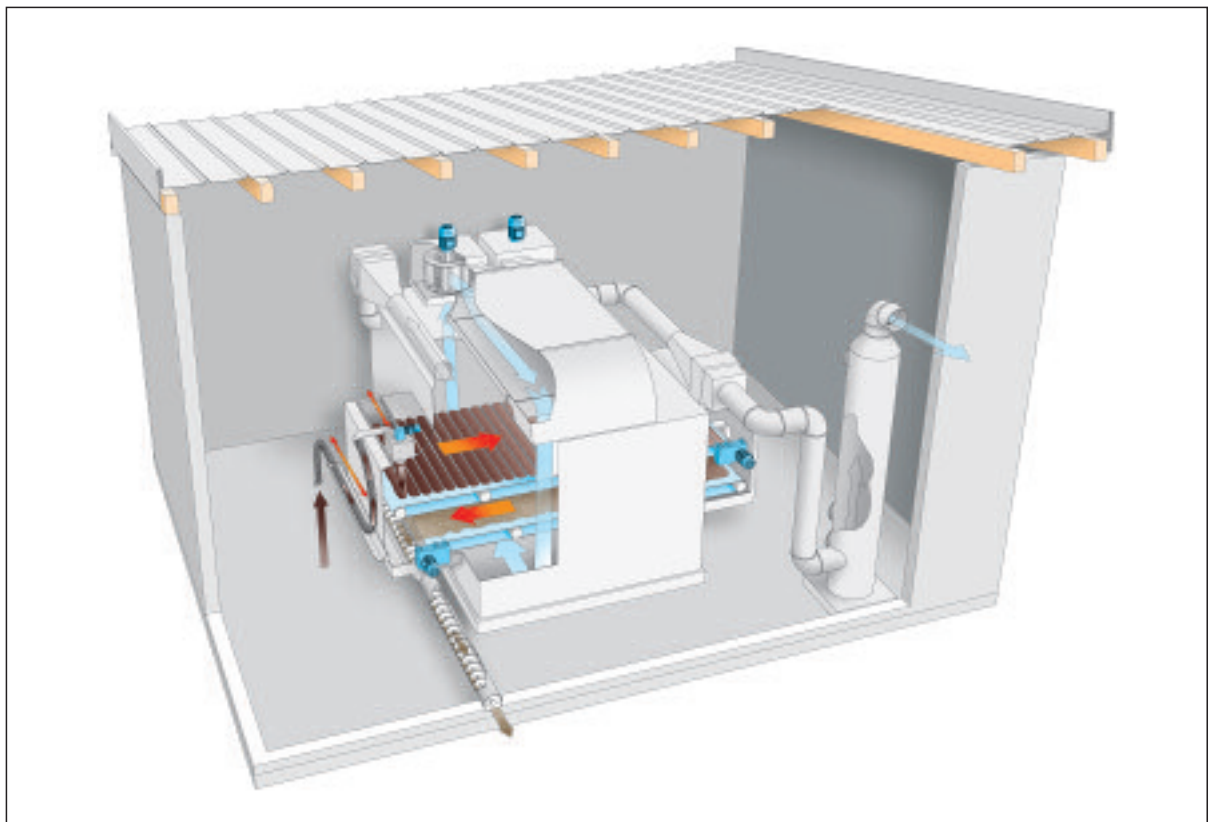
multi-stage progressive cavity pumps for sludge feeding.

The feed sludge is pumped through a flexible hose to an extruder that moves back and forth over the entire width of the upper dryer belt while the belt slowly moves forward. The sludge is extruded through a perforated matrix to form spaghetti-shaped strings that are laid as an even and porous layer on the upper belt.

Sludge Drying

The sludge layer is slowly moved with the belt. At the end of the upper belt it drops down on the next belt, and so on. On its way through the dryer the sludge is dried with hot air to a solids concentration of about 91% DS. The dried sludge drops from the lowest belt into a bucket conveyor and is lifted into a product storage silo.

The hot air entering the dryer has a temperature between 100 and 130 °C (212 to 266° F). It is heated to this temperature in a gas-fired in-line heater. Alternatively, we provide a heat exchanger for heating of the dryer air with thermo-oil or steam. Fans draw the hot air through the belts and the sludge layers thereon. The fans maintain a slight under-pressure within the dryer and prevent air and odors from escaping through leaks into the dryer building or the environment. The dryer air, when it is drawn through the sludge layers, is cooled and humidified as it evaporizes and absorbs water.



Process diagram of a KULT Medium-Temperature Dryer BT^{plus}

Most of the air that has been drawn through the dryer is blended with pre-heated ambient air and re-circulated through the heater and dryer. The re-circulation ratio is controlled via flaps, so that the product dryness remains within its desired range. Exhaust air is drawn through a heat exchanger where it is cooled (not shown in the diagram). The extracted energy is reused to heat the incoming ambient air. We reuse most of the heat and thus minimize energy consumption of the drying process.

Where waste heat in form of hot water or air is available, we use it for pre-heating of the incoming ambient air. Reuse of waste heat can further reduce the fuel consumption of the drying process.

Treatment of Exhaust Air

The exhaust air is blown through a scrubber/ quencher to cool it further and to condens vapor. Effluent from the wastewater treatment plant can be used for air scrubbing and cooling. The condensate is returned to the wastewater treatment plant. The scrubbed and quenched exhaust air is blown through a biofilter for deodorization.

Product Quality

When the dryer is operated with an air temperature above 100° C (212° F) the sludge temperature is maintained above 70° C for longer than 30 minutes. This is in compliance with the requirements of US EPA Part 503 Biosolids Rule for disinfected Class A biosolids.

The dried biosolids can be beneficially used for land application. They can also be used as fuel for incineration, e.g. in cement kilns.

The disinfected and dried granular product has a solids concentration of over 85 % and contains very little dust. The dried biosolids can easily be conveyed to a storage silo or other containers. Depending on their further use or disposal, partial drying to a solids concentration between 60% and 85 % is also possible.

Operation, Automation and Safety

Operation of the KULT BT^{plus} Dryer is fully automated. A PLC controls the entire process. Though the dryer is designed for 24/7 operation, it is always possible to interrupt its operation because start-up and shut-down is easy. The main control parameter is the dryness of the sludge product, which is maintained within a small range.

Operator attendance is minimal. About one man-hour per day and dryer train is spent for supervision and inspection.

Because the sludge is transported so gently through the dryer, very little dust is generated. The temperature within the dryer is moderate. There is virtually no danger of dust incineration or explosion .

The temperatures of the various air flows are monitored and controlled. In addition, the carbon monoxide (CO) concentration in the exhaust air is

monitored. If an elevated CO concentration indicates combustion , the dryer is returned into a safe mode by operation of a sprinkler system. Purging with an inert gas is not required. Our dryers comply with EU and ATEX safety standards.



Sludge feeding through our extruder is essential for the outstanding performance of our belt dryers



Porous sludge layer on the belt riding slowly and gently through the dryer; no mechanical stress is applied and virtually no dust generated



① aerobically digested sludge, fed through a pug mill; ② blended and comminuted industrial and municipal sludge; ③ anaerobically digested and extruded sludge; ④ extruded waterworks sludge

►► Benefits

- Dry and disinfected (Class A) biosolids product
- Granular product, easy and safe to handle and store
- Deodorized exhaust air
- Minimal dust generation, minimized safety risk
- Virtually no noise and vibration
- Low energy consumption due to heat recovery and optional reuse of waste heat
- Low operation and maintenance costs
- In compliance with European and international standards



Turn-key HUBER dryer with two parallel trains and product silo

►► Sizes

- Up to 22 tons/hr (20 t/h) water evaporation capacity
- Up to 5 modules with 2 to 4 belts per train
- All HUBER dryers are individually designed and built to meet our customers' needs. They are installed in existing or new buildings.



Easy operation and maintenance

Type of KULT BT ^{plus} (Modules - Belts)	Number of Trains	Footprint Length x Width [m x m]	Water Evaporation (from 25 to 90 % DS) [kg H ₂ O / h]	Solids Capacity (from 25 to 90 % DS) [kg TR / h]
5 - 2	1	32 x 14	2.100	800
5 - 3	1	32 x 14	2.900	1.100
5 - 4	1	32 x 14	3.500	1.300
...
5 - 4	6	65 x 38	21.000	8.000

Sizes and capacities of HUBER medium-temperature belt dryers KULT BT^{plus}

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Subject to technical modification

KULT® Medium-
Temperature
Belt Dryer BT^{plus}