

CREATIVE SOLUTIONS IN DRYING TECHNOLOGY

FLUID BED TECHNOLOGY

- DRYERS
- COOLERS
- DRYER/COOLER COMBOS
- STEAM STRIPPERS

STEAM DECONTAMINATION

- CONTINUOUS STERILIZERS
- CONTINUOUS PASTEURIZERS

BELT DRYER TECHNOLOGY DEHUMIDIFICATION SYSTEMS PROCESS CONTROLS

Table of Contents

	Fluid Bed Technology	3
	□ Fluidization	
	□ Sub-Fluidization	4
	Fluid Bed System Configurations	5
	Continuous Steam Stripping	6
1	Steam Decontamination	
	Belt Dryers	
	Dehumidification Systems	
	Process Controls	
1	Major Markets	
	Minerals	
	Food, Dairy, and Nutraceuticals	
	Biomass, Animal Feed, and Inorganic Waste	
	□ Chemicals	
	Testing & Pilot Scale Capabilities	
	Spare Parts & Service	
	Product List	
	Applications	

FLUID BED TECHNOLOGY



Ventilex Fluid Bed Dryer/Cooler

FLUIDIZATION

In a Fluid Bed, a product or solid is made fluid by an upward-moving 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 ranging from $5^{\circ}F$ (-15°C) to 1,112°F (600°C). The gas speed can vary from 0.7 fps (0.2 m/sec) to 9.8 fps (3.0 m/sec).





- Ventilex

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 undesirable because, among other things, 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 the rotary weir, makes residence times up to 2 hours possible. The layer thickness of the product can vary from 2" (5cm) to 24" (60cm) 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 such products as:

- CerealsSeedsNutsBeansCroutonsCheeseMeatFibers
- Extrusions
 Pellets
 Recycled Plastic
 Granulates

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 internally by Ventilex.

As the diagrams on the following page show, there are several versions of the air supply system, the fluid bed, and the flue/discharge gas system. They can be configured in a variety of ways:

Configuration Matrix			
AIR SUPPLY SYSTEMS:	VERSIONS OF THE FLUID BED:	FLUE/DISCHARGE GAS SYSTEMS:	
 1a Ventilator/fan 1b Ventilator/fan in combination with heat exchangers 1c Ventilator/fan in combination with direct burner (gas/oil) 1d Ventilator/fan in combination with direct burner (gas/oil) 1e Ventilator/fan in combination with indirect burner (gas/oil) 1f Dehumidification by cooling 1g Dehumidification by adsorption 	 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 	 3a Cyclone 3b Cyclone in combination with wet scrubber 3c Cyclone and filter 3d Filter 3e Venturi scrubber 	

FLUID BED SYSTEM CONFIGURATIONS





Ventilex Fluid Bed Steam Stripper

CONTINUOUS STEAM STRIPPING

Steam Stripping – Solvent Recovery:

Steam stripping is the removal and recovery of volatile substances out of a product stream. Many high value compounds including morphine, caffeine, and other plant extracts, as well as substances such as crude oil, can be washed/dissolved out of a raw material like sand, using various solvents.

The Ventilex steam stripper provides the solvent recovery stage of the process. The volatile solvents are driven off the waste material stream from the extraction process using live steam.

The Process:

The steam acts as a fluidizing medium, combining with the shaking mechanism of the Ventilex steam stripper to create an intense mixing of product and steam and ensuring product transport through the equipment.

The exhaust gases created by the process are collected and condensed to reclaim the solvent and steam (as water).

The product exiting the steam stripper contains <5ppm of the extraction solvent and 10% - 40% moisture (depending on inlet conditions). Making it possible to be safely disposed of, or reprocessed, as non-hazardous material.

Venteletx Ventaleso que value aplovible en fourid les algunations algunation de la company de la com

The airtight sealed state an stripper ceasure sa relatively low ATEX rating (ATEX III 2G) for the production space account the equipment, while the oxygen-starved process space saturated with lives state an intrinsically safece rivicon needs inside the solver tree covery process.

Ventelex vanteepelanascopplylete solperte recevers process processing the diegthex isteach steppler, esteauststrappeoprechasensgap aduratemetrs and outle in beitight esteals, attean seadely teach process/etal proc

Ventilea Vantileace avoids olosed ly choids by withstance stomerotic provide keyly derapponents alloval they clustometro to deally cally se their their for reference stopsieps lier so the other provide international to the stopsieps lier so the other provide the stopsieps lier so the other provide the stopsieps lier so the other so the other so the stopsieps lier so the other so the other so the stopsieps lier so the other so the so the stopsieps lier so the other so the stopsieps lier so the stopsieps lier so the so the stopsieps lier so the stopsieps lier so the so the stopsieps lier so the stopsieps lier so the so the stopsieps lier so the stopsieps lier so the stopsieps lier so the so the stopsieps lier so the st

Capacititiesstyppicallyreange up to 1111,0000 PPPH ((5,0000 kg/h)) of product, or up to 2,200 PPH (1,000 kg/h)) of solvent recovery. Larger processing capacities are possible and the specialized ergyineers of Ventelax Ventilex varies available to discuss privation.



Imtelden Vienti Bete Ste Striptreppe Exating the VFIDia Diagram

STEAM DECONTAMINATION



Ventilex Steam Pasteurizer

CONTINUOUS STEAM STERILIZERS & PASTEURIZERS

Spices, herbs, seeds, nuts, and dehydrated vegetable substances bring a world of flavors, aroma, and colors to food.

The potential for pathogens like salmonella, yeasts, molds, bacteria, and spores to get into the food supply has resulted in the trend towards more stringent "Good Agricultural Practices" and regulations. Spices and herbs are sourced worldwide and they may be heavily contaminated from the soil where they were grown and harvested.

These microbes often remain after local processing due to simple treatments and processing at low temperatures. If left untreated, these products may encounter continued microbial growth that can easily lead to spoilage and customer health issues. There are many commonly used methods to decontaminate natural products, such as ethylene oxide (EtO) and irradiation, but most have been, or will soon be, restricted due to their potential health risks and adverse consumer acceptance.

Ventilex Steam Sterilization Benefits:

- A natural, renewable, process that utilizes steam and is accepted worldwide as safe and wholesome.
- Continuous decontamination of bacteria and pathogens (5 log kills are typical).
- High-temperature, short-time, processing (HTST) which protects the taste, texture, and color of the product with a minimal loss of volatile oil.
- Very gentle, for leafy (friable) products.

Wetercile X Ordifition Counsi Streams Streaminizationinization weter a NEtimal allomional Boot enfa Bacteria:

The use of steam is ideal as it is matural, imexpensive, and can be produced in am unlimited supply. It is a natural "organic" process that does not leave behind any chemical residue, or create toxins.

Steam sterilization/pasteurization systems are the most effective "natural" method for reducing or eliminating bacteria, pathogens, and other food-borne causes of sickness. Effective steam treatment will eliminate listeria, salmonella, E. coli, and a variety of other bacteria and pathogens.

As a result, many of the world's largest spice, herb and mult processing companies have selected Meteridex/contribucousting teamstatemilisters/jacstépaizteus/izers/cont/otheathan0000 systems have been supplied worldwide.

Modern, Hygienic, and Chemical Free Steam Treatment Process:

With the Meterialex/system, system, etca coefficiences in a construction of the state of the sta

The lotencite / estileansystembean beau sedused propersessith biopodeds, swhole leaand ground pepper, paprika, garlic, cloves; and a variety of herbs, seeds, and other spices. We can do leafy spices without harm to the leaf due to our grentle shaking action – there is no screw conveyor or unnecessary vibrations that can damage the product.

The continuous system treats powders as well as whole spices, which is a unique feature of the Weteridex Vsystlem.systemedition distant stearmine attisted to the treatment in the systemer and the systemer and the standard the

The heart of the nut is left matural and allive – it will germinate. This makes it possible for the "organic" food label to be applied and for certain products to be labeled as "pasteurized".



TypToppibate/emt/lextBeerSteatlizetBysBeystElovFDiagDiagram

Steam Sterilizer or Steam Pasteurizer?

We offer two different technologies of decontamination systems commonly referred to as "steam sterilizers" and "steam pasteurizers". The main difference is that "sterilizers" do their work in closed pressure vessels (autoclave) at up to 45 PSI (3 bar) and "pasteurizers" work at atmospheric pressure with super-heated steam. The selection of the appropriate technology depends on the size of the product itself and the type of pathogens to be eliminated.

We offer some standard sizes of sterilizers and pasteurizers to span the range of commonly specified capacities, but each system is customized to meet the client's specific requirements.

We typically work with a "Process Authority" or the client's microbiologist who performs the microbiological testing and sets the process parameters to be validated for regulatory compliance. Our role is to supply equipment meeting these specifications. To facilitate the validation process, we offer a testing service to process samples inoculated with surrogate pathogens for process parameter development.

How Does Ventilex Steam Decontamination Work?

Ventilex Continuous Steam Sterilization/Pasteurization Systems are designed for High Temperature, Short-Time (HTST) decontamination. Steam is the fastest possible way of heating product to an exact preset temperature.



Product Time/Temperature Curve

The HTST process exposes material that are considered contaminated to high temperature steam for just a short time. The material is then dried and cooled. This is a simple idea, but is one of the most practical and effective methods for treating products in the industry.

The process works by feeding and discharging the product through a self-cleaning rotary valve that isolates the pressurized autoclave from the ambient room. Inside this autoclave, a shaking table transports the product through a steam-pressurized chamber at a specific speed and creates a thin layer of product. Condensation builds on the product surface and this imparts high energy into the surface of the product. This kills unwanted bacteria and pathogens.



ImteVenViettiGorCiontinusoldigHiBreBsesseSteStizziritAu(Actionalave)

The time, pressure, and steam temperature within the chamber is tightly regulated such that the minimum amount of **each** required to achieve the desired killiss applied. Attenvaads, in the dryer the temperature is tightly controlled so that the product is returned to a **precise moisture** level. In this way, the final moisture content can be specified and controlled to maximize yield.

We understand how critical temperature, treatment time, and pressure are when decontaminating a product. All three of these parameters can be set individually depending on the particular product and the pathogens to be eliminated. Repeatability is required to validate a system and ensure effective decontamination. Our systems are designed with advanced PLC controls to facilitate this. The operator simply chooses the proper recipe from a menu and all process parameters are controlled, measured, and logged for traceability.

Choose	Menu	
1	Pepper	1
2	Turmeric	
3	Chili	
4	Ginger	
5	Blend A	



Data Logging and PLC Instrumentation

Ventilex Steam Sterilization/Pasteurization System Features:

- Automated controls provide for minimal operator intervention. The operator simply selects the proper recipe the system parameters and set points are always the same.
- PLC instrumentation assures repeatability. Data logging stores all critical data permanently for traceability and verification.
- Automatic Sanitary Clean-In-Place (CIP) design. The Ventilex system is the fastest cleaning system on the market today.
- Recipe based controls for processing multiple validated products in the same machine.
- Hygienic design with minimal cracks and crevices, rounded welds, and high quality surface finishes.
- Product is decontaminated, dried and cooled.
- Shortest duration of steam of any commercial system in use today product still "natural".
- Low energy consumption and low maintenance costs.
- 5 log kills are typical.
- Deactivation of enzymes.
- Minimal loss of flavor, color, and volatile oil.
- Available in a wide range of sizes:
 - □ Sterilizer: Up to 2.75 TPH (2.50 MTPH)
 - □ Pasteurizer: Up to 11.0 TPH (10.0 MTPH)



Ventilex Continuous Steam Pasteurizer

BELT DRYERS



Imtelden Vielet i Belty Bryer

Weretakex Veretiles the psinthesting dustry ptod poed ubet the tigue and a liter product sets by countral ling the temperature and humidity of the environment while minimizing utility usage and maximizing production reatess. Interntilerentiderensryensequisedpisedprotoottratentepreparturatence and humidality levels irrespective of air inlet conditions; and are designed for durability, sanitation and reliability.

The demand for high guality dehydrated products having properties similar to those found in the original product is increasing every day. Additionally, the drying process must have low operating costs and minimal environmental impact.

Weretale X/ eventile extracts decersbeen used used there they introving of a flake kects in peeced nood bed, and granular matterials. Invientiale/entitle/correction/areas aseduseddo/day aaststaaraayooff products, including:

- Biomass
 - Synthetic Rubber Meat
- Pharmaceuticals

Pet Food

Roots

- Digestate Gelatin

- Organic Pigment
- MSG

Sludge

- Fish
- Wood
 - Fruit Products
 - Herbs
 - Feed Granules
 - Charcoal
 - Propylene Fiber
- Vegetables

Ventilex

- Chemicals
- Potatoes
- Mushrooms
- Plastics
- CMC

Weterdex/bettlex/best dreehsparky leightigeretfanienhavel loave tourgenergy irequeines neifitse diesigtesigd aele steden tio thef dinged riseb as easted the threquicits over land of own and a terristic stids min/or stufet for a triantion of the second and the second s the tage all a site of the state of the stat

The combination of temperature cycles and drying times can be adjusted as necessary to control the final product's physical properties. The internal conveyor consists of single or multiple layers of stainless steel belt. Because the drying air flows through the belt, heat exchange is complete and even resulting in high production efficiency and exceptional final product quality.



Inside View of the Drying Tunnel

General Description of the Ventilex Belt Dryer:

The raw material is spread evenly across the conveyor belt by means of a suitable auxiliary mechanism such as a distributor, vibrating belt, pulverizer, or granulator. The drying tunnel is divided into zones, each maintaining a different temperature. Each zone contains an air heating and recirculation system, and if necessary, a moist air exhaust system. As the belt conveyor passes through each zone, hot air passes through the material from top to bottom, then bottom to top, producing a uniformly dried product. An example of a belt dryer with several zones is shown below:



Depending on the product, the tunnel can be equipped with a cooling section and vibration device in the outlet to lower the final product temperature for convenient and timely packaging. Naturally, Ventilex belt dryers are corrosion-resistant. We use various materials such as stainless steel and aluminum, depending on the properties of the product to be processed.



DischercheaogenotievenWielextillerlBiehtyBryer

Before designing the dryer, the product is tested in our laboratory. Here a variety of parameters are evaluated to identify the optimum process conditions. This is necessary for many processes to prevent damage to the product. In our laboratory, samples can be subjected to temperatures ranging from -22°F (-30°C) to 572°F (300°C). After careful analysis of the results, each installation is custom designed and manufactured.

The Wretetide X/Bettlex Beelo Devenous ferso preasing prediction at the individual of the individual o

- Custom made construction tailored to your specific process.
- Optimum time/drying curves for each product.
- Continuous drying system.
- Suitable for granular, fibrous, preformed, sticky, and extruded wet materials.
- High energy efficiency.
- Minimal footprint as compared to competitive designs.
- Uniform and gentle drying.
- Modular system, flexible and easy to ship and install.

Wetetidex Veretiliele pirotnioles in teogise eringinere ingfactarino gataringellas svelllainstallationstallationstand starserpises vice services depaided is depaided is depaided is fallen to ensibility persibility persibility of a prove vice just vibe just vibe

DEHUMIDIFICATION SYSTEMS



Ventilex Polykath Dehumidifier

The Polykath Dehumidifier – the "Standard System"

The Polykath dehumidification system was specially developed to serve the changing needs of industrial, institutional, and commercial users. The conditioner and regenerator are built on one sump and, together with the pumps, plate and frame heat exchangers and DrySol piping, built on one frame with fixed dimensions. This means that a Polykath system is easy to install, integrate, and relocate. The Polykath unit is available in four standard sizes.

Air Volume Range: 2,750 CFM (4,650 m³/hr.) – 10,600 CFM (18,000 m³/hr.) **Moisture Removal**: 125 PPH (57 kg/hr.) – 475 PPH (216 kg/hr.)

The Ventilex Polykath Dehumidifier offers many operational benefits, including:

- Cooling and heating occurs externally.
- Uses relatively inexpensive coolants, like well, river, and cooling tower water.
- Corrosion proof constructed primarily of polypropylene.
- Microbiological decontamination.
- Compact construction.
- Four standard sizes fixed dimensions.
- Competitively priced.
- Simple to engineer easy to integrate.
- Minimal maintenance.
- Easy to relocate.
- Dual purpose dehumidifier **or** humidifier.
- Very long life span.
- Energy efficient low operating costs.



The Polykath Dehumidifier

The DryPac Dehumidifier – the "Custom-Made System"

The DryPac dehumidification system is a custom-made solution designed for low energy consumption. The DryPac system can handle very large volumes of air. The latest designs are constructed of corrosion-proof material and have incorporated the latest advances in heat and mass transfer technology. Its simplicity and choice of materials of construction make the DryPac a reliable air dehumidifier with a long life span.

Air Volume: Up to 82,400 CFM (140,000 m³/hr.) **Moisture Removal**: Up to 4,400 PPH (2,000 kg/hr.)

The Wetetide X/OntiRec Dry Rac identeur of the fism of

- Cooling and heating occurs externally.
- Uses relatively inexpensive coolants, like well, river, and cooling tower water.
- Corrosion proof constructed of industrial heavy duty plastic.
- Several conditioners can be used with one central regenerator.
- Good performance with a variety of airflow configurations:
 - □ Vertical Flows (VPT)
 - □ Counter-Current Flow (air-DrySol)
 - Horizontal Flow (HPT)
- Microbiological decontamination.
- High efficiency.
- Custom-made system.
- Performance reliability.
- Dual purpose dehumidifier or humidifier.
- Very long life span.
- Energy Efficient low operating costs.



Ventilex

The DryPac Dehumidifier

Weteride X/learvite & reations expression in some and the interview of the

The Metetele X/Detilex idefierm/kidi/aenta/ge/antage:

Eliminates airborne micro-organisms – An Vienteletx Vienteletx vientetex offetenmoffersharrorjusthærligbtet ochtronholityumldityto Up7to 97% abf æilbeirberbactecite;rist;rustesearachdmolodsleatee killed and removed as air is washed by the liquid desiccant solution. A unique benefit not available with dry desiccant dehumidifiers.

Saves energy addin inest standard of the state of the sta



Comparison Example

Dehumidifying 14,700 CFM (25,000 m³/hr.) of air, 77°F (25°C) from 50% RH to 20% RH:

	Conventional (AHU)	Ventilex
Cooling Load	335 Kw	150 Kw
Cooling Medium Temperature	23°F (-5°C)	68°F (20°C)

Easy to Operate and Maintain:

Operating a Ventilex system is less complex. Maintenance is minimal. Preventive maintenance schedules include sending a solution sample to Ventilex to verify quality and assure maximum performance. The ability to monitor and adjust the desiccant over the life of the solution is unique to Ventilex dehumidifiers.

How the Ventilex Dehumidification System Operates:

Salt is a hygroscopic substance, even dissolved in water it is able to absorb moisture from the air. All the systems of Ventilex are based on this principle. The highly stable, non-toxic salt solution used is called DrySol. The amount of moisture the DrySol removes from the air is directly related to the concentration and temperature of the solution. Lowering the solution temperature produces dryer air as does increasing the solution concentration.



Working Principle of Ventilex Dehumidification System

Conditioner (dehumidifier):

The hygroscopic salt solution (DrySol) is pumped and sprayed into the dehumidifier (A). Humid air (from outside or recycled air) passes into the dehumidifier. This air comes into close contact with the hygroscopic DrySol solution spray, which absorbs the moisture present in the air. Dry air leaves the top of the unit. By subsequently cooling the salt solution, the air is cooled and dried simultaneously. Drip catchers at the air outlet of the dehumidifier ensure that the air stream does not contain any salt solution particles.

Regenerator:

To ensure a stable concentration of salt in the dehumidifier, the absorbed moisture has to be evaporated. Therefore, part of the (diluted) DrySol solution is pumped to the "regenerator" (B). Here the DrySol solution is pumped and sprayed again. At the neggeneration side, water is evaporated by heating the salt solution. A minor secondary air stream, passing through the regenerator, absorbs this moisture and releases it outside. The concentrated DrySol solution returns to the dehumidifier. The process flow diagram shows that the "cold" (diluted) DrySol solution from the dehumidifier meets the "warm" DrySol solution in the regenerator.

A heat exchanger placed between these flows will preheat the "cold" solution before it enters the regenerator. The "warm" solution will release heat, and thus cool down before it is used in the dehumidifier again.

Operating Advantages of Weteridle X/east iDexy WeesDecyaDuesDeckamb idefincation fication:

Since the conditioner and regenerator units are separate from one another, regeneration can be accomplished without mixing of the air streams. Moist air from the regenerator cannot leak into the conditioner air stream. The only connections between the conditioner and regenerator are small pipes that circulate the DrySol solution. Thus, these two components can be located separate from one another. This provides design flexibility, contributes to space savings, and lowers installation costs. In fact, several conditioners can be used in conjunction with one central regenerator.

Performance Benefits of arVentielen DehtilexciDietatioid Bicsteon System:

- Precise humidity control.
- Simultaneous air cooling and drying.
- Bacteria free air.
- Frost free cooling.
- Stable, long-lasting desiccant.
- High efficiency.
- Integrates well with cogeneration.
- Energy savings.
- Improves air sanitation.
- Corrosion-proof construction.
- Low maintenance long life.

Ventilex

PROCESS CONTROLS

The Ventilex process control system is the result of years of development and refinement. Our controls are recognized by clients as the finest in our industry, ensuring predictable, repeatable product quality.



Industry leading PLC's run the dedicated operating software for our machines. We monitor the product temperature as materials dry, as well as the exhaust gas temperature during the process. Our proprietary algorithm allows us to "predict" the amount of energy needed to create the perfect end result. Any change in the moisture level of the feed is seen immediately in the exhaust air. This allows our machines to adjust much more rapidly to changes in inlet conditions than our competition, thereby conserving energy while still achieving the required product discharge conditions.

The Ventilex operating system and its proprietary algorithms are integrated with our sensor and PLC technology, resulting in the most energy efficient and cost effective drying solutions on the market today!

MAJOR MARKETS

MINERALS MINERALS

To process most mineral producteess stortgyminerial producteess stortgyminerial production as retroined. Solid installation is required is the done bloc comrost of resistant domstand the control of the states done bloc conrost of resistant domstand the control of the states done bloc conrost of the states domstand the states done bloc conrost of the states domstand the states done bloc conrost of the states domstand the states domstates domstand the states domstand the states domst



Intectiventies Fluid Bed Diver/Cooler for Raoini

Specific Characteristics / Advantages

Specific Characteristics / Advantages For this industry it is important to be able to work at high temperatures. In the Imtech Ventilex For this industry it is important to be able to work at high temperatures. In the Imtech Ventilex For this industry it is important to be able to work at high temperatures. In the Imtech Ventilex For this industry it is important to be able to work at high temperatures. In the Imtech Ventilex For this industry it is important to be able to work at high temperatures. In the Imtech Ventilex For this industry it is important to be able to work at high temperatures. In this way it is possible In addition, the Fluid Bed can be divided into different compartments. In this way it is possible

In addition, the Fluid Bed can be divided into different compartments. In this way it is possible in addition, the Fluid Bed can be divided interaction and compartments a line this payer it is possible to dry and cool (evaporative) within a single installation, which saves a lot of space.

Compared to a rotary dryer, the Fluid Bed system has a very short start-up and stopping time. Odnepared to a rotary dryer, the Fluid Bed system has a very short start-up and stopping time. Other advantages are substantially lowies entergy consermation toy drying and oboling with to any machine, and/allog service life and product feed rates.

TYPICAL APPLICATIONS			
Aggregates TYPECALE ARRESCATIONS Calcium Carbonate			
Aggmenigates	Chasta Rulanace Slag	CatpiernSCargbonate	
EarlumateMetals	Ghiposauloday	🔲 Koop Stag	
Kaolous Metals	Gypessione	Manb&a∧	
Maplinerrous Metals	Rinok stante	Standle Sand	
Non-Ferrous Metals	Rock Salt	Sand	

FOOD, DAIRY AND NUTRACEUTICALS

There is not a Ventilex product that is not being utilized every day throughout the world in the Food, Dairy and Nutraceutical markets.



Ventilex Fluid Bed Dryer/Cooler for Cereal

Specific Characteristics/Advantages

Naturally, hygiene has top-priority in the food industry. The Ventilex 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 CIP (Clean-In-Place) system make the installation easy to disassemble and to clean with minimal production interruptions. 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 control system.

TYPICAL APPLICATIONS		
Beta Carotene	Bread Crumbs	Calcium Gluconate
Cereal	Cheese	Cocoa Beans
Coffee	Confections	Crumb
Dextrose	GDL	Gelatin
Grains	Herbs	KGA
Lactitol, Sorbitol, Xylitol	Lactose	Licorice
Lycopene	Meat	Nuts
Potato Flakes	Powdered Milk	PUFA
Rice	Salt	Sausage Farce (rusk)
Seeds	Soya	Spices
Sugar	Tea	Tobacco
Tomato Pulp	Vitamin A	Vitamin C

BIOMASS, Animal Feed, and Inorganic waste

Today more than ever, recycling plays an important role in the sustainability and preservation of the precious world in which we live: It is possible by means of Fluid Bed Processing to upgrade waste products and make them suitable for re-use:



Imtekn Ventilex Plund Bed Bryer BioBioSties

Specific Characteristics/Advantages

The recycling industry often has to deal with products where the particle size varies greatly and the humidity is high. The intechniventiles Fluid Beet asseres and products and with minimal energy consumption.

Our unique drive allows us to design Fluid Beds large enough to meet the high capacity needs typical of this industry. By making use of product recirculation and mixing, we are able to process slurry-like products; and of course; midden Ventilex Fluid Bed high allations are resistant to corresion. Another important requirement of the intelleventies system is one suppression and significant termal exhaust gas combustion (thermal exidation).

TYPICAL APPLICATIONS		
Blood Meal	Bone Meal	Citrus Peel
Compost	Domestic Waste	Fish Feed
Fish Meal	Manure	Paper Waste
Potato Residue	Return Brood	Slaughter Waste
Sludge	Vegetable Pulp	Wood

CHEMICALS

Processing chemicals, while still protecting the environment can sometimes be challenging. Ventilex offer turnkey solutions with flue gas/discharge gas configurations designed with environmental protection in mind.



Ventilex Fluid Bed Dryer/Cooler for Aramide

Specific Characteristics/Advantages

Many industrial chemicals have extremely corrosive properties and can aggressively attack the surfaces of processing equipment, particularly when operating at high temperatures. Ventilex utilizes materials such as stainless steel, duplex & super-duplex stainless steel, titanium, and hastelloy; among others to assure long equipment service life in harsh environments and extreme operating conditions.

TYPICAL APPLICATIONS			
Ammonium Sulphate	Aramide	Butyl Rubber	
Calcium Chloride	Carboxy Methyl Cellulose	Chromic Acid	
Detergent Powder	Fertilizer	Flame Retardant	
Herbicides	Hexamine	Penta Eritritol	
Pesticides	Plastic Granulate	Polymers	
Potassium Chloride	Potassium Sulphate	Rubber Pellets	
Salts	Silica Gel	Sodium Sulphate	
Twaron (Kevlar) Pulp	Vanadium Oxide	Zn Pb Granulate	

TESTING & PILOT SEALE EAPABILITIES

We have found that it is best to test a sample of most clients' products to determine its characteristics and its drying curve. We offer our clients an initial feasibility testing service FREE SI CHARGE IN SUF IBB!

We are able to simulate processes with varying parameters in our lab to determine the optimal we are able to simulate processes with varying parameters in our lab to determine the optimal specifications for product processing. We know that each product is different and we understand that the size of a product, as well as changes in density during processing and drying, affect the optimization of the process.

Our lab testing "scales up" perfectly. The test is a precise model of the conditions experienced of the conditions experienced by your product in a full size machine.

To thoroughly evaluate your product prior to final equipment sizing and selection, we offer the following alternatives:

Lab Testing at Imtech Ventilex USA Inc. (Middletown, Ohio) Lab Lastingsaingnae de vereiter els de Adnicit (dited cevory on un) io)



Survey and the second s

Imtech Ventilex USA, Inc. Test Eacility Imterenties A, SACIncest esterationity



Imtech Ventilex BV Test Facility Imtecenview By Bestesichary

Lab Testing at Imtech Ventilex BV (Heerde, Netherlands) Lab Testingsamgnaeore vielex ev Riderice; (Netherlands)

Sometimes, more extensive testing is required sometimes, more extensive testing is required at pre-production volumes to refine the clients process: in these cases, it is possible to conduct process: in these cases, it is possible to conduct process; in these cases, it is possible to conduct pre-production, process development and refinement at the inflect Ventilex Plant plant in the venter and the inflect Ventilex Plant plant in the venter and instructions, we can process pre-production volumes, typically up to one ton per hour. After processing, this material may be per nour. After processing, the use in subsequent process development steps.



Lab System Rental for In-House Testing



In some cases, the drying process is a step within current plant operations and the conditions of the product can only be duplicated within the current plant operation. In these cases, we can come to you. We can provide a rental lab unit for process development on a weekly basis. We can also supply a qualified test engineer on a fixed daily cost to oversee the process.

Ventilex

Pilot Plant Pre-Production Volumes at Your Facility

In some case, clients need to be able to produce pre-production volumes at their plant location for startups or in conjunction with perfection of upstream and/or downstream processes. In these cases, Ventilex USA can supply a 10.8 ft² (1.0 m²) rental dryer plus associated technical assistance from our application/process engineers. This provides a cost effective alternative to reduce risk before production scale equipment is specified and ordered.

Our equipment can be powered by steam, natural gas, or propane. We provide fans and duct work, as well as the controls. All you need is electrical power with steam or gas. Throughput rates are based on product type, but nominal throughput typically ranges from 550 PPH (250 kg/hr.) to 1,100 PPH (500 kg/hr.). If you would like to learn more about testing or pilot options, contact us to discuss availability and cost.

SPARE PARTS

At Vertech, Vertilexe webstever aparthis Weathing matter tor aby machine matter where stever parts of the second o

SERVICE

At tratege X entilex due tanderstand the inspectance of uptime in We will make every effect to respond to your service needs as iquickly as pressible.

One way we minimize our maintenance response time is via **Remete Diagnestics**. The Intents Ventilex constrains ten is the heart of the paulament. As vestage intrastatute intents is the tesseles and be tesselved, viatible controls. Remote Diagnestics allow us to evaluate, monitor, and control your machine remotely via the internet. Please note: The dedicated moder remains disconnected at all times until required for maintenance.

Preventive maintenance is essectial to assue long length property lifent interval set of the sector of the set of the sector of

To obtain parts, schedule service, or to inquire about a service contract, please contact:

- USA: Vetecto Xestilex USA, Inc. 4640 Emerald Way Middletewn, OH 45044 Phone: +001 513 217 5830 Fax: +001 513 217 5831 Service: Ventilex@Ventilex.net
- Netherlands: Vetach.Ventilex BV P: O: Bex 150 NL=0100 AD Heerde

The Netherlands Phone: +31 85 303 2150 Fax: +31 85 303 1592 Service@ventilex.com

PRODUCT LIST			
Aggregates	Chocolate Granules	Gelatin	
Almonds	Chromic Acid	Gelatin Capsules (Hard and Soft)	
Aluminium Oxide	Chromite	Glass Fiber	
Ammonium Chloride	Citric Acid	Glass Meal	
Ammonium Sulphate	Clay Pellets	Grains	
Anhydrous Caffeine	Cocoa Beans	Granite	
Animal Feed (granular)	Coconut	Granular Glaze	
Animal Feed (pellets)	Coffee	Gypsum	
API (Active Pharmaceutical Ingredient)	Colored Sand	Haisol (NPK)	
Aramid Polymer	Compacted Beef Plasma	Herbal Mix	
Aramid Pulp	Compost	Herbicide	
Aramide	Copper Powder	Herbs	
Asphalt	Copper Sulfate	Hexamine	
Barium Titanyl Oxylate	Corn Grit	Hydrohalite	
Beer	Croutons	Hydroquinone	
Berry Waste	Chalk (crushed)	Hydroxyl Ammonium Sulphate	
Beta Carotene	DDGS (Distillers Dried Grains w/ Solubles)	lon Exchange Resin	
Bioplastics	Detergent Powder	Iron Oxide Pigments	
Black Pepper	Dextrose	Iron Sulphate	
Blast Furnace Lime	Digestate	Iron Sulphate Heptahydrate	
Blood Meal	Dolomite	Kalium Sulphate	
Bread Crumb	Domestic Waste	Kaolin Clay	
Bromine	DSMA Dihydrate (herbicide)	Kevlar	
Butyl Rubber	Effervescent Tablets	KGA	
Cake Mix	Egg Shells	Lactitol	
Calcium Carbonate	EPS Beads	Lactose	
Calcium Gluconate	Feldspar	LAS	
Calcium Hypophosphate	Fertilizer (encapsulated)	Lemon Zest	
Calumite	Fertilizer (NPK)	Lexan (Polycarbonate)	
Candies and Confections	Fiberglas Pellets	Licorice (extruded)	
Caraway seed	Fish Feed	Lime (granulated)	
Carboxyl Methyl Cellulose	Fish Meal	Limestone	
Casings Collagen	Flame Retardent	Lithium Chloride	
Catalyst	Flue Gasses	Lycopene Beads	
Ceramic Granules	Formaldehyde (solid)	Macadamia Kernel	
Cereal	Formic Acid	Magnesium Sulphate	
Charcoal	Fruits	Magnesium Sulphate Heptahydrate	
Cheese	Fungicides (granulated)	Maltodextrin	
Chicken Manure	Garlic	Manure	
China Clay	GDL (Glucone Delta Lactone)	Marble Sand	

PRODUCT LIST (cont.)			
Meat	Propylene (fiber)	Sodium Carbonate	
Medicine	Pumice	Sodium Chloride	
Metal Salts	PVC	Sodium Gluconate	
Milk (powdered)	PVDC	Sodium Lauryl Sulphate	
Milk substitute	Quartz Sand	Sodium Pyrosulfite	
Mono Sodium Glutamate	Rape Seed	Sodium sulphate	
Mushrooms	Recycled Plastics	Sorbitol	
Nuts	Resin Coated Sand	Soy Nuts	
Onions	Return Brood	Soy Splits	
Orange Zest	Rice	Soybeans	
Organic Fungicide (granular)	Rice (un-puffed pellets)	Spices	
Organic Fungicide (pelletized)	Rice Seed Treatment	Starch (granulated)	
Panning (M&M chocolate)	Roots	Steel Coil Cooling	
Paper Sludge	Rubber	Steel Grit	
Paper Waste	Rubber (pelletized)	Stone Powder	
Parboiled Rice	Rubber (synthetic)	Straw	
Peanuts	Rusk	Sugar	
Pentaerythritol	Salt	Sugar (granular flavoured)	
Pepper (ground)	Salt (mineral)	Sugar (powdered)	
Pepper (whole)	Sand	Sulfanilic Acid	
Perlite	Sand (chromite)	Super Absorbant	
Pesticides	Sand (coated)	Synthetic Fiber	
Pet Food	Sand (colored)	Tagatose	
Pharmaceuticals	Sand and gravel (mixture)	Talc	
Pharmaceuticals (room conditioning)	Sand Slag	Talc (granular)	
Photo Paper	Sausage Drying	Talc (pelletized)	
Pigment (organic)	Sea Salt	ТВВА	
РММА	Sea Weed Extract	Теа	
Poly Unsaturated Fatty Acids	Seed Treatment	Tobacco	
Polyester (granules)	Seeds	Tomato Pulp	
Polymer Beads	Sewer Cleansing Silt	Urea	
Poppy Seed	Silica Gel	Vanadium Oxide	
Potash	Silica Sand	Vegetables	
Potassium Chloride	Slag (blast furnace)	Vitamin A	
Potassium Nitrate	Slag (copper)	Vitamin C	
Potassium Sulphate	Slag (iron)	Wheat	
Potato (fiber)	Slag (steel)	Wheat (germ)	
Potato (flakes)	Slate Stone	Wood	
Potato (residue)	Slaughter Waste	Xylitol	
Process Gas	Sodium Bromide	Zinc/Lead Concentrate	



APPLICATIONS

Following are some of the processes in which Ventilex equipment has been utilized:

- Agglomerating
- Baking
- Blanching
- Calcination
- Coating
- Conditioning
- Cooking
- Cooling (Evaporative)
- Deactivating Enzymes
- De-dusting
- Drying with Inert Gas
- Fermenting
- Pasteurizing
- Reacting
- Roasting
- Steam Stripping
- Steam Sterilizing

Ventilex Head Office

Europaweg 8 NL-8181 BH Heerde The Netherlands T: +31 (0)85 303 21 00 F: +31 (0)85 303 15 92 E: info@ventilex.com www.ventilex.com

Ventilex

4640 Emerald Way Middletown, Ohio 45044 USA

T: +1 (513) 217 58 30 F: +1 (513) 217 58 31 E: info@ventilex.com www.ventilex.com

SYS-VENT-FLUID-1

Drying and Thermal Treatment Solutions

