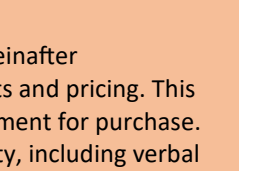
Ventilex

FLUID BED DRYERS

Thermal physical process technology

www.ventilex.com

CONTENTS

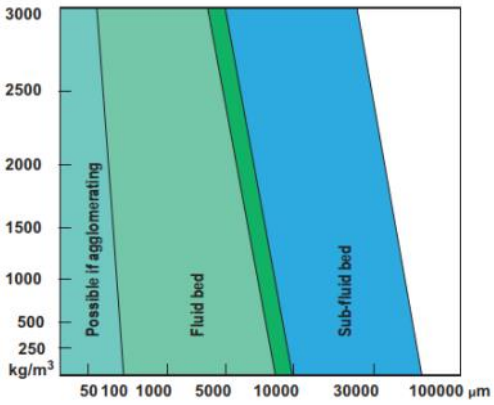


1. FLUIDIZATION

In a fluid bed, a product or solid is made fluid by an upwardmoving flow of gas. The mechanical movement of the fluid bed strengthens this effect. Thus the gas and product are intensively mixed, so that high heat transfer and an optimum physical reaction speed are achieved.

By choosing a good combination of gas speed and mechanical movement (if necessary), you can process granular products with a wide range of grain sizes successfully while forming a minimum amount of dust.

Both the static and mechanical Ventilex fluid bed can function at temperatures from –15ºc to +600ºc. The gas speed can vary from 0.2 to 3m/sec.

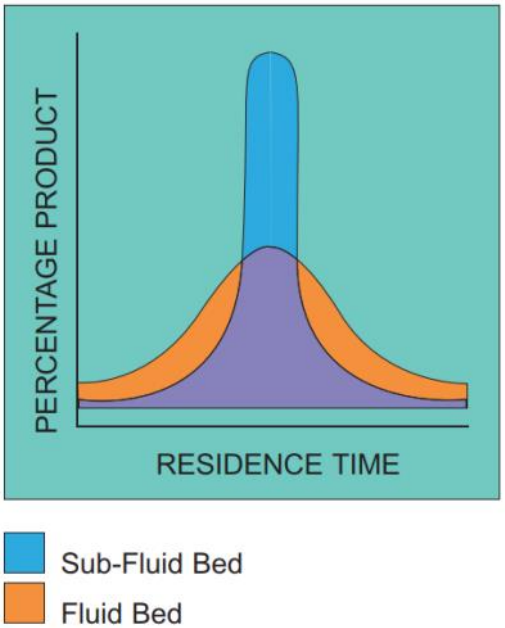


2. SUB-FLUIDIZATION

Longitudinal mixing occurs during the fluidization process. As a result, if the process time is long, the difference in residence time of the individual particles is too great. This can lead to damage to the product.

Yet there are products that require long processing. So this would have to occur in a fluid bed with a very high length to width ratio. This is usually not desirable, among other things because it takes up too much space.

Our solution for this problem is sub-fluidization. In this process,the product remains on the verge of fluidization. our unique drive concept, combined with a rotary weir, makes residence times up to 2 hours possible. The layer thickness of the product can vary from 5 to 60 centimetres with this process method.



ADVANTAGES OF THE SUB-FLUID BED

- There is hardly any or no longitudinal mixing. differences in residence times are kept to a minimum and the various particles are processed uniformly.
- Less fluidization gas is needed for the process than with complete fluidization. This means smaller peripherals and lower energy consumption.

With a fluid bed and sub-fluid bed a range of products can be processed which previously could only be processed with a belt dryer. The Ventilex sub-fluid bed has amply proved its quality in processing, among others: cereals, seeds, nuts, beans, croutons, breakfast cereals, cheese, meat, fibers, extrudates, pellets and plastic granulates.

3. FLUID BED

Each product has its own, specific characteristics. By means of careful testing in our laboratory, we determine the most effective and efficient processing method. The installation is then designed and built by Ventilex.

As the diagrams show, there are several versions of the air supply system, the fluid bed and the flue/ discharged gas system.

They can be combined in different ways.

AIR SUPPLY SYSTEMS:

1a Ventilator/fan
1b Ventilator/fan in combination with heat exchangers
1c/d Ventilator/fan in combination with direct burner (gas / oil)
1e Ventilator/fan in combination with indirect burner (gas / oil)
1f Dehumidifying by cooling
1g Dehumidifying by adsorption

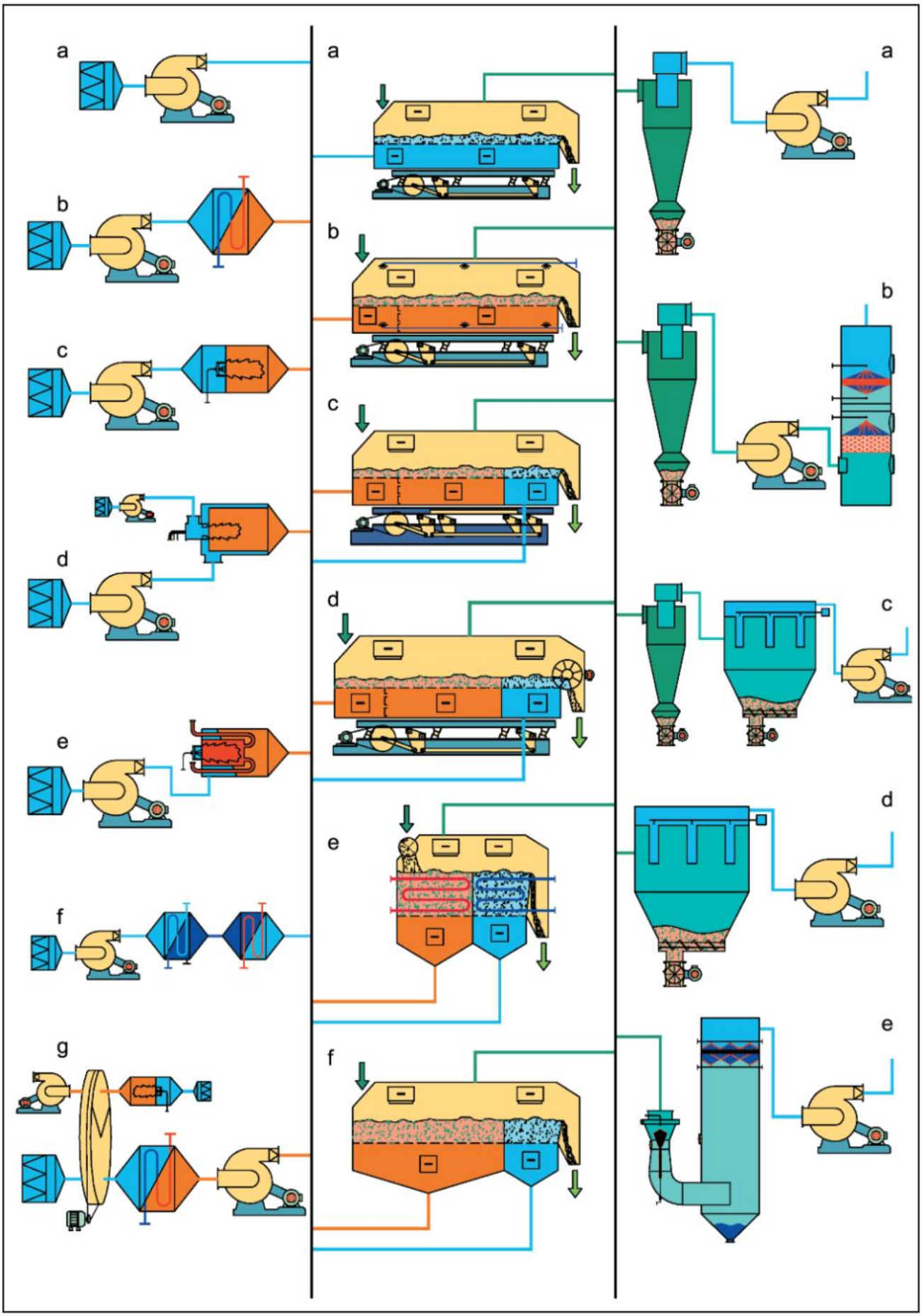
FLUID BED CONFIGURATIONS:

2a Cooler
2b Dryer
2c Combination dryer/cooler
2d Combination dryer/cooler with rotary weir
2e Static dryer/cooler with internal heat exchangers
2f Static dryer/cooler

FLUE/DISCHARGE GAS SYSTEMS:

3a Cyclone
3b Cyclone in combination with a wet scrubber
3c Cyclone and filter
3d Filter
3e Venturi scrubber

FLUID BED APPLICATIONS	
Agglomerating	**Fermenting**
Baking	**Freeze drying**
Blanching	**Inert gas drying**
Calcinating	**Pasteurizing**
Conditioning	**Puffing**
Cooling	**Reacting**
Deactivating enzymes	**Roasting**
Dedusting	**Steam stripping**
Drying	**Sterilizing**


a
b
c
d
e
f
g
a
b
c
d
e
f
a
b
c
d
e

4. FOOD, DAIRY & NUTRACEUTICALS

Within the food, diary and nutraceuticals industries, the fluid bed is applied for:

- Derivates
- Supplements
- Ingredients
- End products

A whole range of products can be processed in the fluid bed and sub-fluid bed and long residence times, up to two hours per machine, are possible. Our unique drive provides an ideal plug-flow.

SUB-FLUID BED DRYER/COOLER FOR CHEESE

SPECIFIC CHARACTERISTICS/ADVANTAGES

Naturally hygiene has top priority in the food industry. The sanitary design (FdA/USdA-gmP) ensures that our installations meet the high requirements of this industry.

Our installations are completely made of stainless steel and all the product contact parts are polished and welded.

The quick-acting closures and the W.I.P. system (Washing-In-Place) make the installation easy to disassemble and to clean. Then production can quickly be resumed.

The Ventilex fluid bed system is preferable to the traditional belt dryer. It takes up less space, has low energy consumption and no product loss. What is more, the installation and maintenance costs are considerably lower.

For processes that contain solvents or alcohols, Ventilex offers a closed-loop system. Inert gas blanketing along with solvent condensing and recovery can be provided as a complete system.

Advanced oxygen analyzing is incorporated in our special control system.

FLUID BED DRYER FOR BREADCRUMB

FLUID BED DRYER/COOLER FOR CEREALS

APPLICATIONS

The Ventilex fluid bed is worldwide used for processing:

Beta carotene	GDL	Protein
Breadcrumbs	Grains	PUFA
Calcium gluconate	Herbs & spices	Rice
Cereals	KGA	Salt
Cheese	Lactitol, sorbitol, xylitol	Sausage farce (rusk)
Cocoa	Lactose	Seeds
Coffee	Licorice extrudate	Soya
Collagen Peptide	Lycopene beans	Sugar
Confectionary	Meat	Tea
Crumb	Nuts/peanuts	Tomato pulp
Dairy	Potato flakes	Vitamins
Dextrose	Powdered milk	

5. FEED AND BIOMASS

It is possible by means of fluid bed processing to upgrade waste products and make them suitable for re-use. In this way the environment is burdened as little as possible.

Recycling and energy recovery from biomass play an increasingly important role in both residual stream management and global energy supply. The Ventilex Fluid Bed dryer enables residual streams to be upgraded for reuse in the food chain. For example, we process potato residue into animal feed and soy protein into fish feed. We also upgrade grain slurries from breweries to DDGS. Due to its high protein content, it can be processed into cattle feed.

Ventilex is also frequently deployed for direct applications, such as the fluid bed drying of animal feed granules.

RTO-AFTER BURNER

SPECIFIC CHARACTERISTICS/ADVANTAGES

This industry will often have to deal with a product in which the size of the individual particles differ greatly from each other and the humidity is high.

The Ventilex fluid bed guarantees a high evaporation rate at low temperatures and low energy consumption. Our unique drive ensures that we can make the fluid bed as big as the product requires.

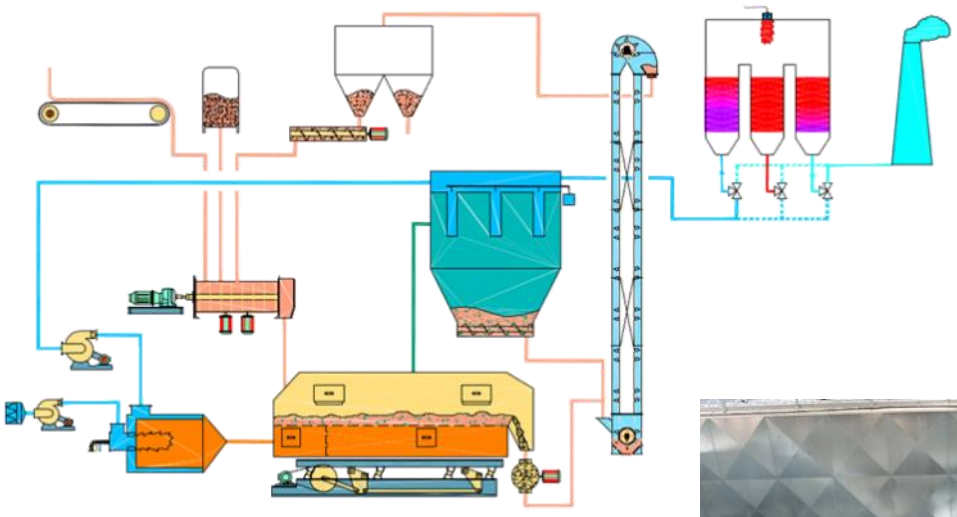
By making use of product recirculation and mixing, you can also process slurry-like products. It is important to know that our installations are resistant to corrosion.

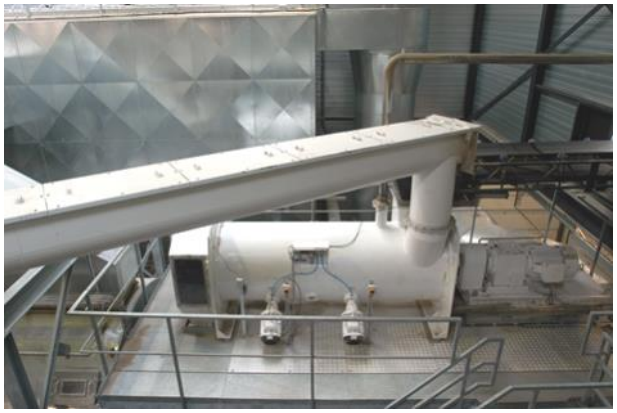
Odor-suppression is another important aspect. We achieve this by making use of either a closed system air recirculation, biobed and/or thermal exhaust gas combustion.

APPLICATIONS
The Ventilex fluid bed is worldwide used for processing:

Blood meal	Paper waste
Citrus peel	Potato residue
Compost	Return bread
DDGS	Slaughter waste
Domestic waste	Sludge
Fish feed	Soy protein
Manure	Wood
Mustard seed residue	

FLUID BED DRYER FOR BIOPLASTICS





6. MINERALS

Sanding and eroding – such is the reality of the heavy-duty drying processes of coarse-grained minerals, like sand, and gravel. Ventilex engineers developed fluid bed dryers and coolers to ensure optimal results while minimizing attrition.

Ventilex mineral dryers are durable and corrosionresistant. Moreover, drying systems for minerals and aggregates consume much energy, leading to high operational costs and low margins. Ventilex high-efficiency fluid bed dryers typically result in energy savings of 30-60%, which makes the Ventilex the most energy-efficient of all drying solutions.

FLUID BED SANDDRYER

SPECIFIC CHARACTERISTICS/ADVANTAGES

Processing minerals require high temperatures. In the Ventilex fluid bed temperatures up to 600ºc can be achieved.

Efficient consumption of energy is possible due to heat recuperation/recovery from the flue/discharged gases. In addition, the fluid bed can be divided into different compartments.

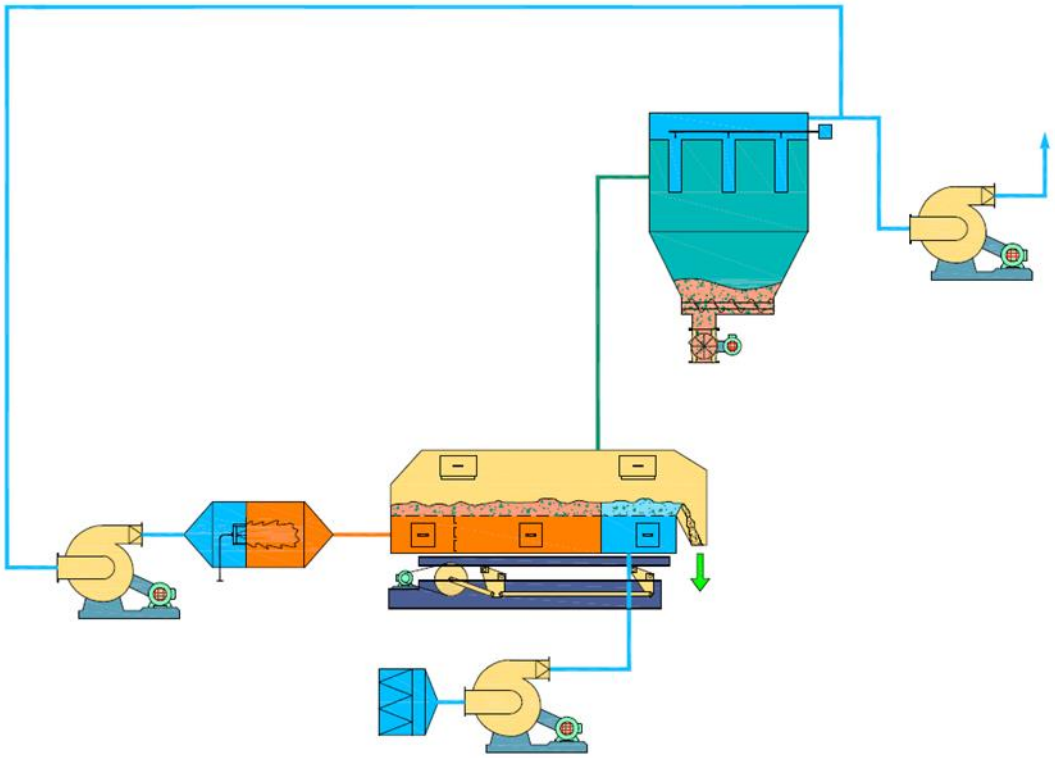
In this way it is possible to dry and cool (evaporative) within a single installation, which saves a lot of space. Also the fluid bed system has a very short start-up and stopping time.

Other advantages are lower energy consumption, by drying and cooling within one machine, and a long service life of the installation.

The installation functions fully automatically, even with varying entry humidity and product amounts or feed rates.

APPLICATIONS
In the mineral industry, the Ventilex fluid bed is worldwide used for processing:

Aggregates	**Gypsum**
Blast furnace slag	**Iron slag**
Calcium carbonate	**Limestone**
Calumite	**Marble sand**
China clay	**Non-ferrous metals**
Copper slag	**Rock salt**
Ferrous metals	**Sand**



SCHEMATIC OVERVIEW OF A TYPICAL FLUID BED PLANT WITH DRYER, COOLER SECTION, BURNER, FILTER AND RECIRCULATION

7. CHEMICALS

Corrosion of valuable components might well be the biggest threat of industrial-chemical processes. Therefore, when designing equipment, it mostly comes down to a custom selection of materials, so that an optimal and sustainable process can be guaranteed.

STATIC FLUID BED DRYER/COOLER FOR KNO_3

SPECIFIC CHARACTERISTICS/ADVANTAGES

Ventilex engineers are specialized in fluid bed drying systems that use the best possible anti-corrosion materials, thus ensuring a durable life cycle.

To meet the requirements of the production process, we opt for materials such as titanium, Hastelloy, duplex, or super-duplex plastics.

Moreover, when you choose Ventilex, you opt for the most energy-efficient solution.

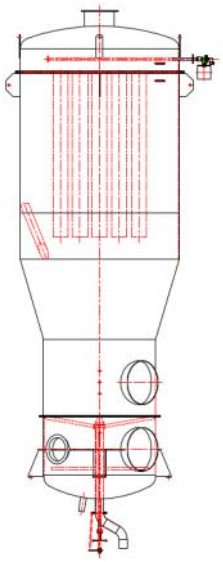
APPLICATIONS
In the chemical industry, the Ventilex fluid bed is worldwide used for processing:

Ammonium sulphate	Plastics granulate
Butyl rubber	Polymers
Calcium chloride	Potassium chloride
Carboxyl Methyl Cellulose	Potassium sulphate
Chromic acid	Rubber pellets
Detergents	Salts
Fertilizer	Silica gel
Flame retardant	Sodium sulphate
Herbicides	Twaron (Kevlar) pulp
Hexamine	Vanadium oxide
Penta eritritol	Zn Pb granulate
Pesticides	

8. SPECIALS

Ventilex designs client-specific solutions with various combinations of the air supply system, the fluid bed and the flue/discharged gas system. But we have more to offer: the so called specials.

1



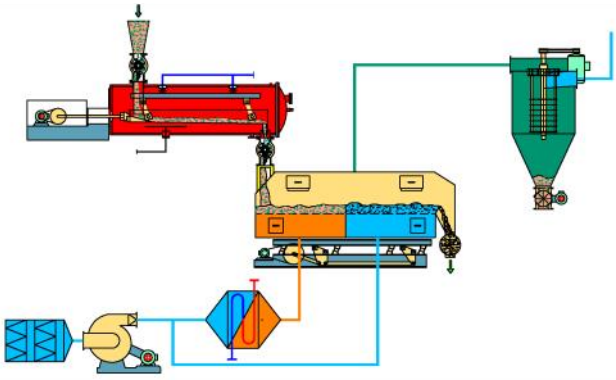
A FEW EXAMPLES

1 Batch dryer with integrated filter. This batch dryer is used for products that require a high processing temperature or different temperature phases.

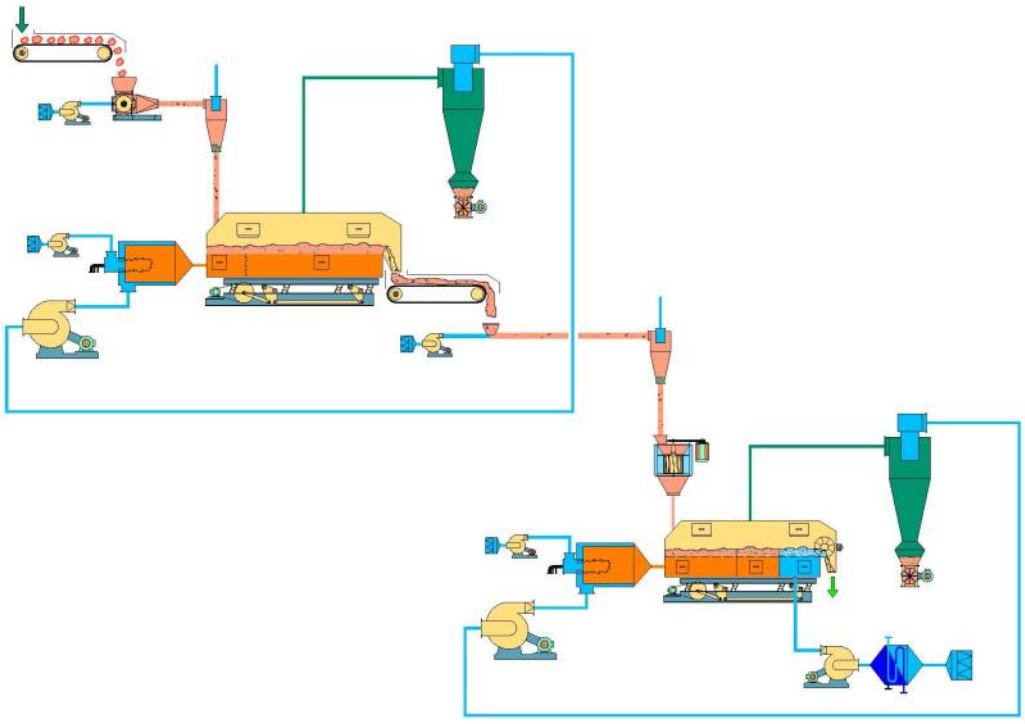
2 A steam treatment system for decontaminating spices and herbs in combination with a fluid bed dryer/cooler.

3 Combination of a fluid bed baking oven and a fluid bed dryer/cooler for producing bread-crumbs.

2



3



9. VENTILEX TEST CENTER

TEST AN INDUSTRIAL DRYER BEFORE PROCUREMENT

You can test a drying solution in the Ventilex Test Center. Here, the Ventilex engineers simulate the drying process with your products.

Equipped with a fluid bed, belt dryer, air dryer, sterilizer, and pasteurizer, our Test Center offers the perfect setting to conduct extensive product trials.

During those trials, we simulate processes with a wide range of parameters to determine the optimal specifications for product processing. Based on the test results, a tailor-made solution can be designed.

TOP VIEW OF THE VENTILEX TEST CENTER

TEST A DRYER AT YOUR SITE

Alternatively, we can integrate the Ventilex solution into your process at your site. In existing processes, this can be a most efficient route to an optimal drying result.

The Ventilex test engineers travel worldwide so you can test the Ventilex drying solution and adapt it to local conditions.

Renting a test unit also belongs to the possibilities!

FLUID BED TRIALS

10. SERVICE: OUR GLOBAL STRENGTH

A LIFETIME PARTNER FOR YOUR DRYING NEEDS

It is needless to say that regular, professional service pays off in maintaining product quality, reducing unplanned downtime and saving operational costs.

As a lifetime partner in drying solutions, we offer support not only during the set up, but also after the installation has been placed. With our knowledge of heat re-usage techniques and energy savings, we help our customers reduce their operational costs.

WE HELP YOU GET THE BEST OUT OF YOUR DRYING EQUIPMENT

For a problem-free operation and a longer lifetime with a total package:

- Inspection: regular inspection to catch possible maintenance needs before downtime occurs
- Maintenance: regular cleaning, refurbishing and replacement of critical equipment parts
- Refurbishment: replacement of components that have reached their life expectation
- Spare parts: stock of critical spare parts on-site, ready to deploy in case of repairs
- Certification: periodic burner inspection and safety certification
- Optimization: quarterly operational improvement feedback based on equipment data (data log), leading to actions to optimize your equipment operational settings
- Training: regular training of personnel to ensure optimized use of equipment, based on usage data

FLUID BED DRYERS

Ventilex

Many companies already chose to partner up with Ventilex for their drying needs.

Our equipment is space saving, energy-saving and there is no product loss.

Customers also discover that their installation and maintenance costs are significantly lower.

Established in 1965, Ventilex has since grown to become a global leader in drying and thermal treatment equipment.

With our deep experience in thermal treatment of food, feed, minerals and chemicals, we are able to help our customers in a most fitting way, according to custom designed thermodynamic profiles. Amongst others, we cover the drying, cooling, sterilization, roasting and puffing of your product.

Our fluid bed dryers serve customers in more than 80 countries.

Do you wish to dry food products, animal feed, minerals, or chemicals in the most energy-efficient way? Then a Ventilex Fluid Bed Dryer is the equipment of choice!

Ready to get the most out of your drying equipment?

It's a Ventilex

Ventilex HQ
Europaweg 8
8181 BH Heerde
The Netherlands
T +31 85 303 2100
sales@ventilex.com
www.ventilex.com

Ventilex USA Inc
10168 International Blvd.
Cincinnati, Ohio 45246
USA
T +1 513 217 5830
sales@ventilex.com
www.ventilex.com