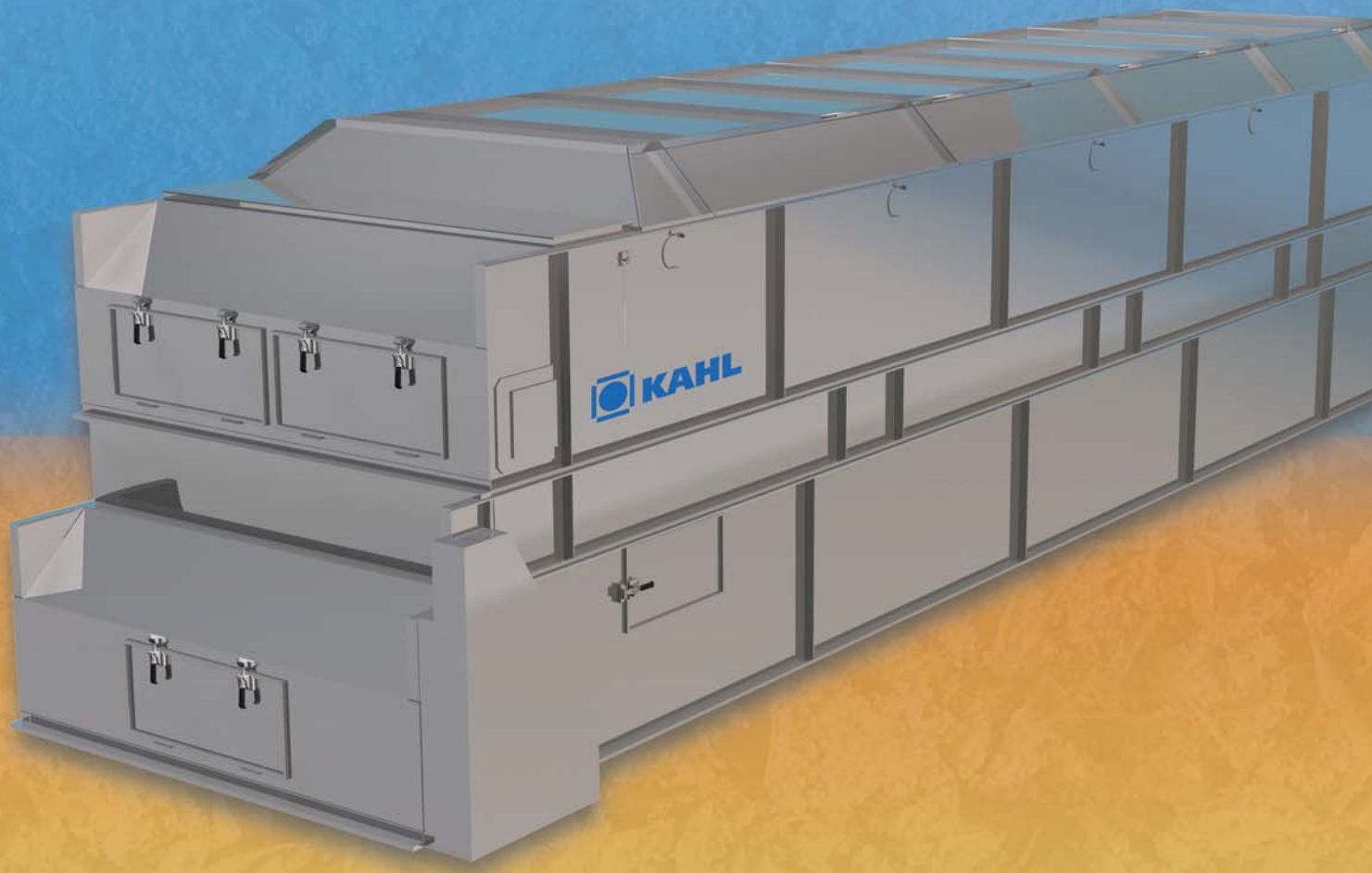
KAHL

Belt Driers and Coolers

for high continuous load



Drier design

KAHL belt units for drying and cooling

AMANDUS KAHL has long-standing experience with regard to design, planning, projecting, and commissioning of belt driers and belt coolers.

For tests for design and projecting, a belt drier and a belt drier simulator are available in our own pilot plant.

If KAHL belt units are used for cooling, cooling is obtained by two physical processes:

- Convection cooling
  = heat exchange between product and air
- Evaporative cooling
  = removal of water from the product

Cooling/drying is achieved according to the cross and counter-current principle, depending on the number of belts.

During the drying process, hot air flows through the product from the top or from the bottom transversely to the running direction of the conveyor belts. In the process, the air increasingly absorbs the moisture of the product. Thus gentle drying is achieved.

Due to the modular design the belt units can be arranged so as to suit the required respective plant size.

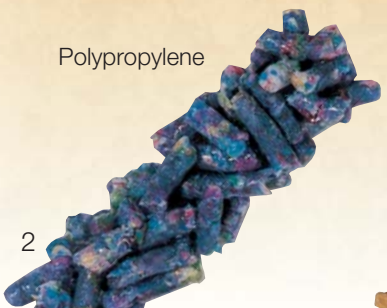
Product shapes:

- Crumbles
- Pellets
- Briquettes
- Lumps
- Powdery products
- Expanded products
- Pasty products
- Extruded products
- Bulk products

Industrial sectors:

- Compound feed industry
- Sugar industry
- Food industry
- Recycling industry
- Disposal industry
- Chemical industry
- Brewery
- Energy industry
- Agriculture
- Biomass industry

Polypropylene



Oat bran

Yellow boletus powder

Wood shavings, wood pellets

2 m² - 350 m² process surface in modular design, layer levels between 30 and 300 mm

Belt coolers and driers are designed to suit both small and large units according to the modular principle.

- Depending on the design, subsequent increases in capacity are possible by extensions or additional storeys.
- Several standard widths are available.
- Special widths can be supplied.

Parameters for design are for example the type of product, quantity, temperature, initial moisture, removal of moisture, condition of process air, type of heating.

The retention time of the product is determined by the belt length and the speed range of the belt drive.

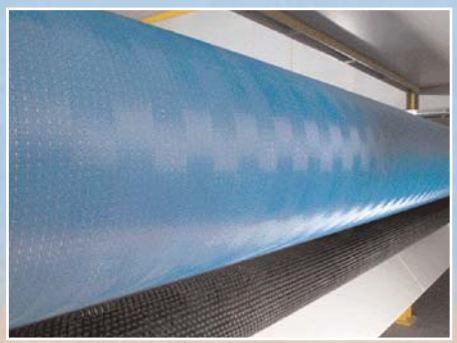
The conveying belt can consist of slotted plates which are laterally screwed onto conveying chains and are easy to replace. Fines falling through the slots are conveyed to a separate outlet by brushes and then discharged. Lamellar plates are also available.

Fabric belt drier

Another possibility is to use a close-meshed plastic fabric belt, which does not only convey the material to be dried through the drier, but also filters the exhaust air.

With this method, for example, the legal limits of dust content in the exhaust air can be complied with when drying wood shavings.

Drive is effected by variable-speed geared motors allowing for adjustment of the layer level and retention time.



Examples of products:

- Pelleted and expanded feed
- Petfood
- Fish feed
- Biomass
- Dried beet pulp and beet pulp pellets
- Chopped grass
- Alfalfa
- Cereals
- Hop umbels
- Wood chips
- Wood shavings
- Sewage-sludge pellets
- FGD-gypsum pellets
- Coal products
- Charcoal briquettes
- Activated carbon
- Recycling products
- etc.

Expanded wheat semolina and rye

Domestic waste

Layers feed

Catalyst

KAHL Process technology for cooling and drying

Drying
Process air (directly or indirectly heated) is drawn through one or more product layers. Temperature of the process air: up to 200 °C.

Cooling
Ambient air (or cooled process air) is drawn through one or more product layers.

Drying and cooling
Both processes take place in a single belt unit subdivided into independent drying and cooling sections and equipped with suitable heating and cooling devices.

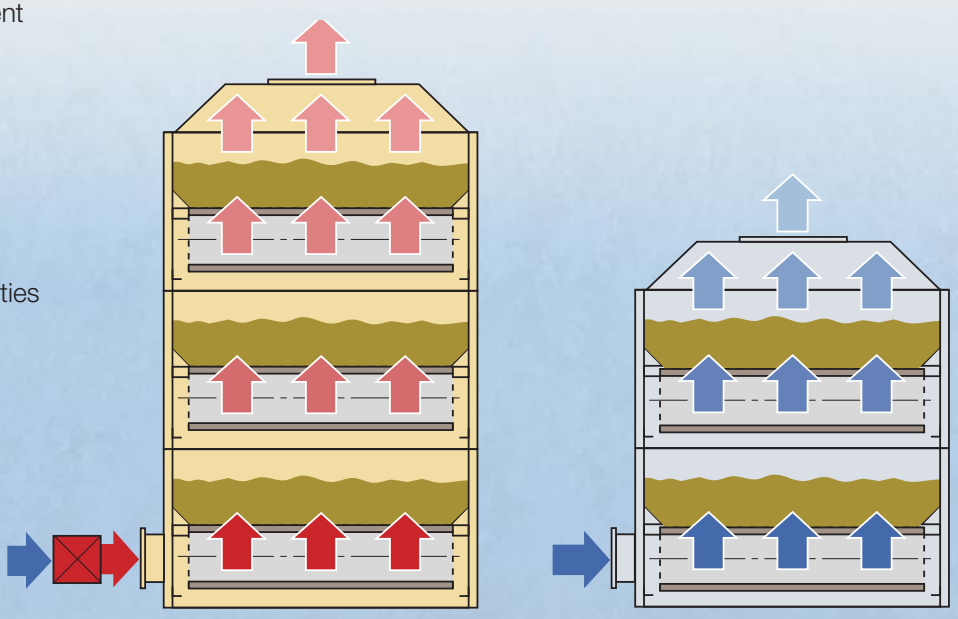
Drying and cooling with recirculated air
Due to the lower exhaust air quantities produced during the cooling, the drying or the combined process, recirculated air systems lead to a reduction of emissions and heat losses. The percentage of recirculated air is adjustable. Delicate products are gently treated by reducing the process speed.

Drying

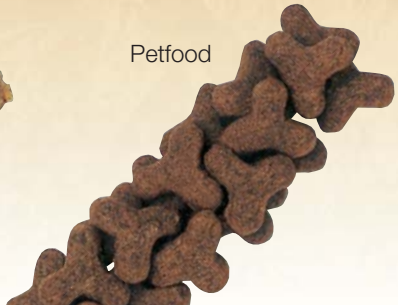
Drying by process air at up to 200 °C for products with high moisture levels which may be discharged at high temperatures, e.g. cat litter, charcoal briquettes, filter sludges, metal oxides etc.

Cooling

Cooling by ambient air of the full range of products with limited moisture levels which must be cooled to a low storage temperature, e.g. compound feed pellets, expanded products, dried beet pulp pellets, synthetic waste, graphite etc.




Maize by-product


Petfood


Expandat®


Graphite

Drying and cooling

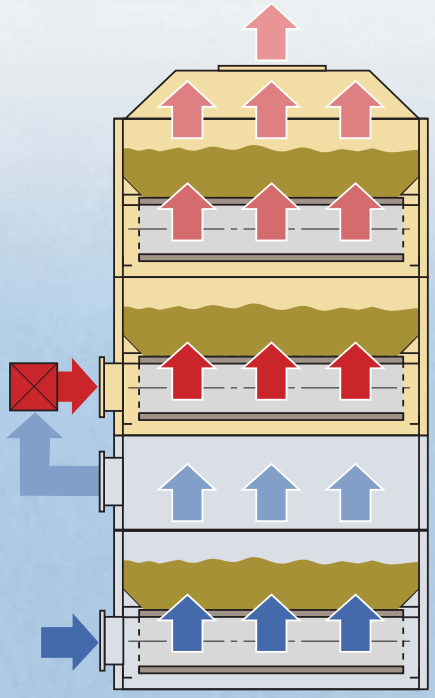
Drying and cooling of products with high moisture levels to be cooled down to a low storage temperature, such as expanded and extruded products or those from hydrothermal treatment processing, FGD gypsum pellets etc.

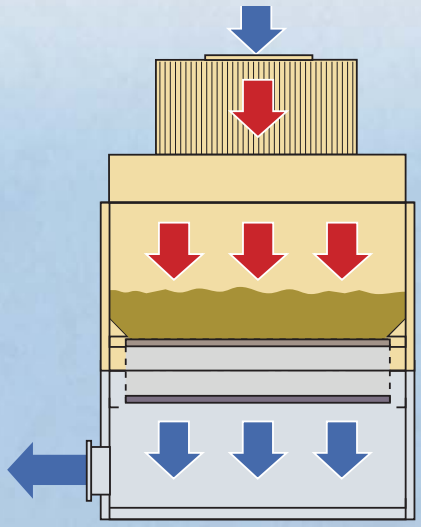
Drying with integrated filtering of the exhaust air

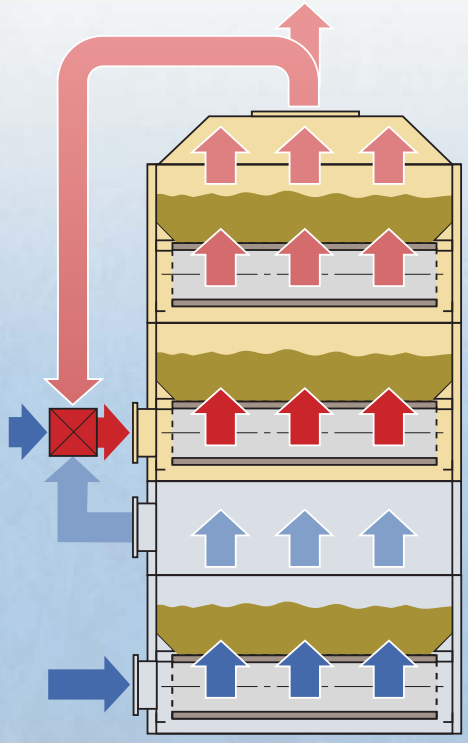
As the hot air flows from above through the product to be dried, a higher flow speed can be realized. Furthermore, the closely woven plastic belt filters the exhaust air. A system for cleaning this belt is integrated in the drier.

Drying/cooling with recirculated air

Drying and cooling with recirculated air for gentle treatment and reduction of emissions, for delicate products with low final temperature, e.g. shrimp feed, sewage sludge etc.







Special feed pellets

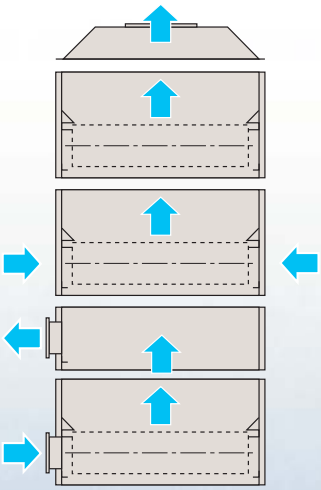
Expanded maize meal

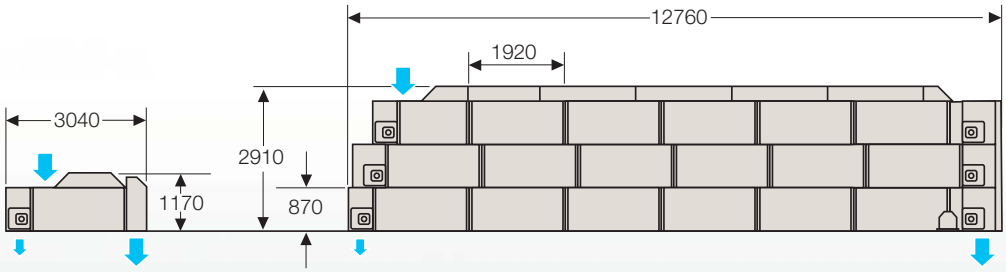
Layers feed

Fish feed pellets

Equipment variants

Belt units for drying and cooling of bulk materials with chain-guided slotted plates



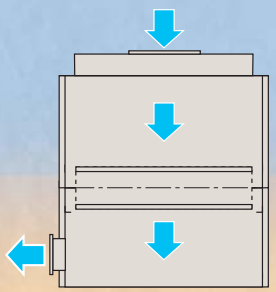


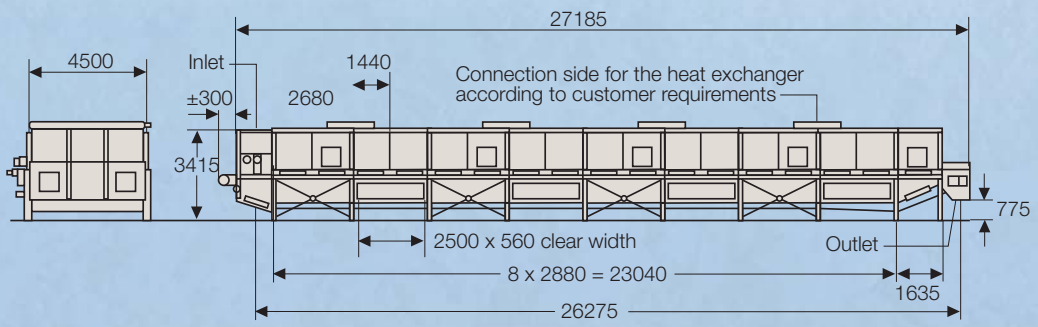
Width of the slotted plate	mm	1150	1500	2000	2870
Total width without drive	mm	1400	1750	2250	3120
Length per belt section	mm	1920	1920	1920	1920

*based on a layer level of 300 mm

Intermediate aspiration. For the separation of the process sections, e.g. pre-cooling and post-cooling, pre-drying and post-drying, drying and cooling.

Belt units with plastic fabric belts





Width of fabric belt	mm	4000	6000
Total width without drives	mm	4500	6500
Length per section	mm	2880	2880
Min. / max. lengths	m	9.9 /47.5	9.9 /42
Max. layer level	mm	250	300
Max. number of sections		15	13

Plastic fabric belt

Slotted plates

Chamber for drying and cooling

Hot air generation

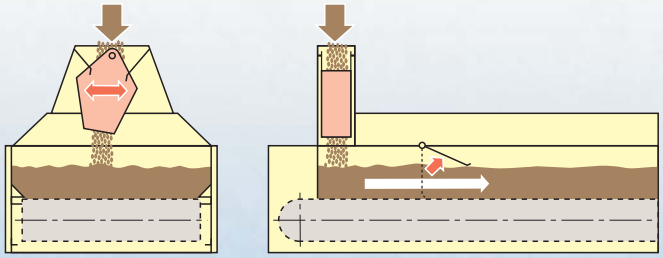
- Direct air heating
- Indirect air heating

Heat carriers

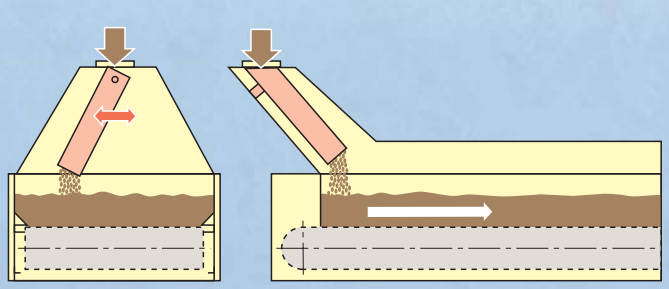
- Firing
- Steam
- Hot water
- Thermal oil

Feeding devices

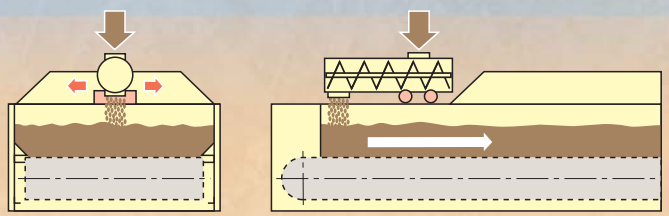
Swivel box
For insensitive products with high layer levels.



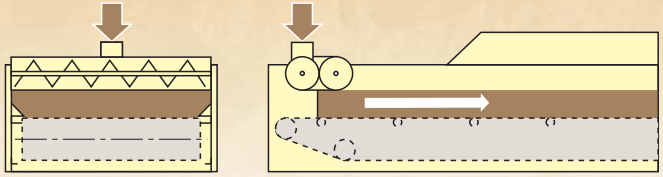
Swivel chute
For delicate products with different layer levels.



Swivel screw
For insensitive products requiring loosening and lump reduction.



Distribution screw system (fabric belt drier)
For dusty, fibrous products for very uniform layer levels, particularly in the fabric belt drier.



Accessories and control

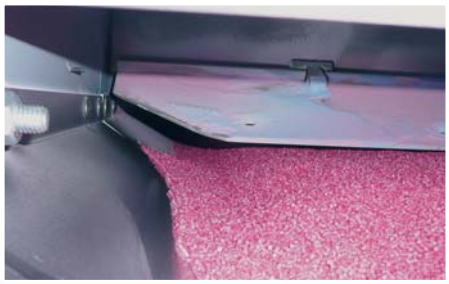
- Product-contacting parts made of stainless steel
- Loosening rakes
- Lump crusher
- Outlet box with pile-up indicator
- Fines discharge screw
- Layer level indicator
- Remote layer-level indicator
- Temperature controller for exhaust air and/or product
- Speed / standstill monitor
- Belt speed control
- Layer level control
- On-line measurements of the product moisture at the inlet and outlet of the drier as well as measurements of the exhaust air temperatures and exhaust air moistures in the individual sections provide the necessary parameters for possible control and regulation concepts
- Automatic belt cleaning system
- Differential pressure measurement system
- Fire-extinguishing system

Special designs

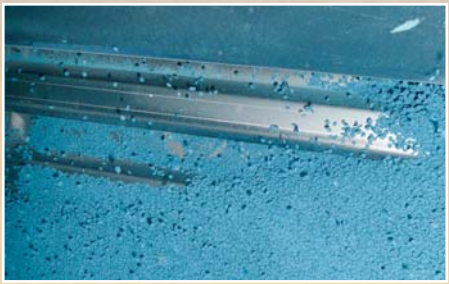
- Belt units completely made of stainless steel
- CARRY OVER (fines are discharged together with the product)
- Wide lateral and front inspection doors
- Fabric belt

More than 1,000 KAHL belt driers and coolers are used worldwide for various technical applications

KAHL belt driers/coolers are appropriate for different types of products. Examples: Pellets, extruded products, Expandat®, agglomerates, pasty products, wood shavings, biomass, and chemical products.



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