



COMSPAIN

COMPANIA DE MANUTENCIONES ESPECIALES ESPAÑA, S.A.



Industrial Equipments

Fluidization Engineering

FLUIDIZATION ENGINEERING

The phenomenon of fluidization

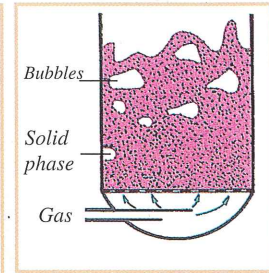
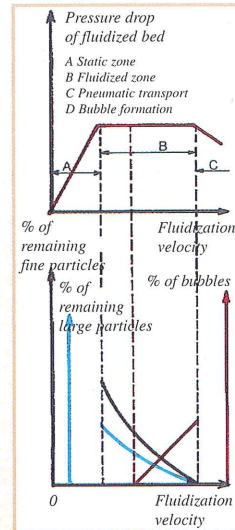
Place a quantity of fine solid particles in a glass column, the bottom of which is made of a porous or perforated plate. Pass a gas through the porous or perforated plate, and let it rise slowly upward through the bed of solid particles. You will see that the gas percolates through the particles, separating them from each other. As the gas flow increases, the separation gets larger, and the bed expands, then bubbles appear. This is the state called fluidization: solid particles dispersed in a gas to form a fluid mass which behaves like a liquid.

Note: if the gas flow is increased beyond fluidization, the solids then reach a condition in which they are pneumatically transported in a lean phase.

Therefore: fluidization is a state of dynamic balance of a solid in a fluid

A fluid bed is an intermediate between two limiting states: the state in which solid particles are at rest... and agitated state of lean phase pneumatic transport. The fluidized bed occurs in two phases: one, a smoothly fluidized bed in which the gas is uniformly distributed between the solid particles which little or no bubbling, two, an agitated bubbling fluid bed. In the agitated bubbling bed, the solid particles are in vigorous agitation and have a very high capacity for heat transfer. Ideal fluidization is obtained when agitation of the solids and size of the bubbles are balanced. Therefore, it is very important to give careful consideration to the design of the gas flow, the size of the processor for the job to be done, the gas diffusion plate, the bed height and the method of heating and cooling.

In most cases, it is important to experimentally check the fluidization characteristics of a material before designing the system. A well-equipped laboratory for this determination is essential.

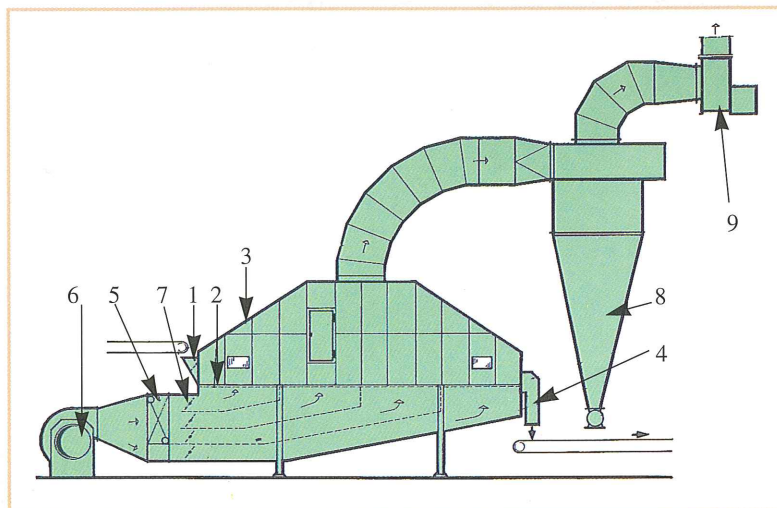


COMSPAIN'S capability in fluidization

All processes and equipment proposed by COMSPAIN are described in this document. The process applications are very numerous, for example: drying, cooling, calcining, desolventizing, reactions sterilization, granulating, pyrolysis, incinerating, heat treatment, mixing, and others.

The fluid bed processor is a closed container in which a distributor plate is secured some distance from the bottom. The volume beneath the distributor plate is the fluidizing gas plenum chamber, and above the distributor plate is the fluid bed processing region. Distributor plates may be perforated sheet, porous metal, our proprietary tuyere type or others, depending upon the requirements of a given application. The plenum chamber is generally subdivided into several sections to provide the optimum fluidisation velocity at each stage of processing. The temperature of the fluidising gas can be changed for each plenum section and the final sections can be cooling zones to discharge low temperature product.

The behaviour of the fluidised product is remarkably similar to a liquid. The processed product is discharged by overflowing an adjustable weir. Adjustment of this weir controls the level of product in the unit and facilitates emptying the unit when necessary. Products fines are collected by cyclones or other suitable systems and are usually remixed with product before or after the overflow discharge weir.

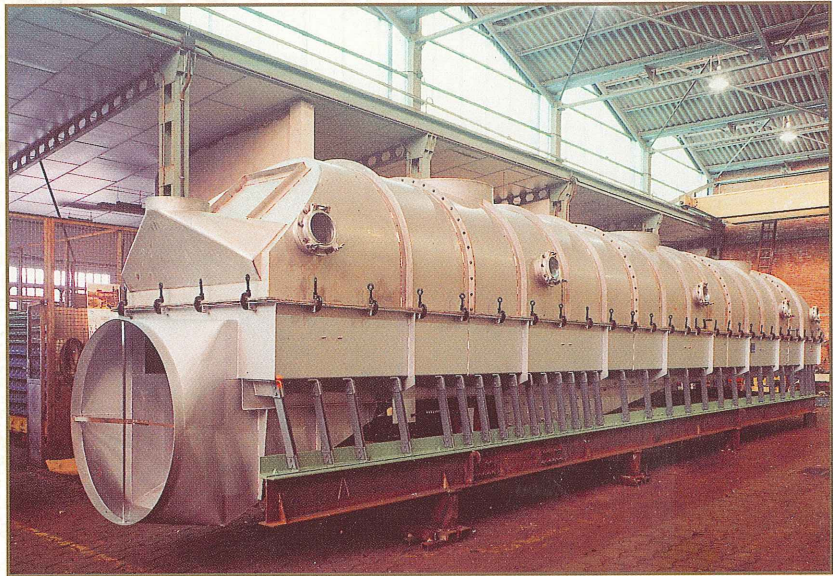


These fluid bed units are utilised primarily for drying. Fluidising air is heated by means of steam or oil in an air heater. Hot gases can be used from a direct fired heater for products which can withstand high temperatures and air quenched gases. These units are also used for cooling applications.

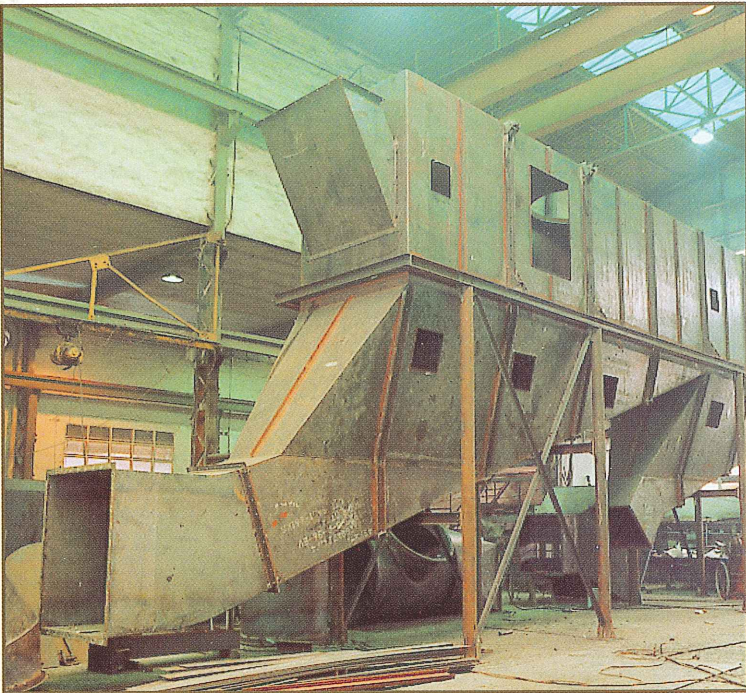
- 1.- INLET CHUTE
- 2.- DISTRIBUTOR PLATE
- 3.- HOOD
- 4.- DISCHARGE
- 5.- AIR HEATER
- 6.- BLOWER
- 7.- HOT AIR DAMPERS
- 8.- CYCLONE
- 9.- EXHAUSTER



Static Fluid bed for Chemicals Products.

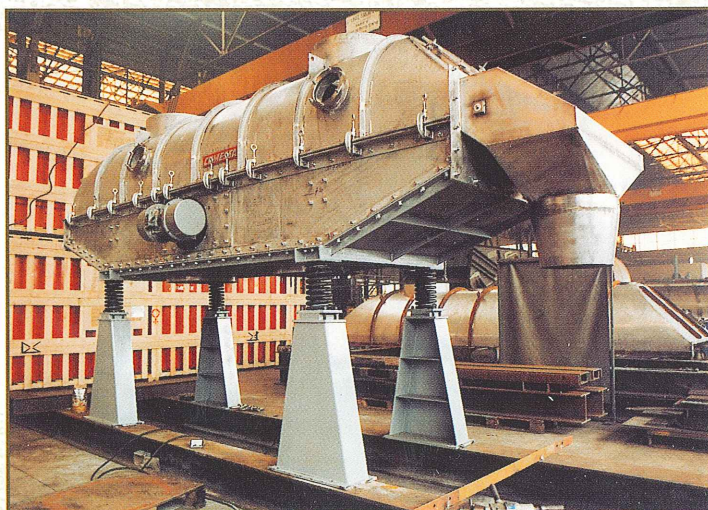


Vibrating Fluid bed supported by blades.



Static Fluid Bed Cooler-Fertilizers.

Special Fluid bed for foods or pharmacology.



Vibrating Fluid bed supported by springs.



DRYERS, CALCINERS, REACTORS, GRANULATORS...

Calculations and simulations by means of computer: drying, cooling, iteration for cooling in double step, cost, speed of fluidisation, flight of fines, time of stay, adiabatic heating in fans, perforation percentage of the heart, pressure drop, point of dew, etc...

SPECIAL TECHNOLOGIES

Product double way over all the length
Expanded shell (also in the vibrating Fluid beds)
Gas double step
Gas triple step
Double/simple step with independent recirculations
Indirect heating Fluid bed
Fluid bed over vibrating platform (high temperature)
Fluid bed with heat exchangers
Mixers or shakers in the first stage (over the fluidised product)
Electrical heating fluid bed
Double step fluid bed with heat exchanger, working with fluidized alumina
Fluid bed with diving radian tubes
Circular static Fluid bed of high capacity
Fluid bed reactors
Fluid bed calciners
Fluid bed granulators
Drying-Cooling Fluid beds
Reactor-Dryers Fluid beds
Inertia Fluid beds
Desolvanting Fluid beds

WORKING WITH DIFFERENT DISTRIBUTOR PLATES

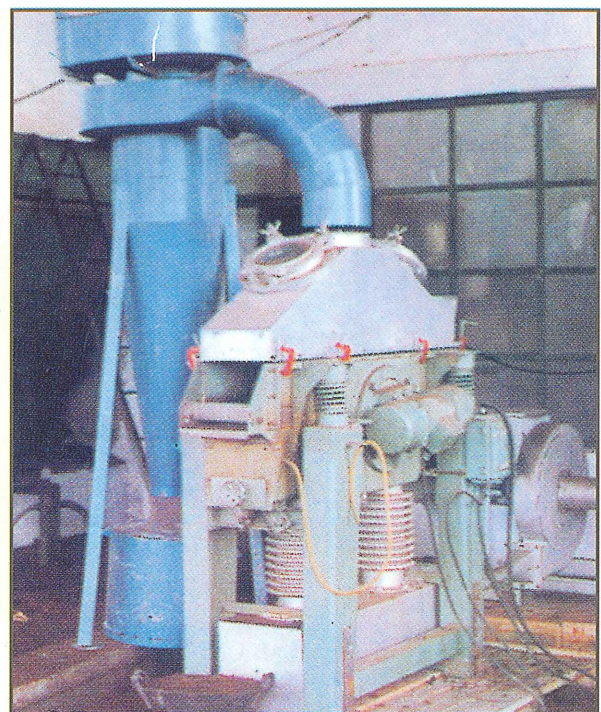
“Conidur” type (for sizes less than 500 microns of the product).
“Screws or bolts” type
Stainless steel plus nylon (size of product less than 70 microns)
Ceramic plates
Porous metal plates

VIBRATING HEADS

Exciters of our own technology,
manufactured by COMSPAIN.

LABORATORY TESTING

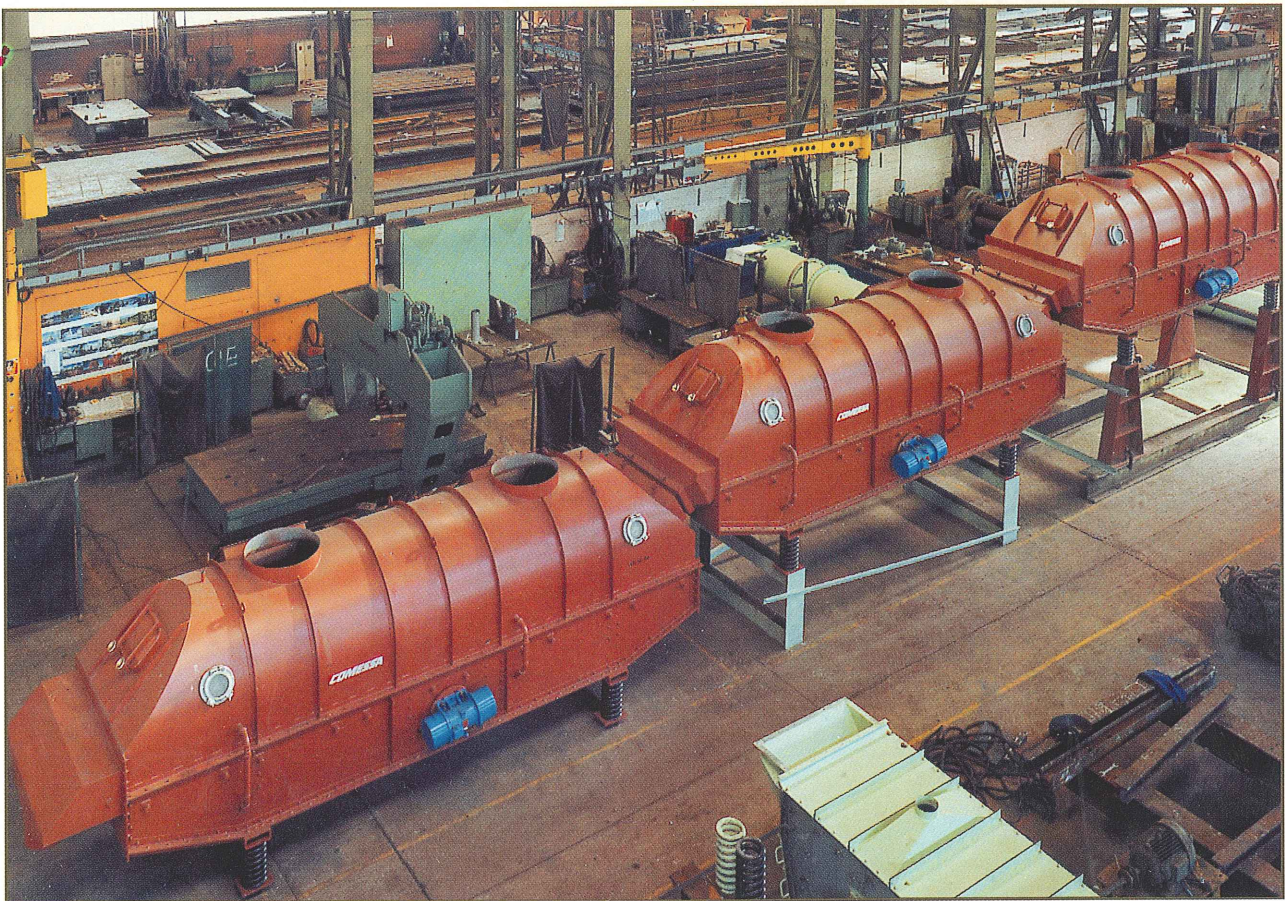
Allowing several test to semi-industrial production.



Laboratory mobile plant-COMSPAIN.

EXPERIENCES AND CAPACITIES

Maximum surface (static fluid bed):	32 m ² / 64 m ²
Maximum surface (vibrating fluid bed on springs)	12 m ²
Maximum surface (vibrating fluid bed on blades)	32 m ²
Maximum surface serially	54 m ²
Maximum temperature (vibrating fluid bed)	1100°C / 860°C
Maximum temperature (vibrating fluid bed):	400°C
Maximum production (by cooling)	100.000 Kg/h
	200.000 Kg/h (2 lines)
Maximum production (by drying)	45.000 Kg/h



3 cooling Fluid beds-surface 54 m²



Cold air conditioning-open circuit by ammoniac evaporation.

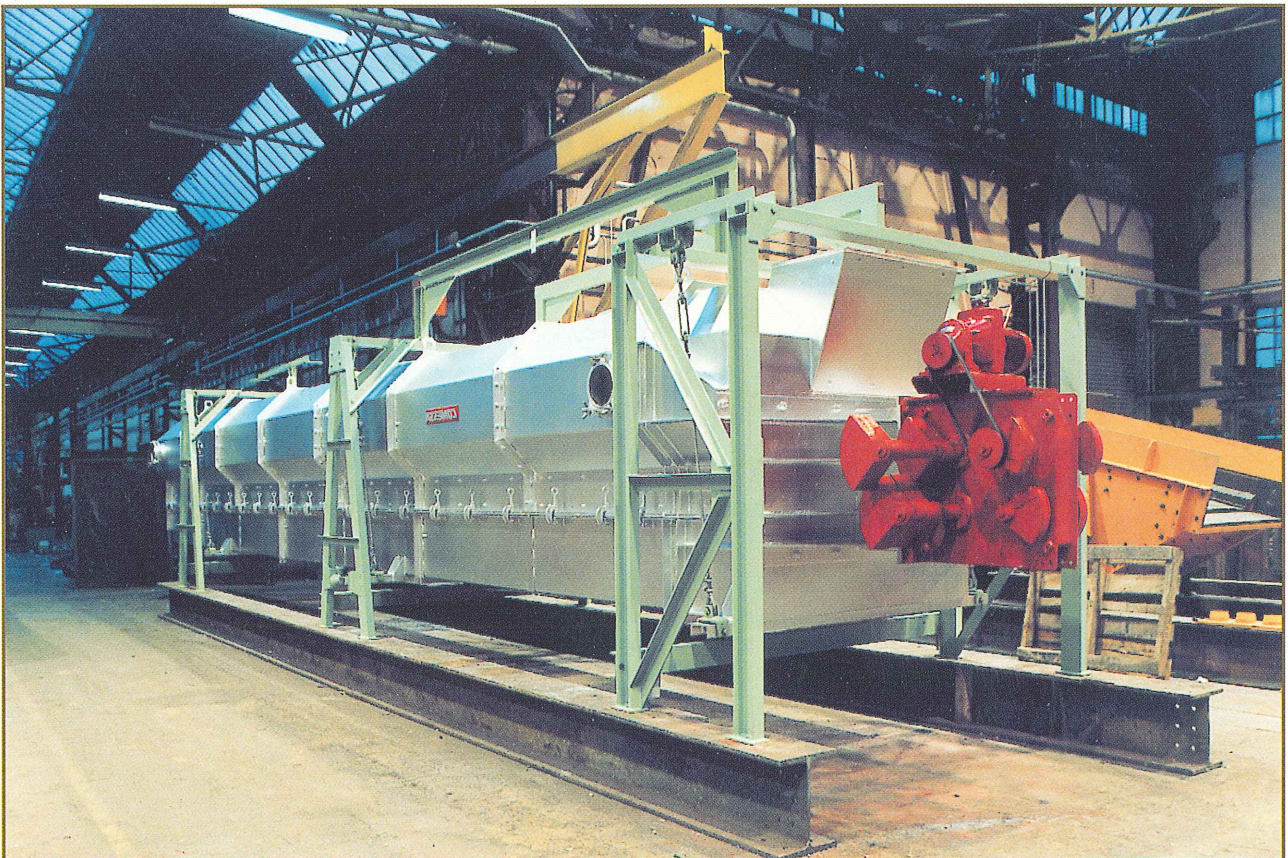
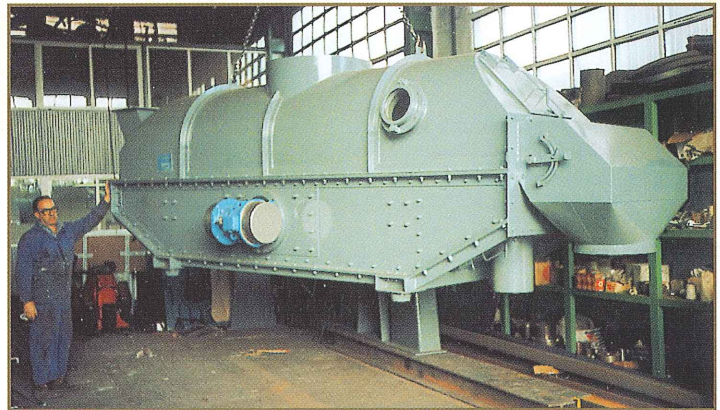
DRYING AND COOLING

The static or vibrating fluid bed is an equipment coming strength in the drying and cooling industrial processes.

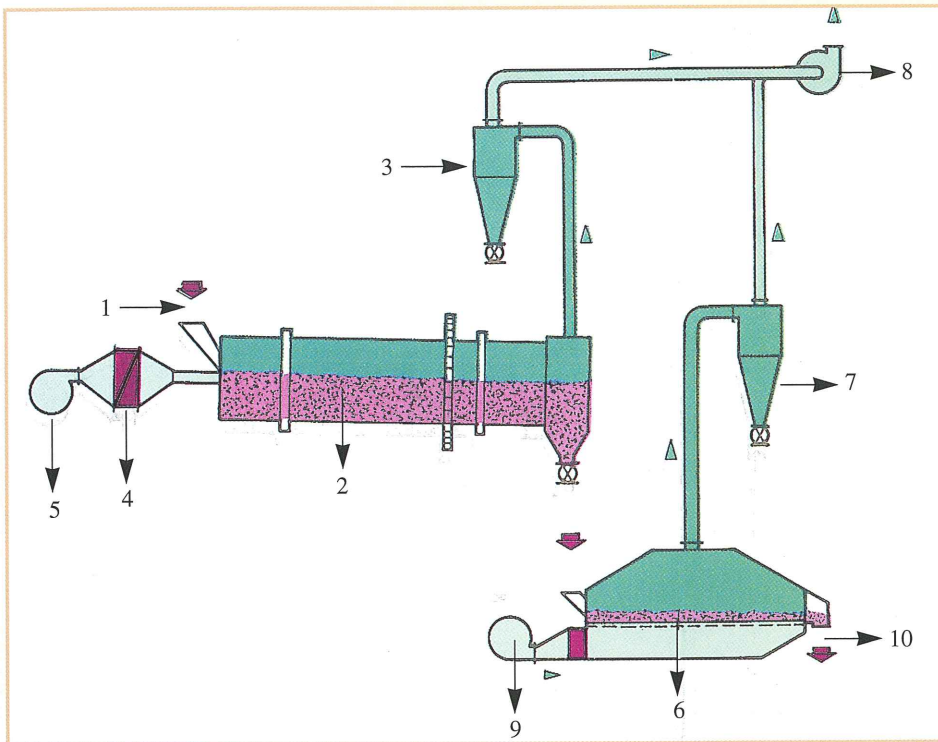
Its characteristics and advantages are:

- drying temperature to 400 °C.
- drying and cooling possibility in the same equipment
- moistures to 30 / 50 % depending on the product
- flows to 45 tph
- fluidification surface to 32 m² in only one vibrant machine
- less energetic cost
- better installation.

Cooling Vibrating Fluid Bed.



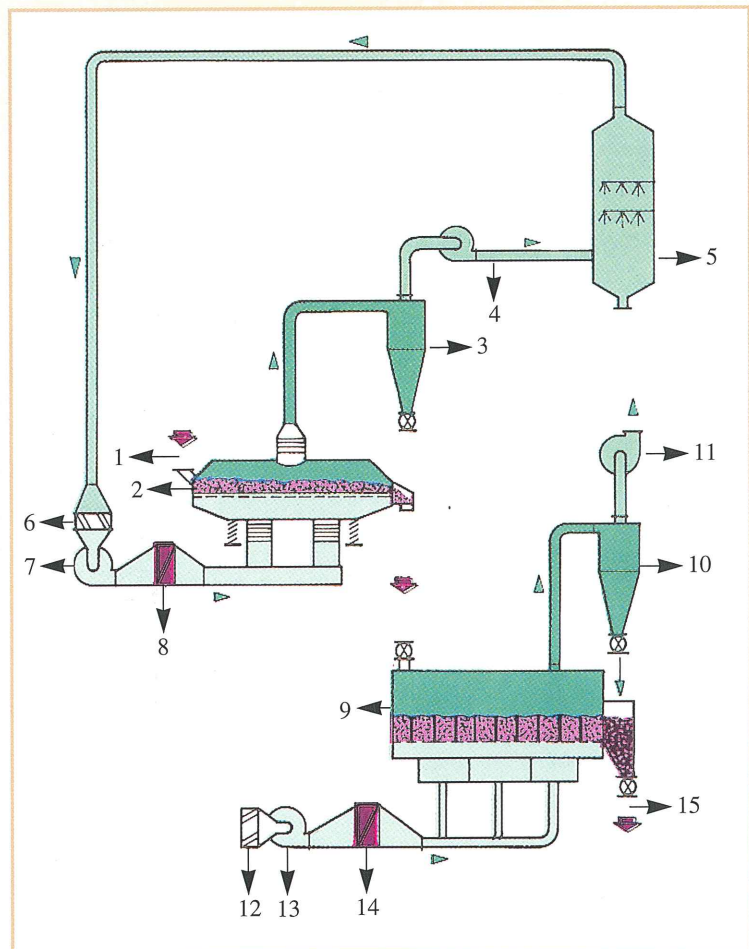
Drying Inertia Fluid bed-Sand (High temperature).



1. Inlet chute
2. Rotating dryer
3. Cyclone
4. Air heater
5. Blower
6. Fluid Bed
7. Cyclone
8. Exhauster
9. Blower
10. Discharge

The COMSPAIN fluid bed dryer may be used alone or it may be placed downstream of the rotary dryer to permit final drying or cooling of the processed material.

In some cases when fluidisation of the product is doubtful, predrying is feasible in a COMSPAIN vibrating fluid bed. Final drying or cooling is carried out in a standard fluid bed or in a vibrating fluid bed dryer.

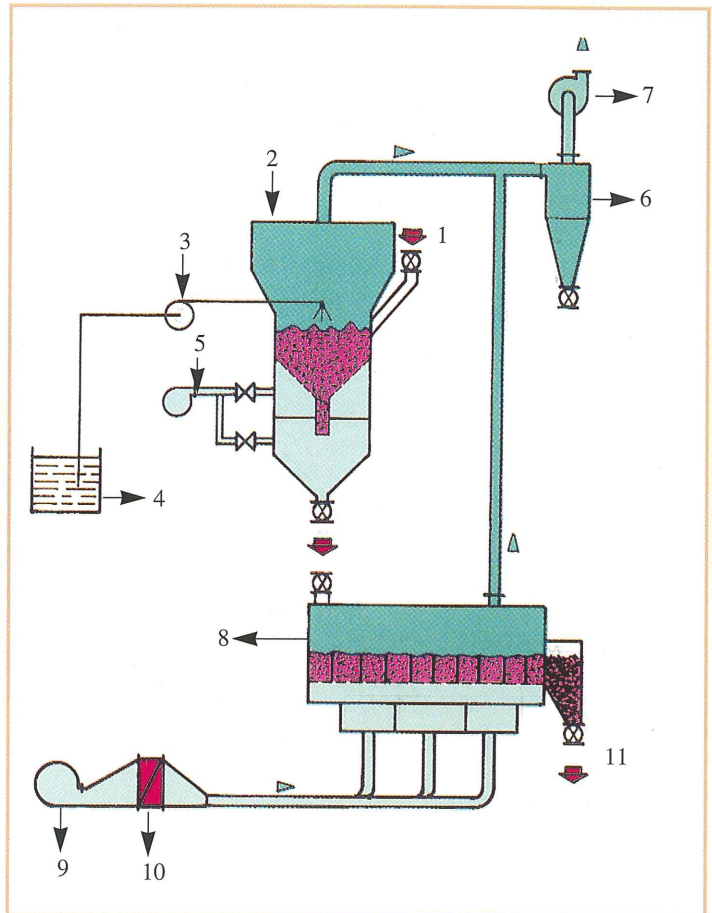


1. Inlet chute
2. Vibrating fluid bed dryer
3. Cyclone
4. Exhauster
5. Scrubber
6. Filter
7. Blower
8. Gas heater
9. Exchanger fluid bed dryer
10. Cyclone
11. Exhauster
12. Filter
13. Blower
14. Heater
15. Discharge

GRANULATING

Special COMSPAIN fluid beds permit granulation of fine powders. The operation consist of spraying solvent over the fluidised material. The constituted granules being gravimetrically selected are discharged towards a COMSPAIN exchanger fluid bed or a vibrating fluid bed.

- 1. Inlet chule
- 2. Fluidizing granulator
- 3. Pump
- 4. Tank
- 5. Blower
- 6. Cyclone
- 7. Exhauster
- 8. Exchanger fluid bed
- 9. Blower
- 10. Heater
- 11. Discharge



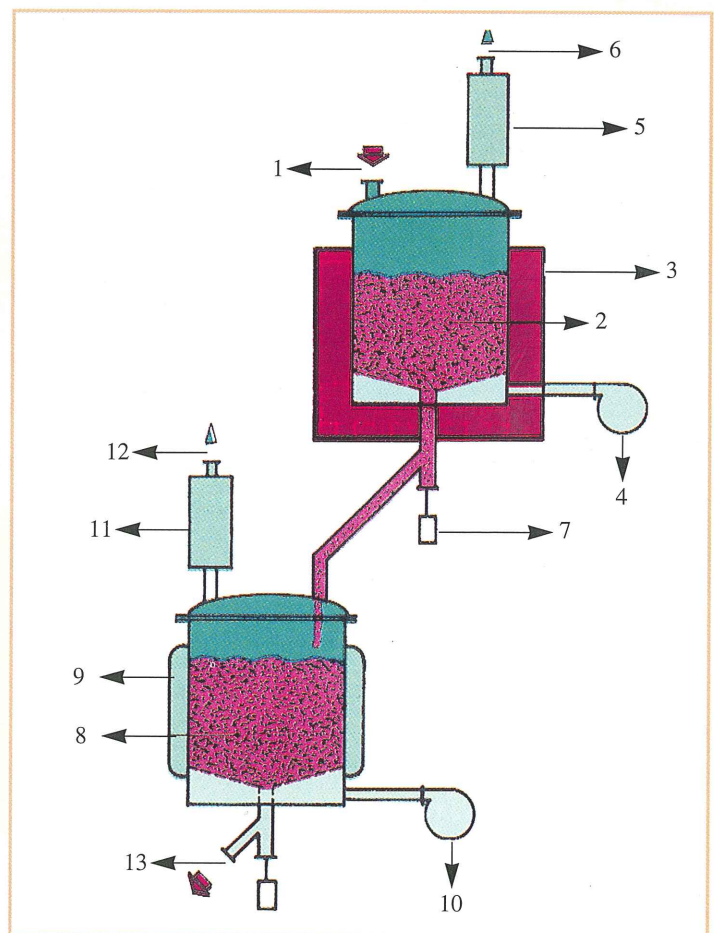
CALCINING

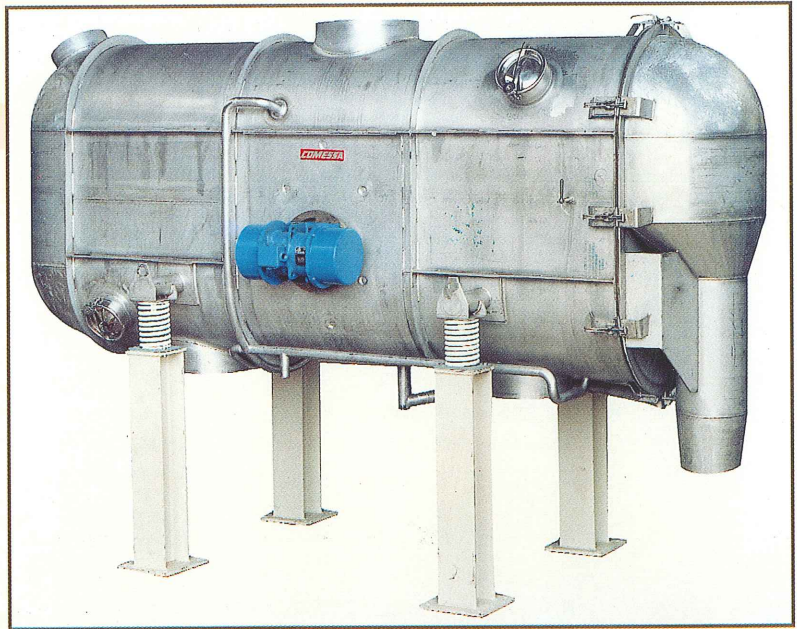
Due to the excellent heat transfer characteristic and the good mixing of particles the COMSPAIN fluid beds permit very uniform treatment, this factor being essential for good calcining.

Small particle systems (30 microns) can be processed in the calciner for a controlled cycle operation of up to 24 hours in some cases . Power is controlled to meet the temperature-time profile requirements of this process.

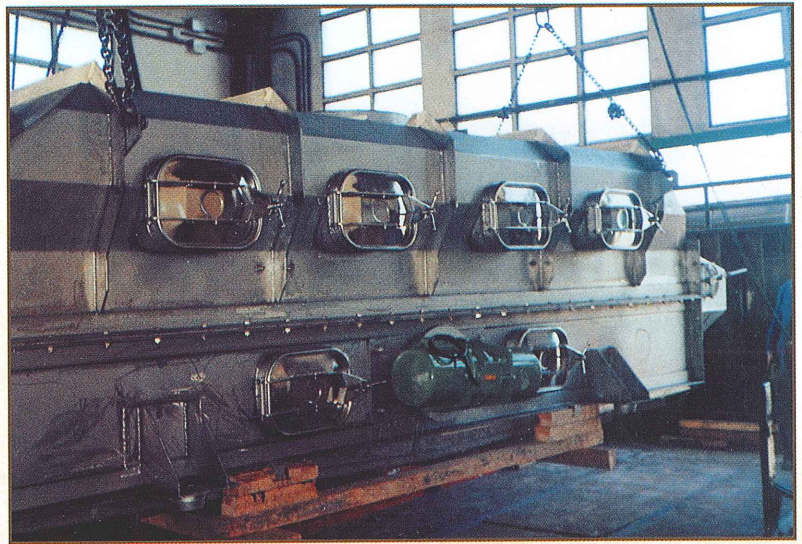
Then product is discharged into the fluidised bed cooler which is similar to the fluid bed calciner, except that it is equipped with a cooling jacket. A rapid cool-down of the product may be advantageous or necessary.

- 1. Product feed
- 2. Calciner
- 3. Heating jacket
- 4. Inert gas blower
- 5. Filter
- 6. Clean atmospheric discharge
- 7. Calciner product discharge
- 8. Cooler
- 9. Cooling jacket
- 10. Inert gas blower
- 11. High temperature filter system
- 12. Clean atmospheric discharge
- 13. Cool product discharge

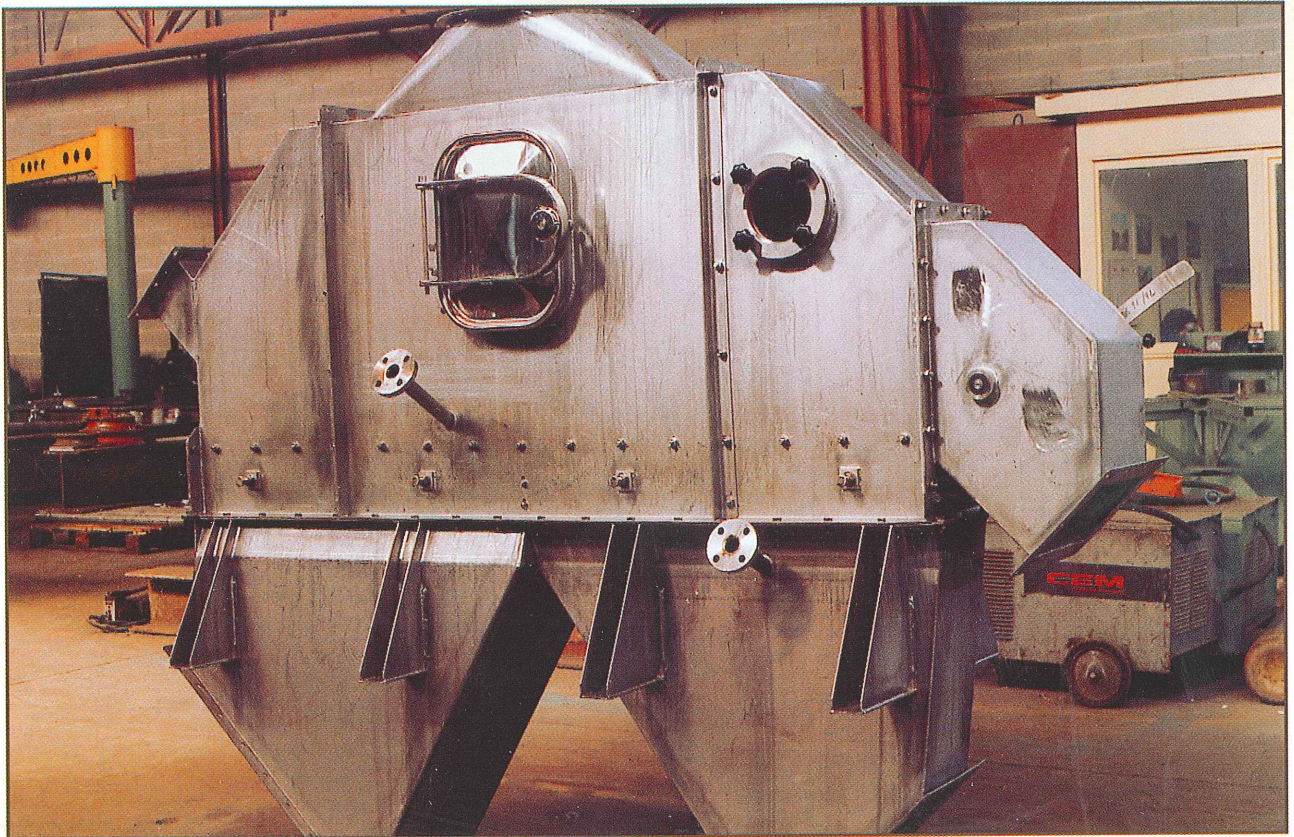




Catalytics-calcination.



Urea Granulator.



Granulation Food Products.

THE VIBRATING FLUID BED

Advantages of the vibration in a fluid bed

The principle involved is to vibrate the particles to form a mechanically fluidized bed and then pass a gas phase across the bed.

The gas flow requirements are determined by processing considerations independently of the creation of the fluidized state. The direction and force of vibration are readily changed to adapt to the needs of an extremely diversified sampling of products.

The casing of this kind of processor is vibrating

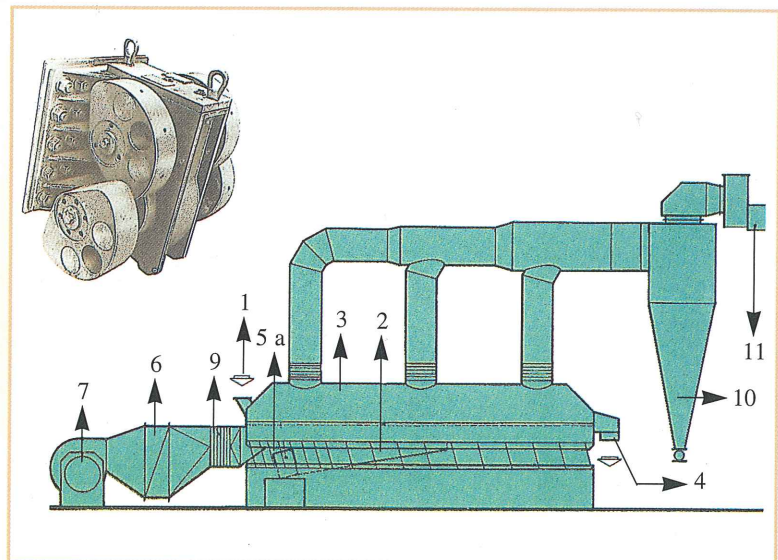
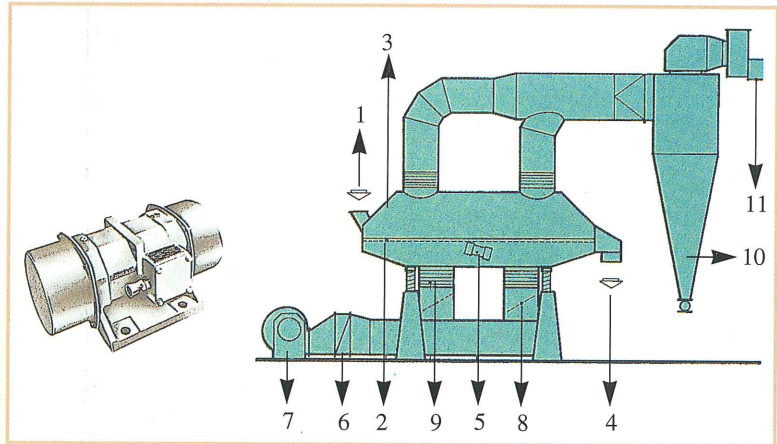
Two basic types are proposed:

- D type for small and medium units (distributor plate surface from 0,3 to 12 m²). The casing is vibrated under the action of two adjustable vibrating motors and variable static torque.
- DL type for heavy duty units (surfaces from 10 to 32 m²). The casing is supported by plate springs and is actuated by means of an exciter.

Adjustment of the vibration is performed by variation of the static torque or by adjustment of the exciter's speed.

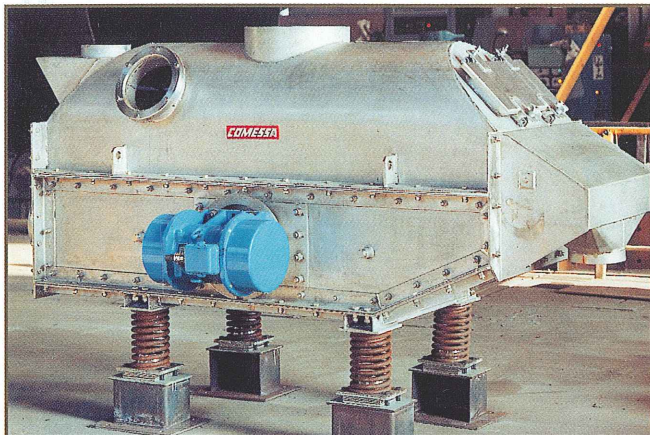
Advantages of this system

- Handling of products having high water contents at feeding or inconstant wetness.
- Breaking of conglomerate product and lumps formed during process.
- Acceptation of a wide product and lumps formed during process.
- Uniform product temperature.
- Will not break fragile crystals.
- High evaporation rate.
- Energy-saving.
- Recycling of gases (closed loop).
- Small floor space.
- Easy adjustment.
- Low maintenance.
- Multiple processing in on machine.

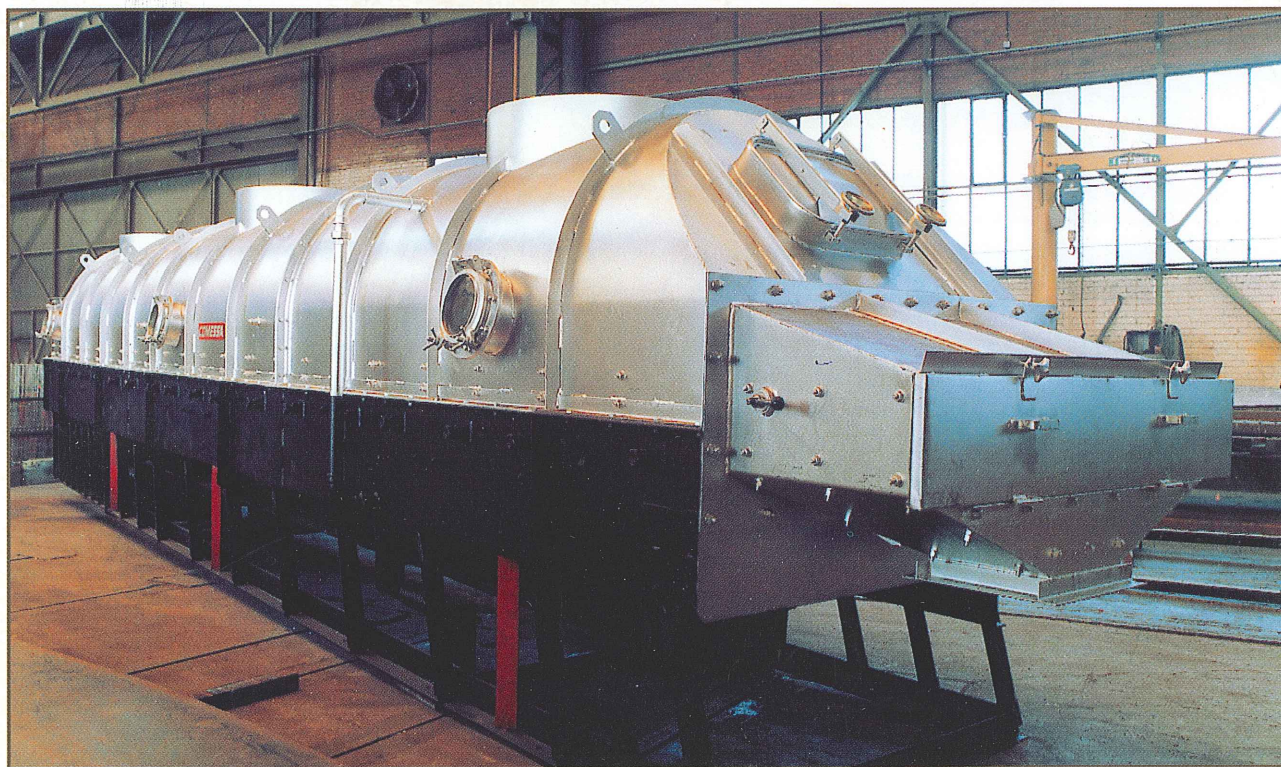
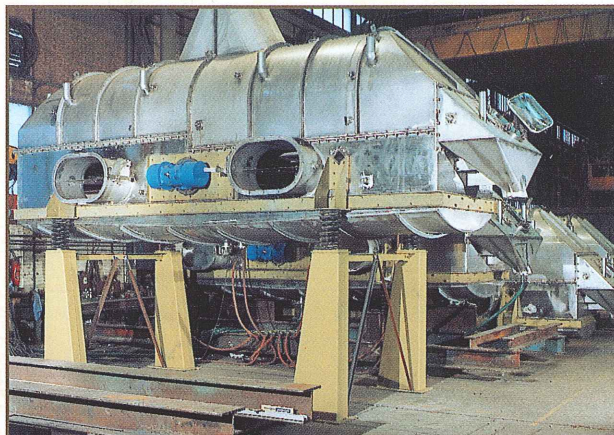


1. Inlet chute
2. Distributor plate
3. Dome
4. Discharge
5. Vibrating motor (D type VFB)
- 5a. Exciter (DL type VFB)
6. Air heater
7. Blower
8. Air dampers
9. Bellows
10. Cyclone
11. Exhauster

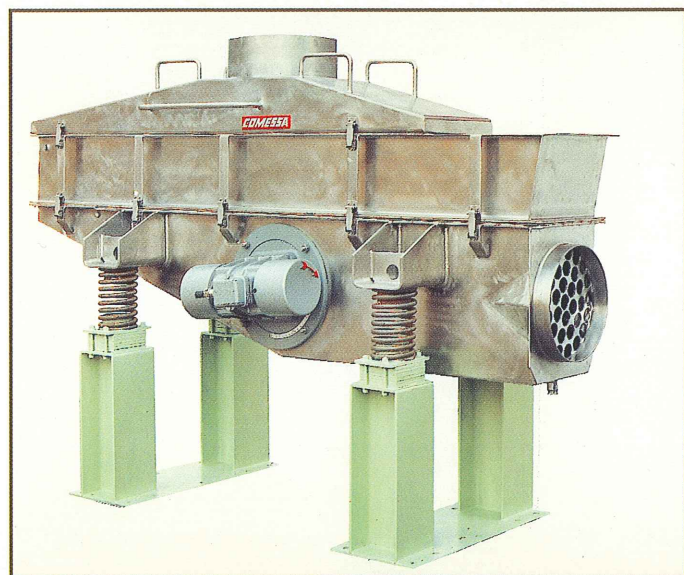
Vibrating Fluid Bed supported by springs



Vibrating Fluid Bed-Lisine



Vibrating Fluid Bed supported by plate springs-Organo-Minerals.



Vibrating Fluid Bed-boric acid

Vibrating Fluid Bed cogeneration-clays



THE STATIC FLUID BED

Description

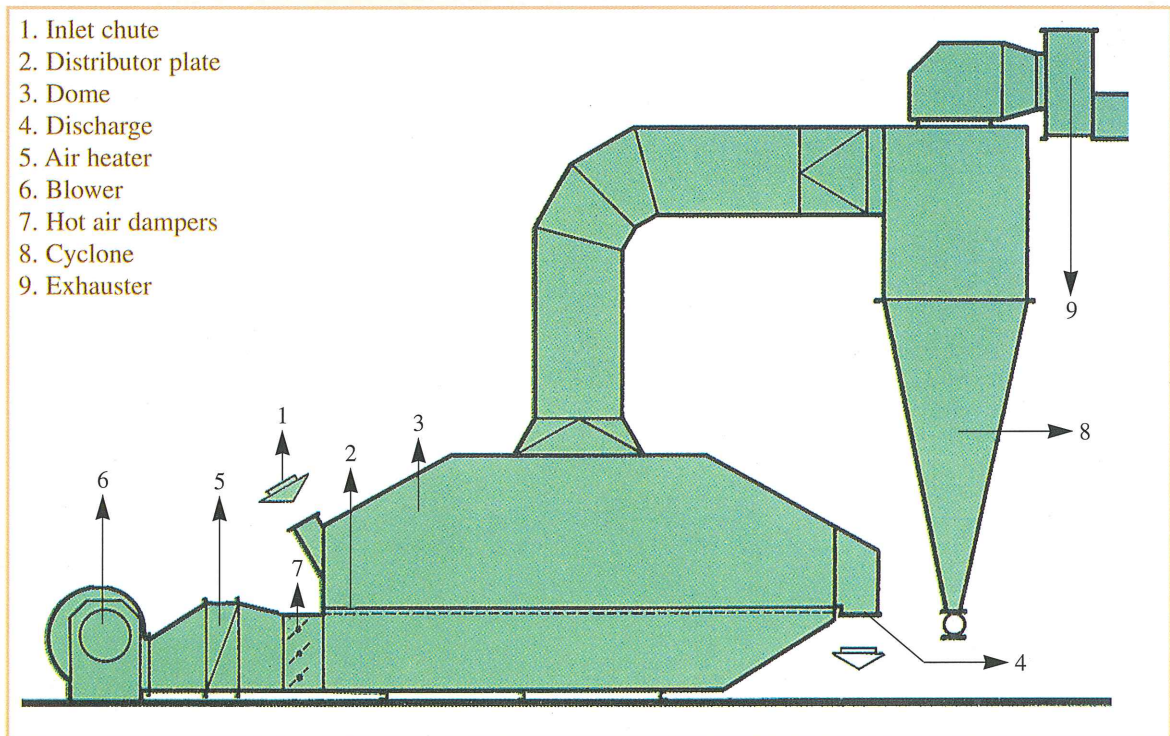
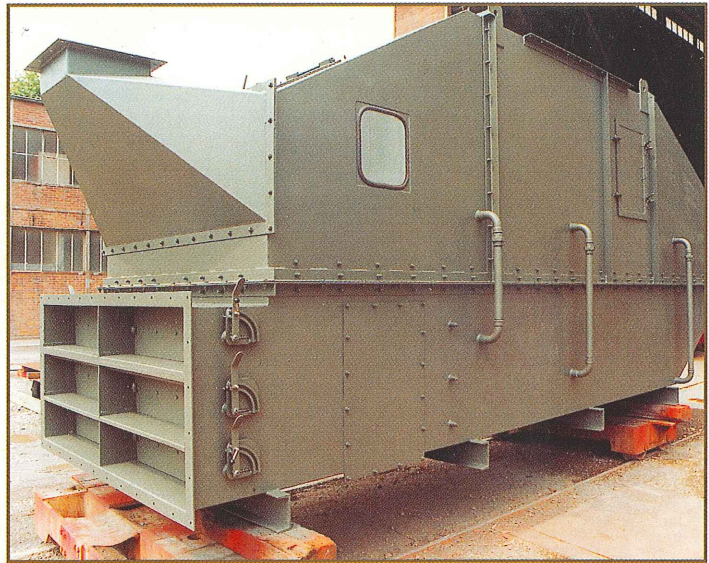
The static bed processor is a closed container in which a distributor plate is secured some distance from the bottom. The volume beneath the distributor plate is the fluidizing gas plenum chamber, and above the distributor plate is the fluid bed processing region. Distributor plates may be perforated sheet, porous metal, or proprietary tuyere type or others, depending upon the requirements of a given application.

The plenum chamber is generally subdivided into several sections to provide the optimum fluidization velocity at each stage of processing. The temperature of fluidizing gas can be changed for each plenum section and the final sections can be cooling zones to discharge low temperature product.

The behaviour of the fluidized product is remarkably similar to a liquid. The processed product is discharged by overflowing an adjustable weir. Adjustment of this weir controls the level of product in the unit and facilitates emptying the unit when necessary.

Product fines are collected by cyclones or other suitable systems and are usually remixed with product before or after the overflow discharge weir.

These fluid bed units are utilized primarily for drying. Fluidizing air is heated by means of steam or oil in an air heater. Hot gases can be used from a direct fired heater for products which can withstand high temperatures and air quenched gases. These units are also used for cooling applications.



Static Fluid Bed «cascade» for reactions-drying-cooling.



Static Fluid Bed for Ammonium Sulphate.



Static Fluid Bed for Fertilizers-Air double stage.



Static Fluid Bed for pellets.



Static Fluid Bed for salt.

HIGH TEMPERATURE STATIC FLUID BED

The technology of radiant tubes allows to obtain until 1000 Celsius degrees in the fluid bed. The radiant tubes are burners (included the system of recovery of heat) that, introduced in the mass of product, they arrive to temperatures of 1300 Celsius degrees, contributing a great amount of heat for radiation.

The gases of fluidisation are clean and do not contaminate the product, could use, many times, in close circuit.

The energetic saving is big. Not only are retrofitted the hot gases, but rather it could recover the energy by means of heat exchangers.

For example, COMSPAIN has supplied the Research Department of Auxini-National Institute of Industry - a pyrite turn-key distillation plant with a high temperature, inert atmosphere, closed circuit fluid bed. Pyrrhotite and sulphur are profitably obtained for the first time ever. The plant performs mineral treatment (milling, classification, transport, stockage...), drying (vibration fluid bed, hot gas generator, cyclones), dosing (SAS, continuous scales), furnace (static fluid beds crossed by 23 radiating tubes at 1.300 °C), exchangers, high pressure blower, etc.

The plant is operated by computer with programmable automata, including gas analysers, etc.

HIGH TEMPERATURE VIBRATING FLUID BED

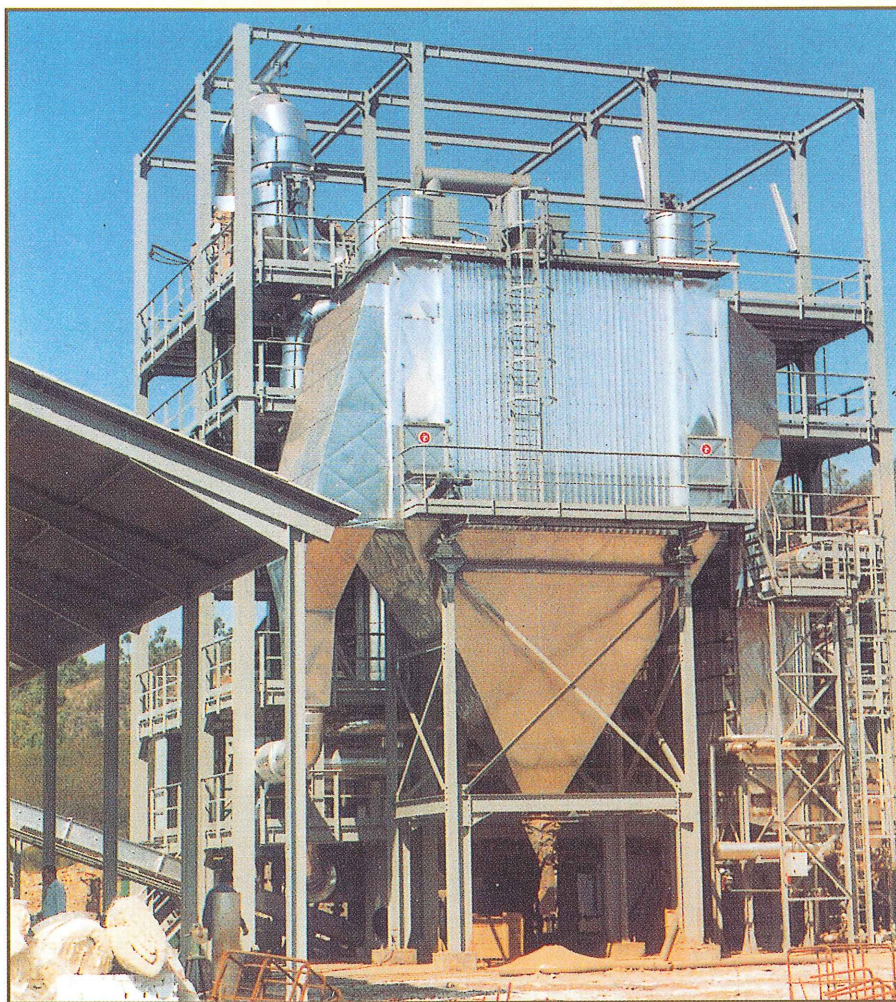
COMSPAIN is the only company of the world that has developed the technology with success of compensate the vibration in the fluid bed, with a temperature of drying from more than 400 Celsius degrees.

It is fluid bed that goes located on a vibrant platform of flexible blades. The effort is absorbed for the cold platform and the fluid bed works only like a heat exchanger of crossed flow.

Another of necessities that it has been solved with success is the idea of carrying out an effective interior heat isolation of the fluid bed, that could work, so, in extreme conditions:

- more than 400 Celsius degrees and its corresponding dilatations
- speeds of air in the plenum of up to 24 metres per second
- vibrations of ± 3 millimeter of amplitude and 750, 1000 or 15000 Hertz.

This type of fluid beds is especially appropriate in order to work with gases of cogeneration.



A pyrite distillation plant with a high temperature, inert atmosphere, closed circuit fluid bed



Drying Vibrating Fluid Bed (High temperature) for sepiolite-clays (400° C).

FLUID BED WITH EXCHANGER

Description

Typically, the depth of fluidized bed in the dryer is 600 to 1800 mm. Interior baffle plates maze segment dryer into separate drying compartments. The fluidized product advances through the unit from feed to discharge, by overflow and underflow.

Advantages of an Internal Heated Baffle Maze in Continuous Fluid Bed Drying Systems

1. Heat transfer

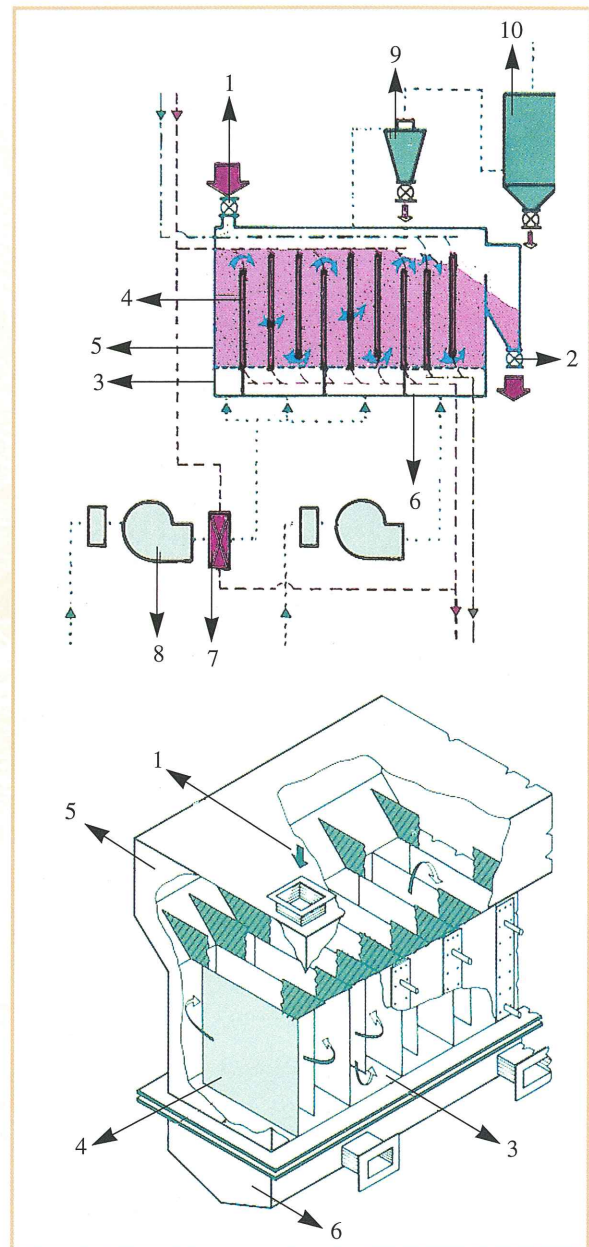
When fine particles, rather than large particles are processed, it is necessary to use a low volume of air passing up through the bed, in order to minimize the amount of product that is carried out with the air.

In our Internal Heated Baffle system, only a very small amount of air is passed up through the product bed (only enough to fluidize the bed). In many cases, up to 95% of the heat transfer required for drying and cooling is accomplished through the heated baffle walls.

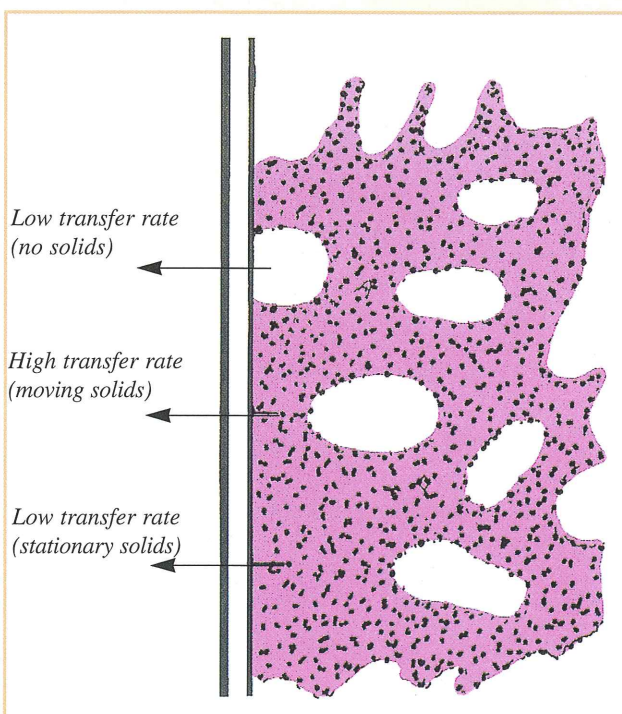
Because a fluidized bed has a very high rate of heat transmission, the transfer from the internal baffles can be made with reduced heat transfer area and smaller temperature difference.

Thus, a small Procedyme fluid bed processor can provide a very considerable capacity for drying or cooling... minimize air pollution or dust collection equipment because only a very small amount of air is used... and in general, will be more energy efficient than other types of drying or cooling equipment.

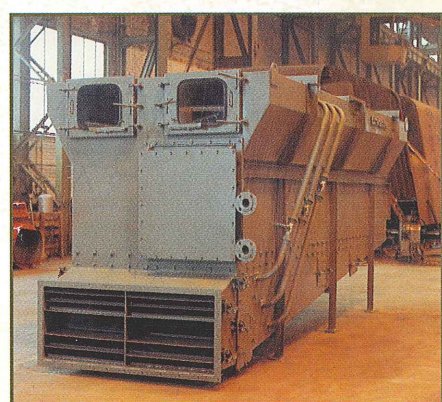
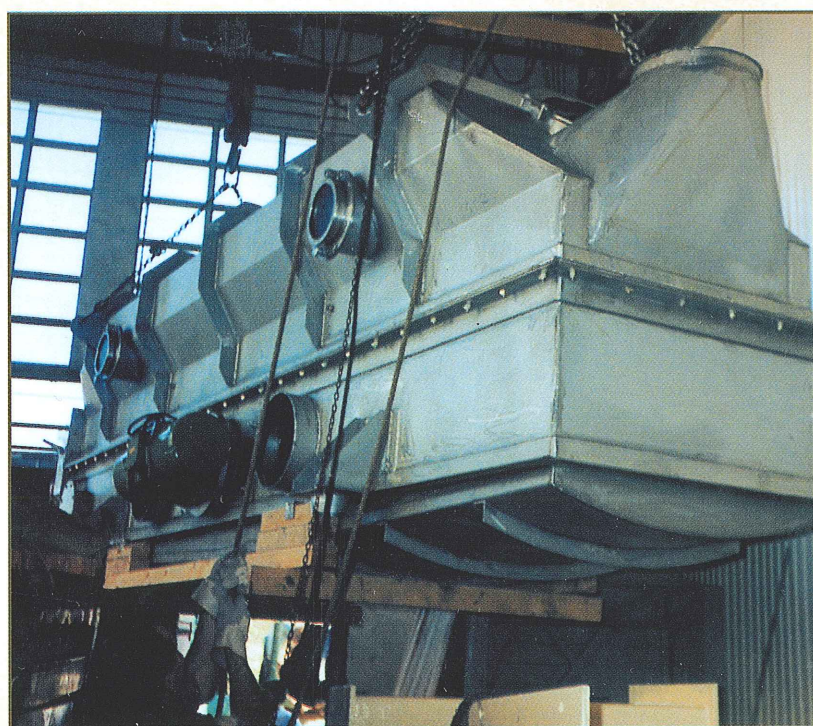
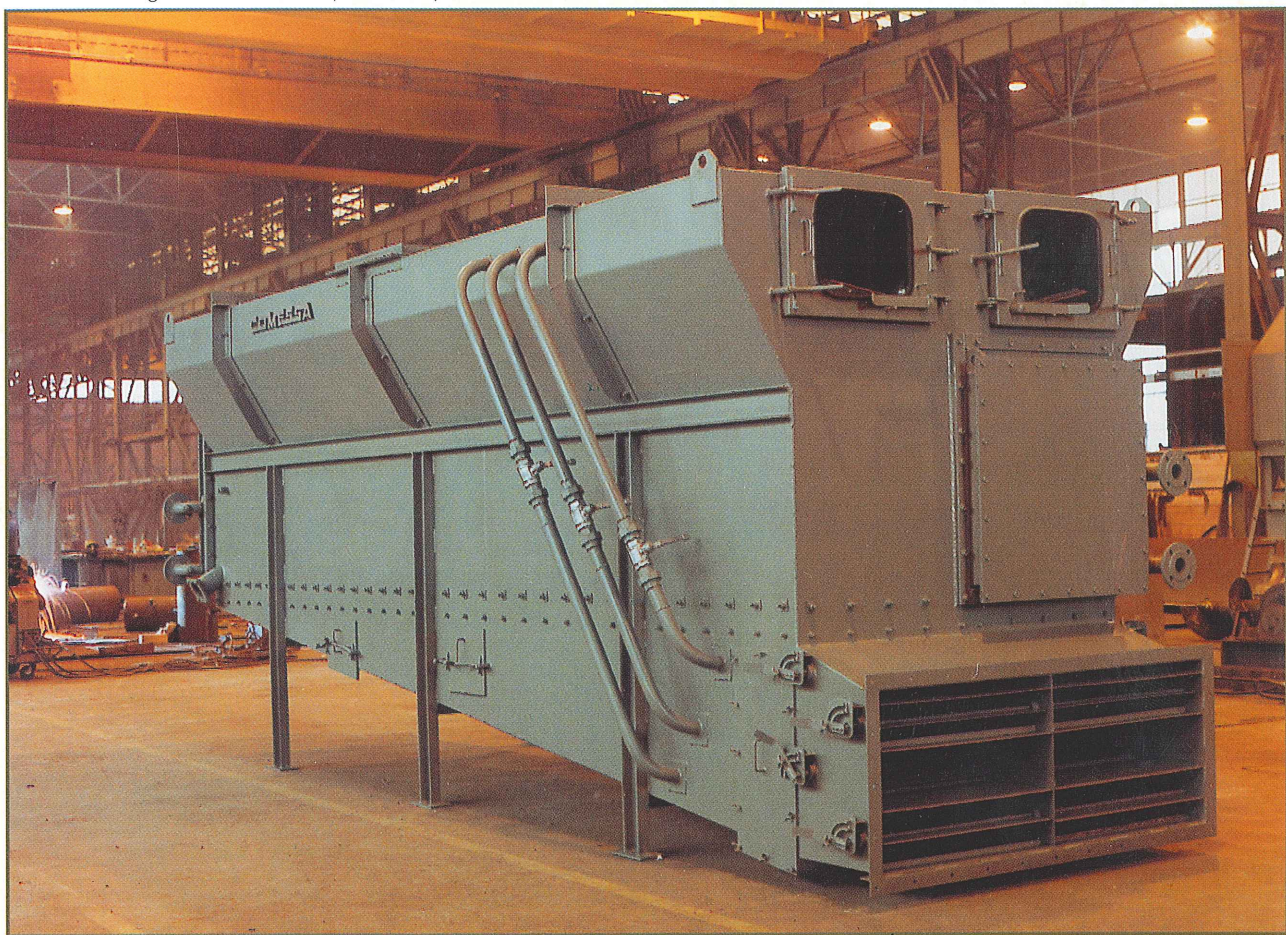
The coefficient between solid particles and the heat source can be as high as 150 to 300 Kcal/m²/H° C, depending upon properties of the solids and temperature level.



1. Wet feed
2. Discharge rotary lock
3. Distributor plate
4. Hot water or steam heated baffle maze
5. Fluidization sections
6. Plenum Chamber
7. Gas heat exchanger
8. Blower
9. Cyclone
10. Scrubber



Fluid Bed «High Fluidized Bed» (1.200 mm).



Fluid Bed with exchanger for sodium sulphate.

Fluid Bed with exchanger-Thermic oil.

PRODUCTS

MINERALS

Atapulghite
Bauxite
Clays
Coal
Coke
Dolomite
Feldspat
Fluor spath
Iron Oxides
Limestone
Magnesite
Pyrite
Pyrrotine
Sand
Sepiolite
Talc
etc.

CHEMICAL INDUSTRY FOOD

Alumina
Aminoacid
Ammonium sulphate
Boric acid
Catalytics
Explosives
Fertilizers (Na, Nac, Dap, Npk, Urea, Tsp, Nitrosuphate, Compost, Organominerals, Map)
Magnesium sulphate
Manganese dioxide
Oxalic acid
Porous nitrate
Potassium bromure
Potassium chlorat
Potassium nitrate
Resin
Sodium chlorat
Sodium metasilicate
Sodium methabisulphite
Sodium monopersulphate
Sodium nitrate
Sodium perborate
Sodium sulphate
Sodium tripoliphosphate
Trioic acid
Trisoium phosphate
etc.

Chocolate powder
Coffee beans
Coffee powder
Dried fruit
Flour
Lactose
Leaven
Lemon acid
Lisine
Milk Powder
Nutmeg
Pollen
Protein
Salt
Snacks
Soja
Starch
Sugar
Sunflower
Tomatos powder
etc.

DIVERSES

Bark
Bath salt
Fibre
Matches
Rubber
Toothpick
etc.

STANDARD-EQUIPMENTS VIBRANTING FLUID BED

WITH VIBRATING MOTOR

Type/m ²	Wide mm	Length mm
LFV 0,3	250	1250
LFV 1,2	600	2000
LFV 1,8	600	3000
LFV 2,4	800	3000
LFV 3,2	800	4000
LFV 4	1000	4000
LFV 5	1000	5000
LFV 7	1400	5000
LFV 8,4	1400	6000
LFV 10	1750	6000
LFV 12	1750	7000

WITH EXCITER

Type/m ²	Wide mm	Length mm
LFV 10	1400	7000
LFV 12	1400	9000
LFV 15	1400	11000
LFV 18	1400	13000
LFV 22	1750	13000
LFV 26	1750	15000
LFV 29	2.000	14.500
LFV 32	2.000	16.000

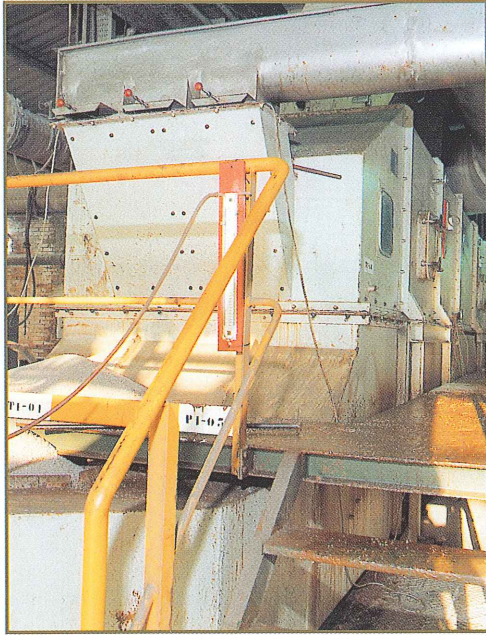
STATIC FLUID BED

According to the needs of the client, until 32/64 m²

INERTIA FLUID BED

According to the needs of the customer, until 24 m²

*Granulation Plant-NPK-DAP.
Cooling Fluid Bed-Guixi-China.*



Dryer Plant-coffee beans-Nestle-Switzerland.



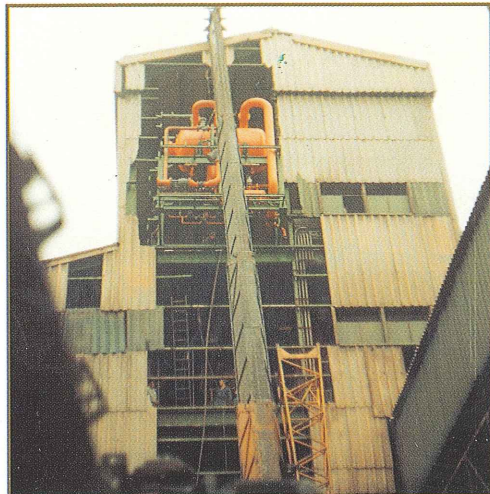
Dedusting Plant-Cogeneration Fluid Bed-Sepiolsa SPAIN.



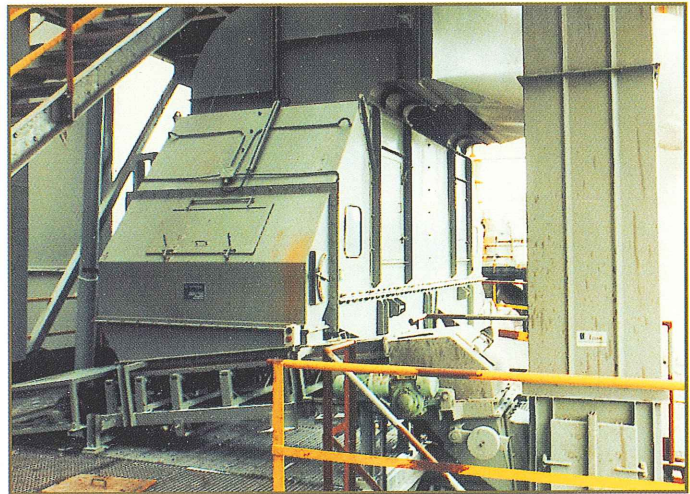
Cooling TSP-SABIC-SAUDI ARABIA.



Erection cooling production-Fertiberia Spain.



Cooling static fluid bed products from prill tower.



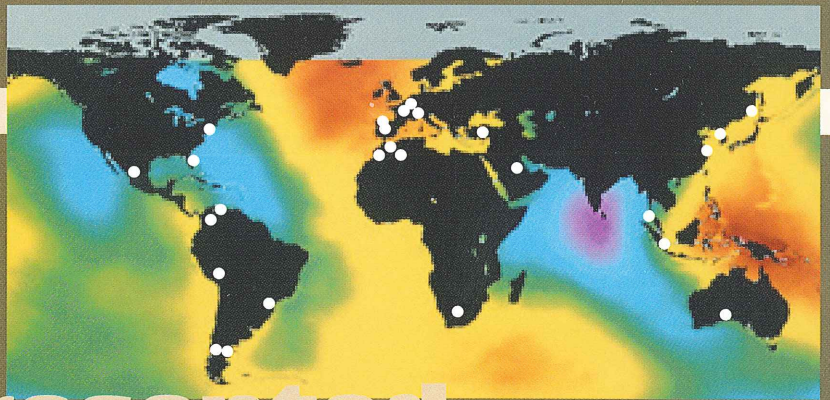
COMSPAIN

Compañía de Manutenciones Especiales ESPAÑA, S.A.

SUMMARIZED LIST

COUNTRY	CLIENT	EQUIPMENT	PRODUCT	COUNTRY	CLIENT	EQUIPMENT	PRODUCT	COUNTRY	CLIENT	EQUIPMENT	PRODUCT
ALGERIA	KREBS	1 LFE 18 m ²	NPK	GERMANY	KRUPP-UHDE	1 LFE 30 m ²	NA, NAC	SPAIN	ISEMASA (JAEN)	1 LFE 0,6	POLLEN
ALGERIA	SONATRACH	1 LFE 12,00 m ²	UREA	GERMANY	OXIRABNE, TX OXICRABNE	CALCINATION CATAL 1.050° C	CATALYTICS	SPAIN	JUSTE, S.I.F. MADRID	1 LFE 0,6	TRIOIC ACID
BELGIUM	SOPAD (SAINT MENET-FRANCIA)	1 LFEV 14 DL	COFFEE	GERMANY	PFIZER, IN	OXIDES REDUCTION 900° C	METALLICAL OXIDES	SPAIN	KOPE, S.A. (JAEN)	1 LFEV 14	GRAPES
BELGIUM	APPAREILS & EVAPORATEURS	1 LFEV 4,6	AMMONIUM SULPHATE	GHANA	SOTROPALPARIS	1 LFEV 1,8	MATCHES	SPAIN	LUZENAC	1 LFEV 4	TALC
BELGIUM	LAGUILHARRE PARE LAITERIE BELGE	1 LFEV 4D	POWDER-MILK	GREECE	PEC	1 LFEFE 11,00	NPK	SPAIN	MAGNESITAS DE RUBIÁN (LUGO)	1 LFEV 5 D	PELLETS MAGNESIUM
CHINA	CHUMILLAS Y TARONGI (ESPAÑA)	1 LFEV 2,4	CLAYS	GREECE	UHDE	1 LFEFE 10,00	NA	SPAIN	MYTA (MADERUELO)	1 LFEV 2,4	SEPIOLITS
CHINA	KPEC-TAIWAN	1 LFEV 4,9 m ²	NPK	GREECE	UHDE	1 LFEFE 24	NA	SPAIN	MYTA (SEGOVIA)	1 LFEV 10,5 DL	ATAPULGITHÉ
CHINA	TOYO ENGINEERING	1 LFE 34,00 m ²	Np	HOLLAND	FABELTA	1 LFEV 6	CELLULOSE	SPAIN	NESTLE	1 LFEV 22 DL	COFFEE
CHINA	JIANGXI (GUOXI)	1 LFE 30	NPK, DAP	IRELAND	IRISH FERTILIZER INDUSTRIES (IFI)	1 LFE 30 m ²	NA, NAC	SPAIN	NESTLE	1 LFEV 3,2	COFFEE
CHINA	WANG KANAI	1 LFEV 2,4	SUGAR	ITALY	ANIC	1 LFEV 4R	THERMOPLASTIC	SPAIN	NITRATOS DE CASTILLA	1 LFE 11,00	NA-NAC-NMG
COLOMBIA	INCRO	1 LFE 8 m ²	NPK	ITALY	S.E.P.R.	1 LFEV 5	SAND	SPAIN	ORSAN	1 LFEV 8,4	FERTILIZER
DENMARK	BENDIX	THERMIC TREATMENT 760° C-925° C	STEEL	ITALY	STRUTHERS WELLS	1 LFEV 3,2	AMMONIUM SULPHATE	SPAIN	PENIBÉRICA-ANTIBIÓTICOS	1 LFEV 5	LISINE
FRANCE	C.D.F. CHIMIE	1 LFEV 5	TAR	JAPAN	CATALYST IND., JPN	CALCINATION 1.000° C	CATALYTICS	SPAIN	PRODUCTOS LABIN	1 LFEV 20	FERTILIZER ORGANUM MINERALS
FRANCE	L'AIR LIQUIDE	1 LFEV 1,2	MONOSULPHATE POTASSIUM	JAPAN	LUZHAI	1 LFE 5	NPK	SPAIN	PYCASA «LA COCINERA»	1 LFEV 2,4	FOOD PATATOES
FRANCE	L'AIR LIQUIDE	1 LFEV 5	TAR	KOREA	DELATRE LEVIVIER	1 LFEV 15	AMMONIUM SULPHATE	SPAIN	RISI	1 LFEV 2,4	SNACKS
FRANCE	L'AIR LIQUIDE	1 LFEV 5	PERSULPHATE	KOREA	DONGBU	1 LFEV 6	AMMONIUM SULPHATE	SPAIN	SAMCA	1 LFEV 6	CLAYS
FRANCE	L'AIR LIQUIDE	1 LFEV 3,2	AMMONIUM PERSULPHATE	KOREA	INCRO	1 LFEFE 11,4 m ²	NP-NPK	SPAIN	SEFANITRO	1 LFE 18,00	NA-NAC-NMG
FRANCE	L'AIR LIQUIDE	1 LFEV 3,2	SODIUM PERBORATE	KOREA	NAM HAE	2 LFEFE 10,3	NPK	SPAIN	SEPIOLSA	1 LFEV 4	SEPIOLITE
FRANCE	NAPHTACHIME	2 LFEV 1,8	POLYOLEPHINE	MÉXICO	KREES-FERTIMEX	1 LFEFE 28,00	SODIUM	SPAIN	SEPIOLSA (GUADALAJARA)	1 LFEV 20,4 DL	SEPIOLITE
FRANCE	NESTLE-SOPAD	1 LFEV 20	COFFEE	NIGERIA	NEW NIGERIA SALT COMPANY	1 LFEV 15 DL	SEA SALT	SPAIN	SEPIOLSA (GUADALAJARA)	1 LFEV 3,2	SEPIOLITE
FRANCE	NESTLE-SOPAD	2 LFEV 3,2	COFFEE	RUSIA	SPHICHIM	1 LFEV 2,4	SODIUM SALT	SPAIN	STEIN NESTLE	2 LFEV 7	COFFEE
FRANCE	PECHINEY	1 LFEV 4,6	SODIUM CLORATE	SAUDI ARABIA	NATIONAL FERTILIZER CO. (TPL)	2 LFEFE 32,00	NAP-DAP-GTSP	SPAIN	STEIN BALTOCAR	1 LFEV 3,2	COFFEE
FRANCE	POTASSES ET PRODUITS	1 LFEV 4	BROMIDE	SAUDI ARABIA	TECHNIPETROL (ROMA) PARA AL-BATAR, AL JUBAIL	2 LFEFE 36,00	DAP-NPK-NP-GTSP	SPAIN	TOLSA	1 LFEV 10	CLAYS
FRANCE	POTASSES ET PRODUITS CHIMIQUES DE THAIN	1 LFEV 1,8	BROMIDE	SOUTH AFRICA	OMNIA FERTILIZERS LTD	1 LFEFE 19,24	NPK	SPAIN	TOLSA (MADRID)	1 LFEV 12	BEITONITE
FRANCE	PROCESS ENGINEERING C.O.	1 LFEV 5	ACIDO CÍTRICO	SOUTH VIETNAM	P.E.C.	1 LFEV 5	SEA SALT	SPAIN	TOLSA-MADRID	1 LFEV 15	CLAYS
FRANCE	RHONE POULENC	2 LFEV 12,6	CHEMICAL PRODUCTS	SPAIN	3M, MN	REDUCTION 900° C	CATALYTICS	SPAIN	TORRECID (ALICANTE)	1 LFEV 4	CERAMICS
FRANCE	RHONE POULENC	2 LFEV 5,0 D	ALUMINA	SPAIN	AGRAZ-BADAJOS	1 LFEV 8,4 D	POWDER-TOMATO	SPAIN	TORRECID S. A. (CASTELLÓN)	1 LFE 4	CERAMICS
FRANCE	RHONE PROGIL	1 LFEV 2,4	ALUMINA	SPAIN	ALCOA FORGINGS	TRET. 400° C	STEEL	SPAIN	TRATAMIENTOS RIZA	THERMIC TREATMENT 1.000° C	TOOLS
FRANCE	S.E.I.T.A.	1 LFEV 5	MATCHES	SPAIN	AUXINI-INVESTICIÓN	TRET. 850° C / 180° C-525° C	PIRYTE	SPAIN	TRAVESA	2 LFEV 4	SNACKS
FRANCE	S.E.I.T.A.	2 LFEV 4	MATCHES	SPAIN	AUXINI-MINISTERIO INDUSTRIA	DESTILLATION 1.300° C	PIRYTE	SPAIN	UNIÓN CARRIBE NAVARRA	1 LFEV 12	COKE
FRANCE	SERETE	1 LFEV 12 D	COKE	SPAIN	CIVIMASA (CUENCA)	1 LFEV 7	TARTHARIC ACID	SWITZERLAND	WELDING ENGINEERS	1 LFEV 1,8	RUBBER
FRANCE	SERETE ENGINEERING	1 LFEV 3,2 D	SAND	SPAIN	COMERCIAL DE NITRATOS	1 LFEV 5	FERTILIZEER	THAILAND	ADRA SUGAR	1 LFEV 4	SUGAR
FRANCE	SOCIETE FRANÇAISE D'ELECTROMETALLURGIE	1 LFEV 1,8	BAUXITE	SPAIN	E. I. ARAGONESAS	1 LFEFE 12	AMMONIUM SULPHATE	THAILAND	MID SIAM SUGAR	1 LFEV 4	SUGAR
FRANCE	SOCIETE UCLAMA	1 LFEV 7	LACTOSE	SPAIN	ENFERSA	1 LFEFE 12,00	UREA	THAILAND	MITE PHOI SUGAR	1 LFEV 4	SUGAR
FRANCE	SPEICHHIM	CALCINATION 1.050° C	CHEMICAL PRODUCTS	SPAIN	ENFERSA	1 LFEFE 28,8	NA-NAC	THAILAND	PRACHUAP	1 LFEV 4	SUGAR
FRANCE	TECHNIP	1 LFEV 0,6	POLYETHYLENE	SPAIN	ENFERSA	1 LFEFE 8,40	NA	THAILAND	THAI IDENTITY	1 LFEV 4	SUGAR
FRANCE	UGINEKUHLMANN	1 LFEV 5	SODIUM METHABISULPHITE	SPAIN	EURECAT	2 LFEV (L=11 m) INERTIA	CATALYTICS	TUNISIA	HEURTEY SAPEA	1 LFE 10,00	DAP
FRANCE	UGINEKUHLMANN	2 LFEV 7	NITRATE SODIUM	SPAIN	FERTIBERIA SEVILLA	1 LFEFE 1,2 DL	NITRATE	TUNISIA	SALINES DE TUNISIE	1 LFEV 4	SEA SALT
FRANCE	UGINEKUHLMANN	1 LFEV 4	PHOSPHATES TRISODIUM	SPAIN	FERTILIZANTES DEL OESTE	1 LFEV 20	FERTILIZER ORGANUM MINERALS	TUNISIA	GGT	1 LFE 30	NPK-DAP
FRANCE	UNICHEMA, BRD	REDUCTION 900° C	BAUXITE	SPAIN	FORET	1 LFEV 10	SODIUM PERBORATE	TURKEY	ALARKO	1 LFEV 4	SEA SALT
FRANCE	WELDING ENGINEERS	1 LFEV 0, 3	PELLETS RUBBERS	SPAIN	FORET, S. A.	2 LFEV 16,8	SODIUM PERBORATE	TURKEY	INTECSA	1 LFE 15,5	NPK
GERMANY	BABCOCK WILCOX	TEMPER 1.100° C-1.315° C	STEEL	SPAIN	FORET, S. A.	2 LFEV 8,4	SODIUM PERBORATE	TURKEY	L'AIR LIQUIDE	1 LFEV 12 L	PERSULPHATO
GERMANY	EXTRACTIONS-TECHNIK	1 LFEV 8	SUNFLOWER	SPAIN	FORET-LAZAIDA (ZARAGOZA)	1 LFEV 30	SODIUM PERBORATE	TURKEY	SANSUM	1 LFE 12,00	DAP
GERMANY	EXTRACTIONS-TECHNIK	1 LFEV 8	GRANULATED	SPAIN	GENOSA	4 LFEV 7	COKE	TURKEY	STRUTHERS WELLS	1 LFEV 22	BORICO ACID
GERMANY	EXTRACTIONS-TECHNIK	3 LFEV 12	COLLING	SPAIN	HEFRAN	1 LFEV 8,4 D	CLAYS	UNITED KINGDOM	ALCOA FASTERNERS	THERMIC TREATMENT 480° C	STEEL
GERMANY	HOECHST	1 LFEV 1,2	CORK	SPAIN	HERCULES	REDUCTION 900° C	CATALYTICS	UNITED KINGDOM	MOBIL OIL	CALCINATION CATAL 1.000° C	CATALYTICS
GERMANY	KREES	1 LFE 18 m ²	NPK	SPAIN	HOESCHST IBERICA	1 LFEV 5	POLIPROPILHENE				

COMSPAIN



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