

HAZEMAG



HAZEMAG Tubular Dryer | HTD



HTD | energy efficient indirect drying

General

In the drying of lignite, the indirect drying (contact drying) in the tube dryer has been proven for many years for reasons of reliability and safety. Especially in counter-pressure boil-off from power-plant turbines, the great advantage of combined heat and power takes effect, which in addition to the heat of superheating and the heat of condensation of the steam in the dryer can be exploited. Depending on the quality of the steam delivery, the thermal efficiency of this procedure is 70% -90%. Condition is the cheap utilization of the heat of vaporization.

When drying lignite, tube dryers achieve evaporation rates of up to 7 kg of water per square meter of heating surface and hour.

The heat requirement is thus below 700 kcal per kg of water to be evaporated.

The entire amount of condensate is returned to the power plant without losses and without contaminants with its residual heat.

Mode of operation of the tubular dryer

Between the two end walls of a slowly rotating about the longitudinal axis drum (1) a large number of tubes (heating surface) is mounted.

The feed material coming from a bunker is loosened by means of a feeding device (3) and distributed into the pipes.

It moves gradually from the upper to the lower end of the tube with each rotation of the inclined tube drum (8...2 °), where it is discharged dried into the discharge-housing (6).

Special jamming- or conveying turning-rods (4) in the pipes support this process.

The drying steam enters through the feed-side hollow pin of the axis (2) into the drum, flows around

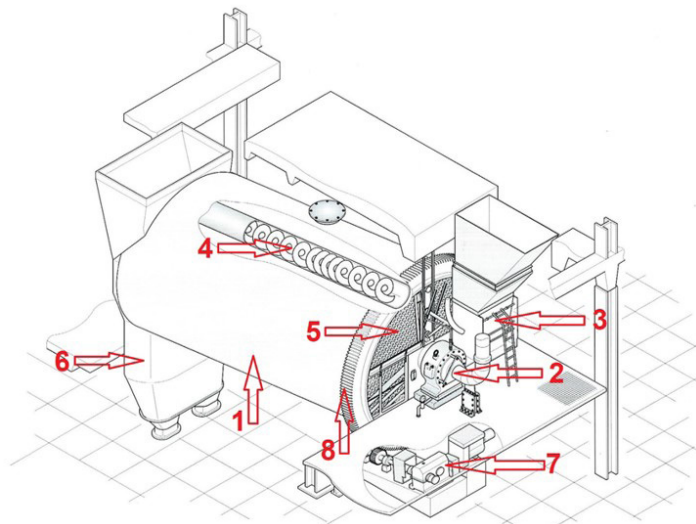
the pipes and flows off again as condensate via the discharge-side hollow pin.

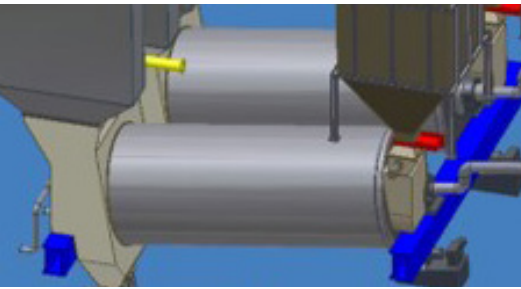
The air used as a carrier for the expelled water-vapor enters the tubes with the product on the upper end wall (5) and leaves it together with it on the lower end wall.

The air-water vapor mixture (Brüden, vapors) emerging from the pipes is enriched to a greater or lesser extent with dust, depending on the material and grain size, and is conducted via dedusting.

The hollow pins of the dryer axis also serve as a bearing and ensure optimum drive performance.

An infinitely variable adjustable drive (7) moves the drum via a ring gear (8) mounted on the feed side. As a result of this design, large dryers can be mounted at the site from their individual parts with the highest accuracy.





Application

HAZEMAG Tubular Dryers achieve a very long lifetime. Their utilization can be optimized in case process steam is available and the grain size of material to be dried is up to 10 mm.

Due to their design, tubular dryers are assembled at site with the highest accuracy of running. Thus tubular dryers can have the required dimensions to achieve a drying capacity of 100 t/h coal and more. Compared to other dryers, the HAZEMAG Tubular Dryer achieves very high evaporation indexes. This index signifies the ratio of evaporated water per dryer surface.

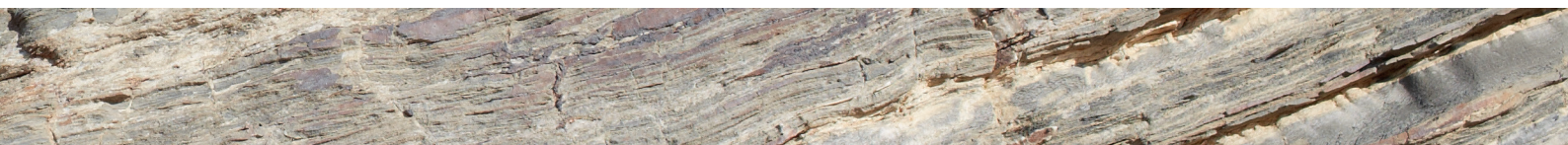
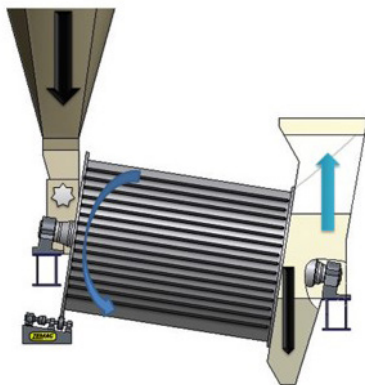
Tube dryers are used successfully worldwide for the drying of raw lignite, hard lignite, hard coal, corn, cereals and other free-flowing materials.

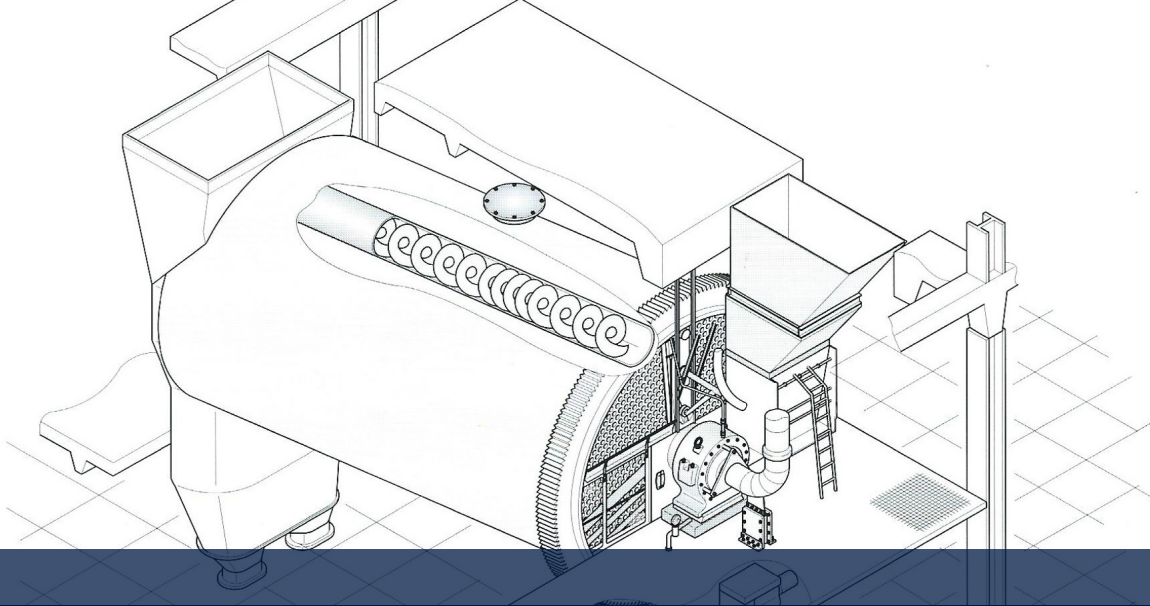
This drying technology has been adopted in currently-constructed large coal chemical projects taking lignite as raw materials, such as coal-to-olefins and coal-to-ammonia projects.

Their utilization can be optimized in case process steam is available and the grain size of material to be dried is up to 10 mm.

Water content of the carbon for brown coal refining	
Briquetting	16...19%
Dust-production	10..12%
Winkler-Gasification	12-15%
Hydrogenating gasification	2...4%*
High temperature coking	14%

* Additional measures to ensure operational safety are required here, as lignite with a below 10% water content tends to ignite spontaneously





Tubular Dryer HTD – HAZEMAG is the specialist

Operating conditions of the tubular dryer in lignite drying

Basically tube dryers are designed for continuous operation from 7,000 - 8,000 h / year.

The conventional tube dryer was developed for the drying of lignite and is mainly used for this scope.

Decisive for the throughput in the tube dryer are the filling and movement processes at the inlet and the residence time in the dryer.

Possibilities for increased performance, be it enlargement of the clear tube width, increase the tilt-angle of the dryer, modification of the turning rods or the use of blow-in units, all have the target to increase the input of raw material.

Some important auxiliary equipment beside the HAZEMAG Tubular Dryer:

- Crushing- and screening unit for raw lignite
- Steel construction to support the bearings
- Coal feeders and hoppers for each HAZEMAG Tubular Dryer
- Filter system for the resulting vapors and the dust
- Coal removal equipment for the warm dry coal and the accumulating dust from the filter system
- Dryer control, integrated in the overall system of a dryer house
- Steam- and condensate system
- Safety devices to prevent dust explosions

Type	Drum diameter [mm]	Drum-length [mm]	Heating surface [m ²]	Product output ¹ [t/h]	Rotation speed [min ⁻¹]	Power [kW]	Total weight [kg]
HTD 3070	3,140	6,990	1,160	7...17	4...14	15	61
HTD 3080	3,140	7,990	1,325	8...20	4...14	15...18,5	67
HTD	3,990	7,990	2,210 (2,230)	14...32	4...12	22...30	112
HTD	5,230	7,990	3,910 (3,960)	25...60	4...10	37...45	190
HPI 2530	2,500 x 3,000	GSK	2300 - 2500	3,0	1,900	2,400 - 2,700	164,000

¹ depending on the product and its input- and final humidity