

# DRYING & COOLING

THERMAL PROCESSING TECHNOLOGY FOR ALL INDUSTRIES





# AMANDUS KAHL ACCOMPANIES YOU

on your way to the right decision

Drying and cooling play an essential role in every product of the processing industry. Different raw materials, for example, start out with different moisture levels. Drying is therefore a frequent necessity for efficient further processing and cost-effectiveness. Either fabric belt driers or belt driers from AMANDUS KAHL are used depending on the primary product.

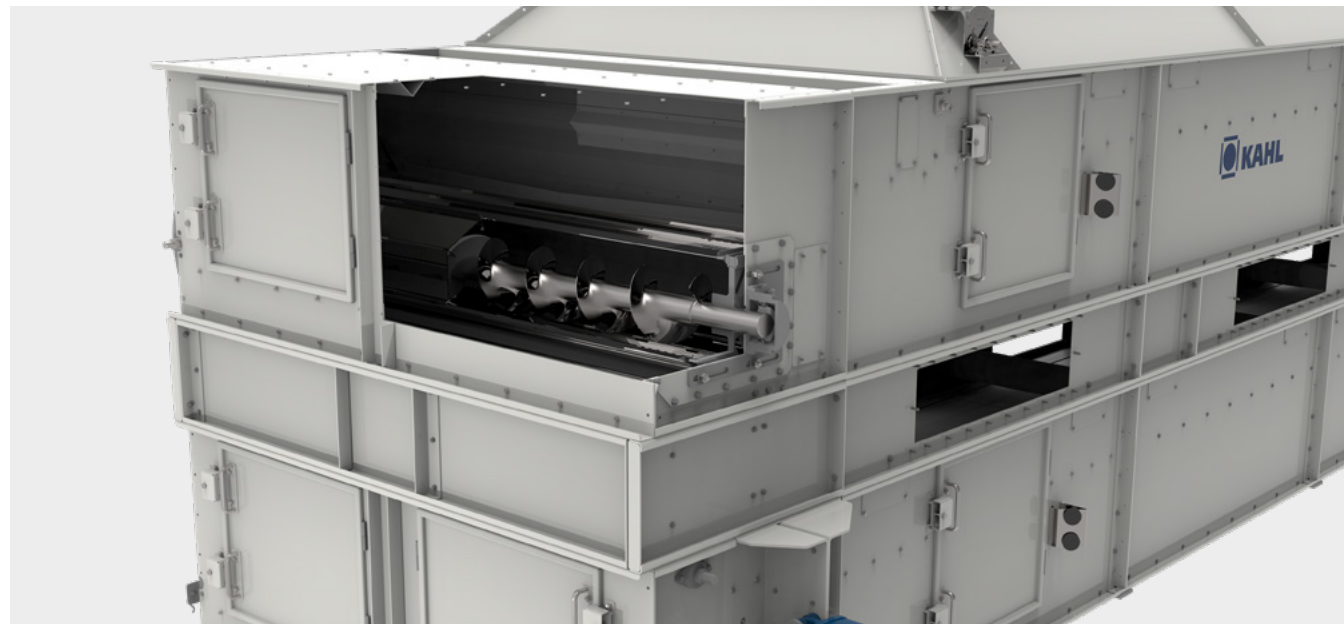
The process temperatures created during the production of pellets, expanded or extruded feed heat the final product. A KAHL belt cooler can cool it down.

Read on to find out which machines and processing technology are the right ones for your project and let our expertise guide you.

AMANDUS KAHL stands for quality, durability and energy efficiency in machine and plant construction worldwide. Technology for drying and cooling make up a large part of the range of machines KAHL offers. Based in Reinbek, northern Germany, KAHL has been delivering machines and plants around the world for more than 140 years. If you choose processing technology from KAHL, you are choosing top quality in product manufacturing.



AMANDUS KAHL has delivered over 1500 belt driers, belt coolers and fabric belt driers since its start.



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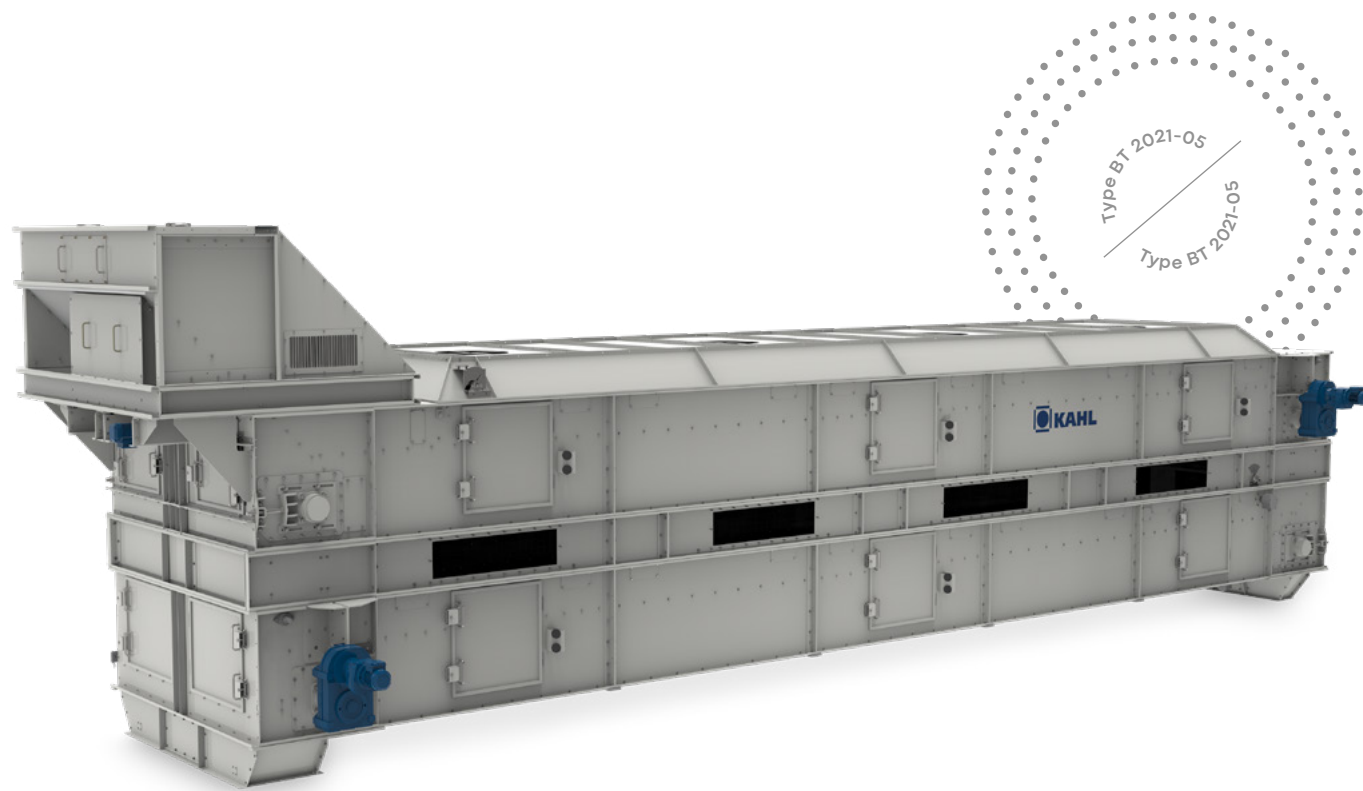
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# BELT DRIERS

Drying with process air, integrated filtration of exhaust air or using recirculated air systems



Belt driers are suitable for different products: granulates, pasty products, wood chips, straw, hay, chemical primary products, bulk materials and much more.

The cross-flow and counter-flow principles are used for drying, depending on the number of belts. During the drying process, the warm air flows up or down through the product across the direction of travel of the conveyor belts. As it flows, the air takes on increasingly more moisture. This method achieves gentle drying. Thanks to its modular design, the belt drier assembly can be optimised to suit any plant size required. The modular system can be assembled into small as well as large units.

## Design parameters

- Product type
- Throughput capacity
- Temperature
- Starting moisture level
- Water removal
- Process air status
- Drying air
- Drying temperature
- Ambient conditions



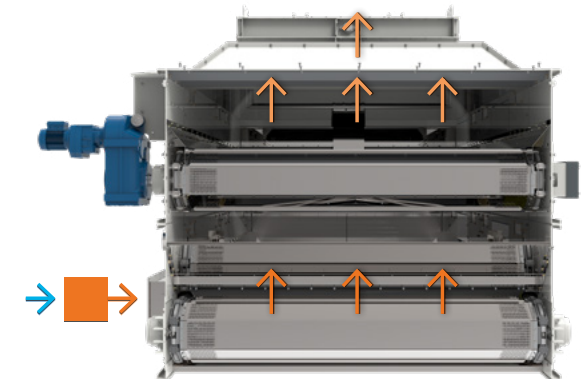
## Advantages of the belt drier

- Most flexible drier on the market
- Can be expanded later by building it up or extending it
- Multiple standard widths available
- Custom widths also possible upon request
- Intelligent control for optimal, cost-effective drying
- Maintenance-friendly design
- Integrated fire protection system



## Drying with process air

The process air, which is heated directly or indirectly up to 200 °C, flows through one or more product layers. This drying process is suitable for products with high moisture levels and temperature resistance, including cat litter, charcoal briquettes, filter sludge, metal oxides and much more.







# FABRIC BELT DRIERS

## For biomass and recycling products

The fabric belt drier uses a special, tightly woven plastic fabric belt that performs two tasks at the same time: it transports the product being dried through the drier and also filters the exhaust air. As a result, it keeps dust and exhaust air levels below the legal threshold. Intermittent automatic cleaning prevents product particles from clogging the belt openings.

As only low inlet air temperatures below 120 °C are needed, this drier is especially suitable for using waste heat from cogeneration.

The product supply system allows for a uniform layer of product being dried, even if the input material and throughput capacities vary. The material is turned over in the drier by means of specially adapted devices so that a very uniform moisture level is obtained in the final product.

On-line moisture measurements ensure that the drier always uses energy as efficiently as possible and the residual moisture in the product stays at a defined level.

### Advantages of the fabric belt drier

- Convective, gentle drying with warm air
- Modular machine setup
- Individual technical design based on the product, throughput and heat source
- Special plastic fabric belt used as filter medium (in accordance with legal exhaust air specifications)
- Intelligent control for optimal, cost-effective drying
- Maintenance-friendly design
- Integrated fire protection system



↑ Wood shavings



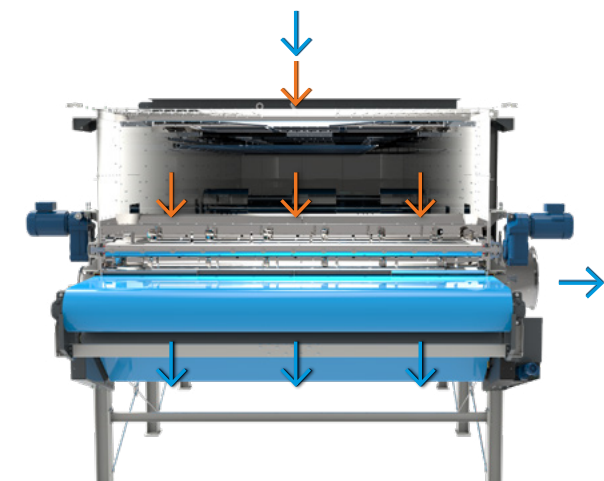
#### Did you know?

The last two numbers in our machine designations always indicate the number of modules that make up the drier or cooler.



### Drying with integrated filtration of exhaust air

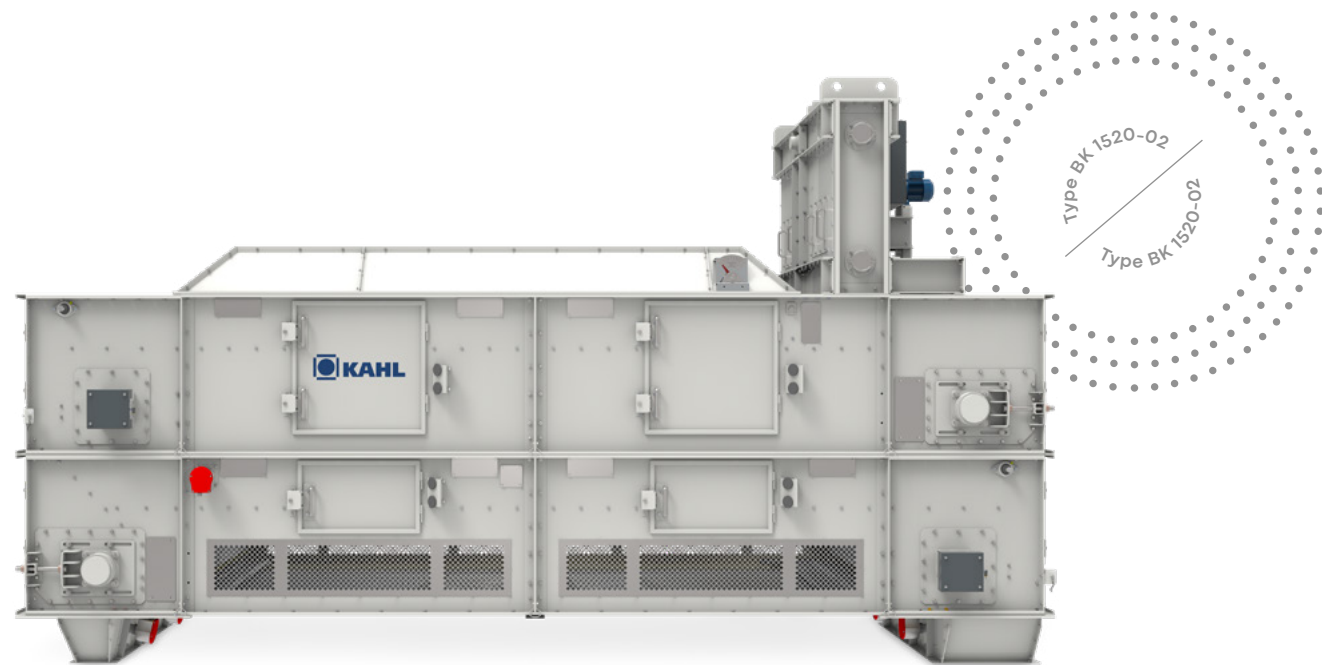
Directly warm air up through the product being dried can achieve a higher flow speed. The tightly woven plastic belt also acts as an exhaust air filter. Belt cleaning is integrated in the drier.





# BELT COOLERS

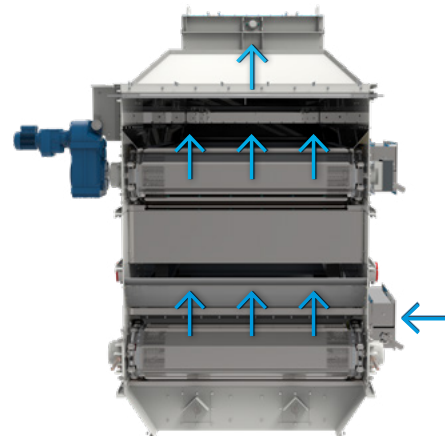
Cooling with ambient air



KAHL belt coolers follow a cooling principle that entails two physical processes: convection cooling involves heat exchange between the product and the air. Evaporative cooling removes water from the product being cooled. The cross-flow and counter-flow principles (depending on the number of belts) are used for cooling, just like with the belt drier. The conveyor belt can be made of slotted plates which are screwed onto conveyor chains on the sides and are easy to replace. Slatted plates are also available.

## Drying and cooling with recirculated air

Recirculated air systems prevent emissions and heat loss because less exhaust air is produced during drying/cooling and the combined process. The percentage of recirculated air can be adjusted. The reduced process speed protects sensitive products. For this reason, this process is especially suitable for products with a low end temperature, such as crab feed or bulgur wheat.



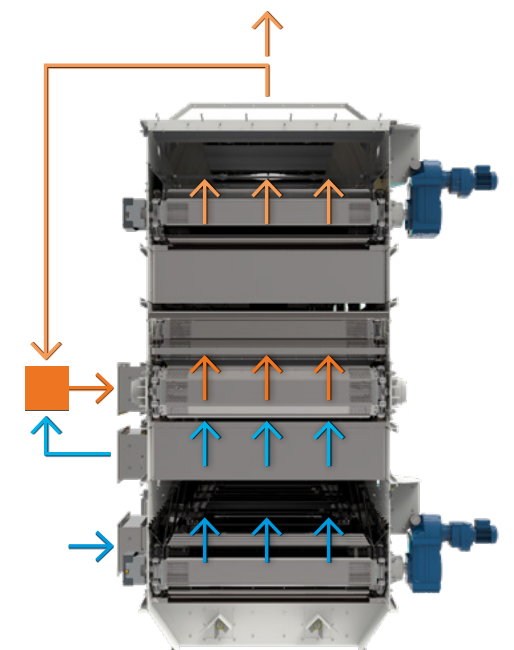
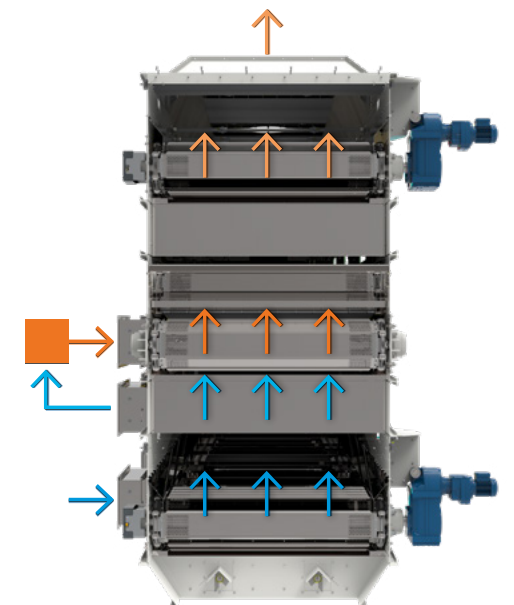
# DRIER-COOLER COMBINATIONS

Two processes in one machine

Thanks to the modular and flexible design, coolers and driers can be constructed as drier-cooler combinations as well as being extended variably in height and length. The combination allows two process steps to take place in just one machine, saving space in the plant.

## Drying and cooling

The drier-cooler combination is divided into independent drier and cooler sections and equipped with corresponding heating and cooling units. The drier-cooler combination is suitable for products with high moisture content that must be cooled to a low storage temperature, such as expanded and extruded feed, products that have undergone hydrothermal treatment, FGD gypsum and much more.



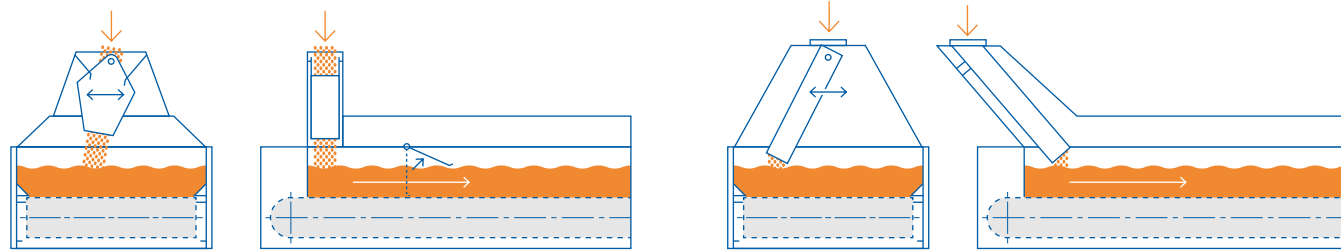
**Do you have questions  
regarding the KAHL  
technology?**

We will be happy to  
answer them and can be  
reached here:

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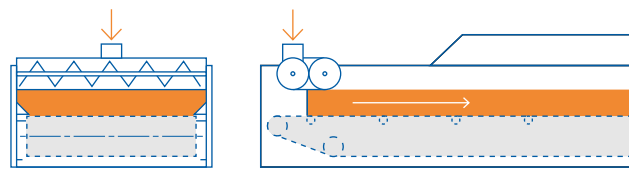


# FEEDING DEVICES & EQUIPMENT



↑ **Swivel box**  
For standard products

↑ **Swivel chute**  
For sensitive products



↑ **Distribution screw system for fabric belt drier**  
For dusty, fibrous products with very even layer thicknesses,  
especially for fabric belt drier

## Equipment

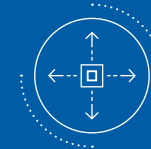
- Parts coming into contact with product are made of stainless steel (fabric belt driers also have high-quality plastic fabric belt)
- Loosening rakes
- Lump crusher
- Outlet box with jam alarm
- Discharge screw for fines
- Temperature control for exhaust air and/or product
- Speed/downtime monitoring
- Stainless steel extraction hood
- Belt speed control
- Automatic belt cleaning
- Differential pressure measurement
- Fire protection system
- On-line measurement of product moisture at drier inlet and outlet, as well as measurements of exhaust air temperatures and potentially exhaust air moisture levels in the individual sections, to provide the necessary parameters for possible control and regulation concepts
- Layer level display (manual control)

# ADVANTAGES DRYING/ COOLING



## Advantages offered by the machine

- Flexible warm air generation (directly and indirectly heated)
- Machine can be extended in height and length at any time
- Individual machines can be expanded into machine combinations later
- Selection of standard widths as well as custom widths possible upon request
- Custom design: belt cooler and drier (and combination) completely made of stainless steel upon request
- Custom design: CARRY OVER (fines output together with the product)
- Custom design: large inspection openings on the sides and front



## Advantages for the products being dried/cooled

- Maximum product flexibility (feed pellets, expanded feed, pet food, fish food, biomasses, sugar beet pellets and shreds, grass clippings, alfalfa, various cereals, wood chips, wood shavings, coal products, sewage sludge and much more)



## Advantages offered by AMANDUS KAHL

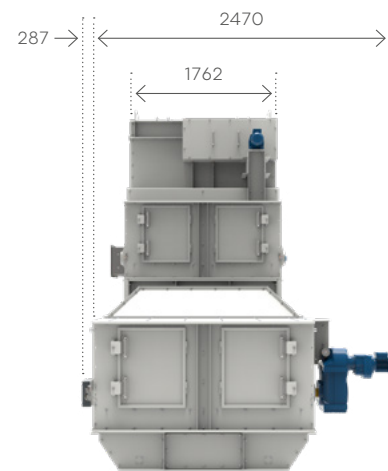
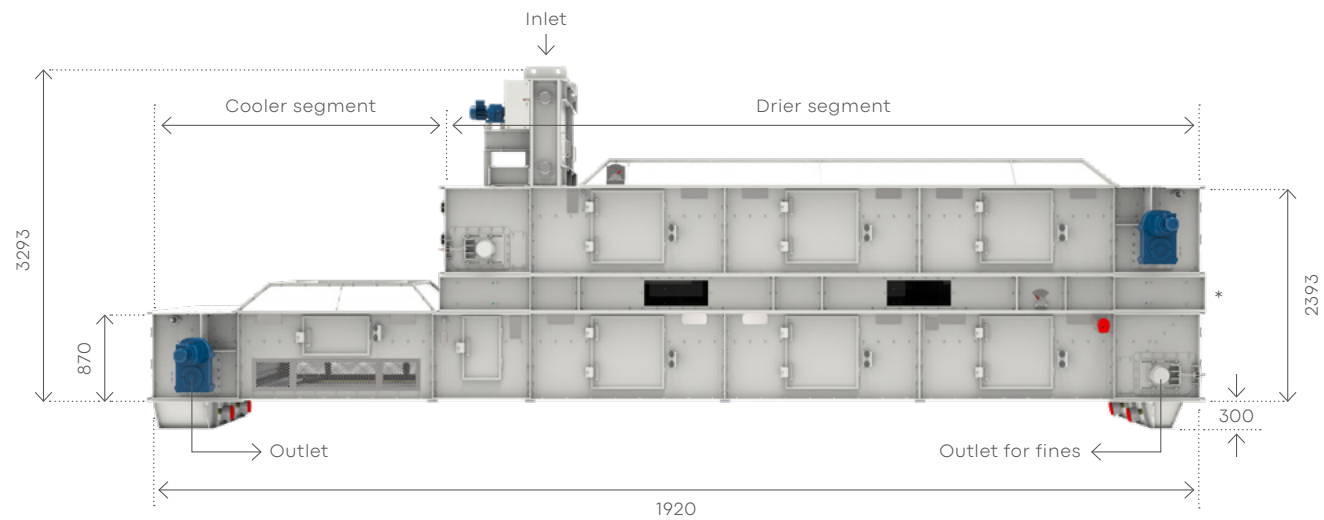
- A large part of our manufacturing is done in-house
- Service provided long-term even after commissioning
- Numerous height and length combinations possible, thanks to high design flexibility
- Product-specific design







# BELT DRIER/ COOLER



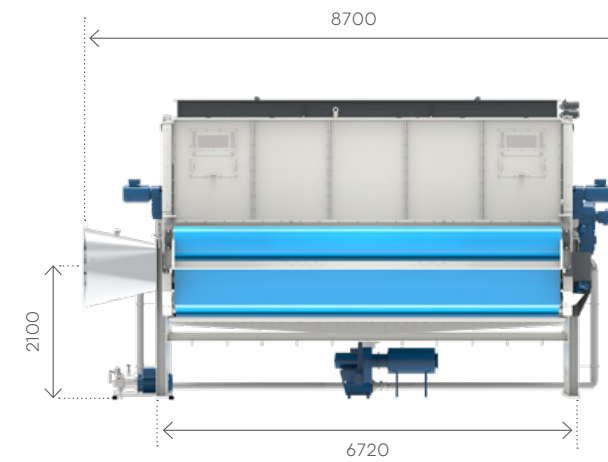
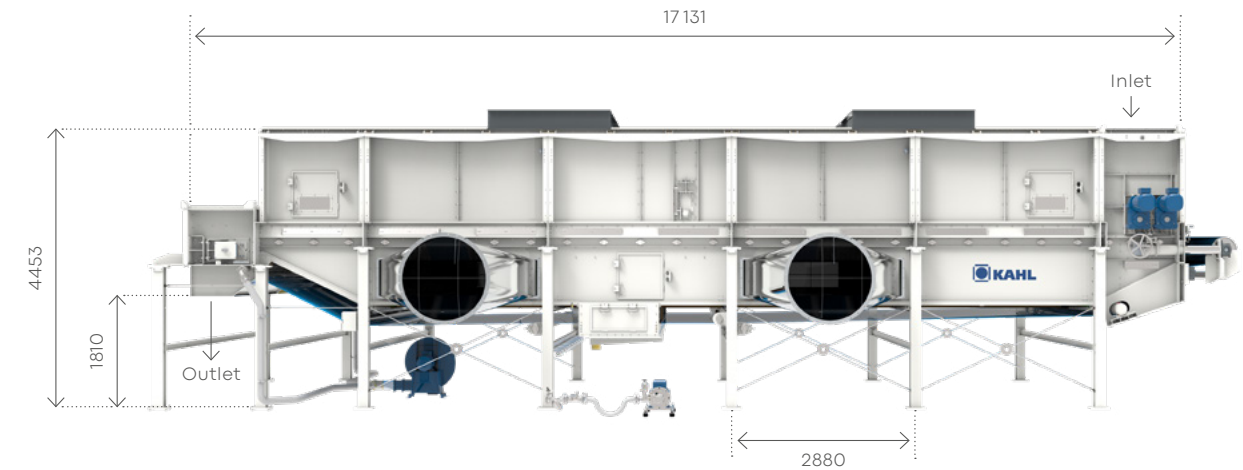
↑ BTK 1521-03/04 belt drier /cooler  
Sample dimensions, other models may vary

Process belt width (mm)	1090	1440	1940
Total width not including drive (mm)	1412	1762	2262
Length of one section (mm)	1920	1920	1920

\* Intermediate extraction to separate the technical process steps, for example: pre-cooling and post-cooling, pre-drying and post-drying, drying and cooling.



# FABRIC BELT DRIER



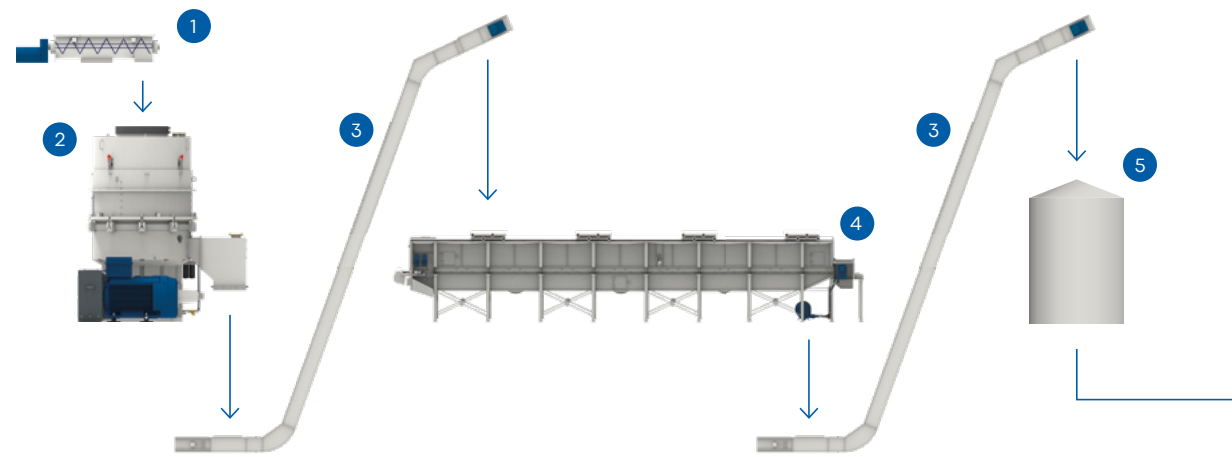
↑ GBT 6010-04 fabric belt drier  
Sample dimensions, other models may vary

Process belt width (mm)	4000	6000
Total width not including drive (mm)	4720	6720
Length of one section (mm)	2880	2880
Lengths min./max. (m)	11.4/54.6	14.3/54.6
Layer height max. (mm)	280	280
Sections max. (quantity)	17	17



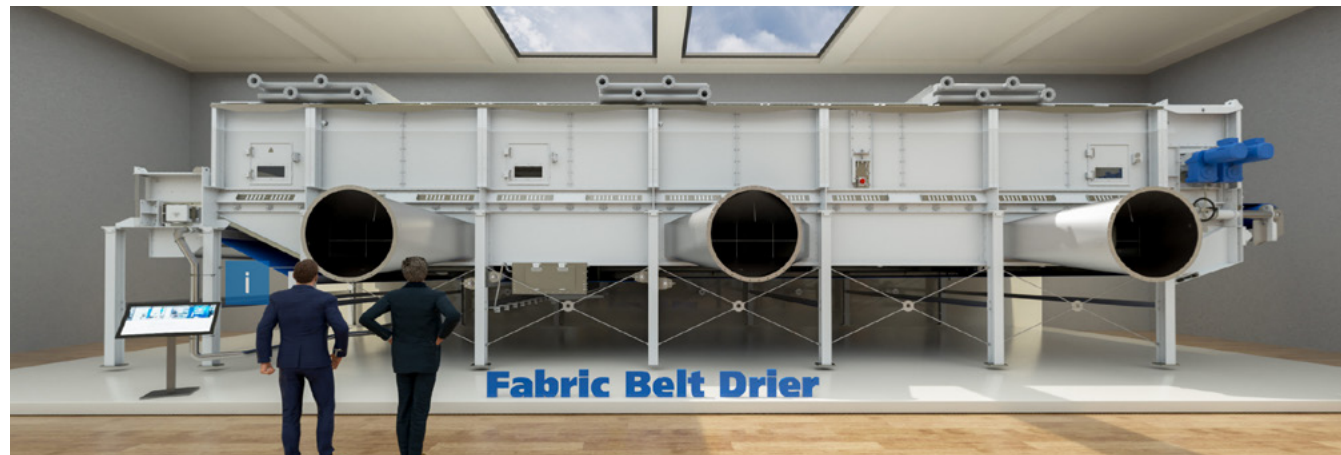
# PLANT SCHEMATIC

for a sample plant with fabric belt drier and belt cooler

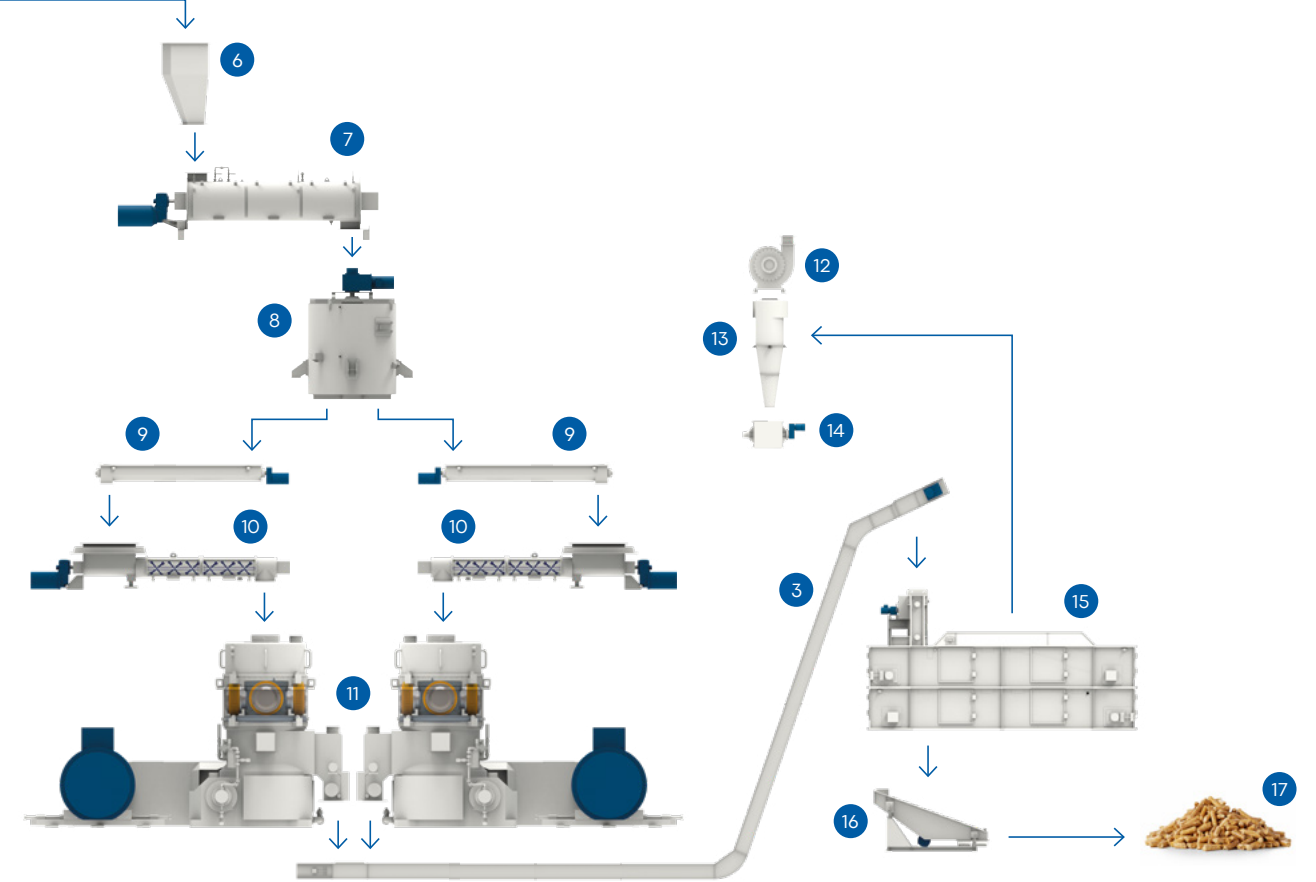


- 1 Dosing screw
- 2 Pan grinder mill
- 3 Continuous vertical conveyor
- 4 Fabric belt drier
- 5 Bin
- 6 Pre-bin with dosing system
- 7 Mixing conditioner
- 8 Agitator bin
- 9 Conveying screw
- 10 Mixing screw

## References



↑  
Watch our fabric belt  
drier animation in our  
virtual showroom



- 11 Pellet mills
- 12 Radial fan
- 13 Cyclone
- 14 Rotary valve
- 15 Belt cooler
- 16 Vibration screen
- 17 Finished pellets



↑  
Wood pelleting plant with  
a throughput capacity of  
50 000 tons per year







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