



**A BRIEF FEATURE OF  
MAHLTECHNIK GÖRGENS GMBH**

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# 1. General Introduction

Mahltechnik Gorgens GmbH is a medium-sized company operating in the field of mechanical and thermal processing and specialised in fine grinding, drying, simultaneous grinding and drying, coating, mixing as well as selective grinding techniques.

Our company is solely handling the engineering part of business. This ensures a maximum flexibility for immediate reaction to environmental changes and possible local supply.

In the non-food area, our activities concern the following topics:

- Thermoplastics and Duroplastics
- Pharmaceuticals, Cosmetics
- Production and processing of plastics, especially of PVC
- Wood processing (shavings, chopped barks)
- Metal powder
- Recycling of composite materials
- Printed circuits
- Minerals

In the food section, the following applications are possible, i. e.:

- Cereals, Bran, Germs, Fibres
- Animal food (rumen contents)
- Starch and derivatives as well as proteins and protein derivatives
- Dietetic food
- Vegetables, spices, herbs
- Sugar
- Dairy products

This list should be regarded as a brief extract to give a first impression of our activities. Apart from this, we have made experience with more than one thousand different products from the above-mentioned industries.

## 2. Pictures of our Pilot Plant



### 3. Structure and management

#### **MAHLTECHNIK GORGENS GMBH**

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## 4. Description of grinding principle and method of drying

The method of micronisation is based on a high air throughput. In the grinding zone, the powerful air-stream builds up tremendous turbulences creating micro-whirls in which both direction and speed of the particles are changed in extremely short intervals. This increases the probability of two or more particles splitting by mutual impact. As long as the particles are in the TurboRotor, they are constantly kept suspended in the air-stream. This is shown in the picture on the next page.

Because of the special advantages of its grinding principle, the TurboRotor is predestined for smooth grinding of temperature-sensitive materials or such with a low melting resp. softening point. Moreover, products of a pasty consistence or products which tend to smear or to stick and also those with a high fat content can be processed to a free-flowing powder.

Since the installation is constantly held below atmospheric pressure, no dust will escape from the machine during the grinding procedure.

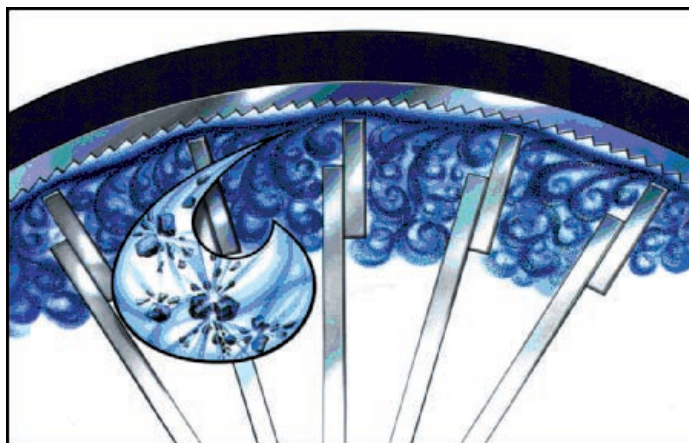
Because of the high air-throughput, the TurboRotor represents the outstanding solution regarding simultaneous grinding and drying. Combined with a heatgenerator for heating the air, the TurboRotor can be used for drying without any constructional changes. As the drying is accompanied by simultaneous grinding, the surface of the single particle to be dried is quickly expanded so that humidity within the core of the particle can also vaporise.

The evaporation capacity is calculated according to the local moisture content of the ambient air regarding the climate conditions in average over the year.

### Grindingprinciple

The grinding processes in the TurboRotor divide into different parts in dependence of kind and behaviour of the products.

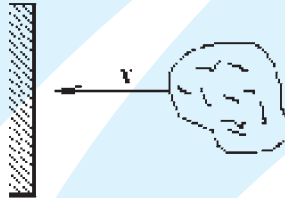
#### Impact stresses between two or more particles in the turbulent air stream



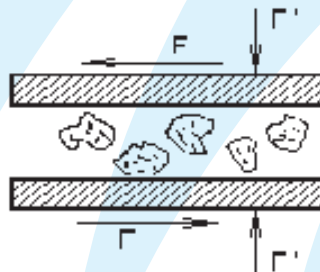
→ similar to the stresses inside a jet mill

## 4. Description of grinding principle and method of drying

### Impact stresses between the particles and the grinding tools



### Pressure-shearing-stresses in the gap between the grinding plates and the inner liner



→ especially for the selective grinding of composite materials like laminates, blister

### Stresses inside the turbulent air stream



→ imparted energies too small to result in a „real“ grinding, but important for the grinding-drying process to reduce agglomerates

## 5. The product range

The product range is composed of the following grinding installations, which will be described in detail hereafter.

**TurboRotor - Mills**

**BlowerRotor - Mills**

**HorizontalRotor - Mills**

**Heatgenerators,**  
electrical, steam- or water heated Heat exchanger, directly and also indirectly Heat generators (gas or oil)

**Heat exchangers,**  
for cooling- or chilled-water Dosage equipment, for the continuous and load dependent product feeding as well as volumetrically and gravimetrically

**High duty cyclones,**  
for the economical pre-separation with maximum separation degree

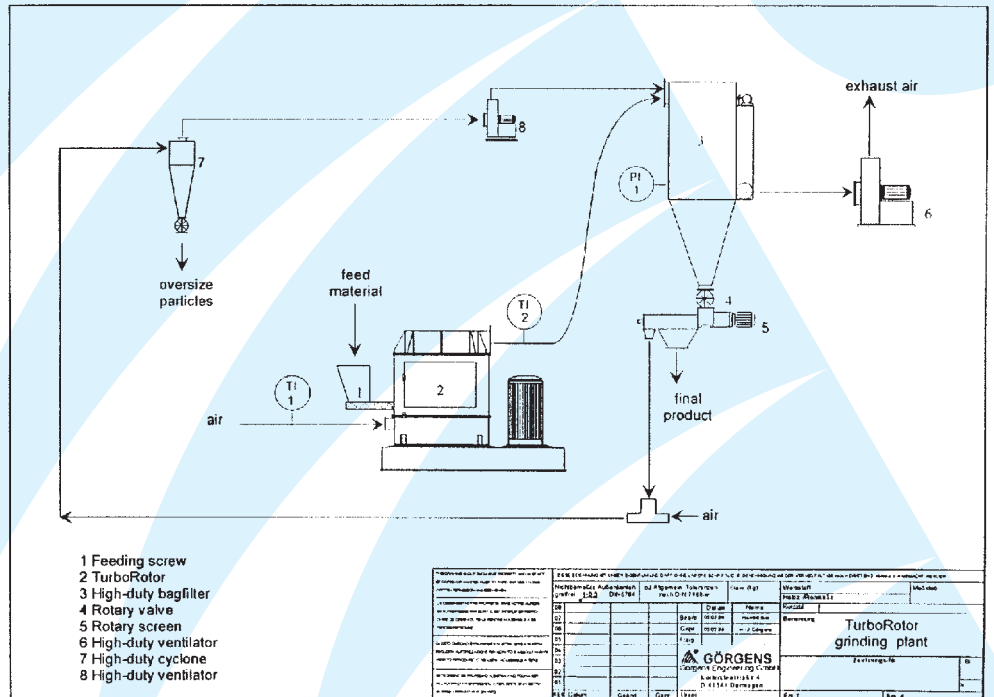
**High duty oval bag filter,**  
with horizontally installed filter bags in round or angular execution with hinged doors and easy access for the pure gas area and the filterbagchange

**Ventilators,**  
with ventilator wheels in different executed paddlewheels depending on the task

**Electric panels,**  
control and automation depending on the task and customer-requirements

**Accessories,**  
for the completing of our grinder- and dryer-installations for the different customer requirements

## 6. Flow sheet of the TurboRotor installation



### Comments on flow sheet of TurboRotor installation

By passing through the feeding screw (Position 1), the material gets into the TurboRotor (Position 2). The air gets into the grinding-zone through an air-inlet in the bottom part of the TurboRotor. Afterwards the mixture of air and particles is conducted to the filter-cyclone (Position 3), which is used for separating micronised material from the air. Then the material passes a rotary valve (Position 4) and is thus dosed into a rotary screen (Position 5). In case the customer wishes to achieve a fineness of 100 % below a certain particle size, we integrate a screen after the filter. Those particles which do not pass through the screen will be re-circulated to the grinding procedure. The air leaving the clean-air part of the filter is blown out by the ventilator (Position 6). Depending on the filter cloth used, the particle content in the exhaust air can vary between 5 and 20 mg per cubic meter of air.



## 8. Execution

The execution of the TurboRotor-System matches the various properties of the processed products resulting in use of different materials of construction of the contact parts. The range is from mild steel up to higher alloyed stainless steel types e.g. AISI 316 L or wear resistant material like tungsten carbide resurface welded on matrix plates.

Our equipment is manufactured according to the EU- Regulations for safety: CE, VDI 2263, VDI 3673, ATEX 94/9/EG

## 9. Construction

The TurboRotor can be dismantled and the Rotor itself extracted of the housing-without moving any of the two bearings. Two different combinations of bearings have been proved for the above mentioned applications. Different shapes and sizes of grinding tools and sifter-fingers are available. The profile of the inner liner is selected in accordance with the requirements. It is ensured that a high rate of air guarantees the unique grinding principle of impact in a turbulent air-stream.

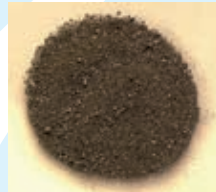
## 10. Business activities

- 1. Fine micronisation**  
especially of crystalline products like minerals, pigments, carbon, sulphur, sugar etc. down to particle sizes in the micron range.

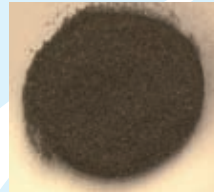
### Al-foils



Feed



Product > 250 µm



Product < 250 µm

### Copper braid



Feed



Product raw



Product fine

### Iron Oxid



Feed

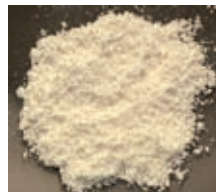


Product 100% < 20 µm

### Ca-stearate

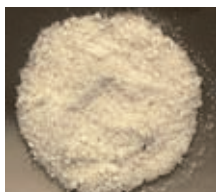


Feed

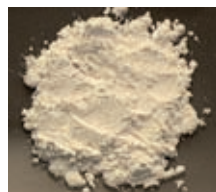


Product  $d_{50} = 10 \mu\text{m}$

### Limestone fertilizer



Feed



Product

## 10. Business activities

### 2. Grinding of heat-sensitive products

such as various thermo-plastic materials, rubber, caoutchouc, waxes, stearates, soaps, materials with a high fat content and materials which get pasty or smeary at ambient temperatures.

Ray husks



Feed



Powder

Cacao, 21% Fat



Feed



Powder

Oat husk



Feed



Powder

Cristal sugar



Feed



Powder

Wheat husks



Feed

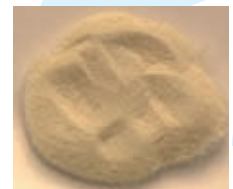


Powder

Potatoe dew, dry



Feed



Powder

Sugar 70% + Wheat husk 30%



Feed



Powder

Car tire



Feed



Powder 100 %  
< 800  $\mu\text{m}$

NBR



Feed



Powder

PVC



Feed



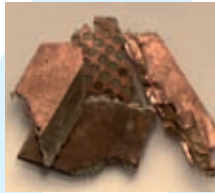
Powder 100 %  
< 400  $\mu\text{m}$

## 10. Business activities

### 3. Selective grinding

of composite materials such as aluminium-plastic foils, electronic waste, thin copper cables and a great number of metal/plastic and/or paper composites. The single components of such materials can be ground to different sizes at a time in order to separate them afterwards. Machines for a nearly complete separation of two or more fractions are also part of our product range.

#### Copper Clad Laminate



CCL, shredded



CCL, granulated



CCL, Copper fraction after Separation



CCL, Resin fraction after Separation

#### Al-Capsules



Feed



Al-Capsules after selective grinding



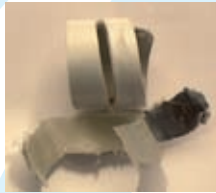
Al-Capsules, Al-spheres



Al-Capsules, PE Fraction

## 10. Business activities

### Floor heating pipe



Shredded Floor heating pipe



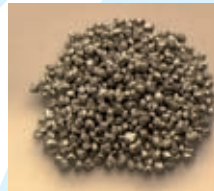
Granulated Floor heating pipe feed



KS-fraction  
> 5,0 mm



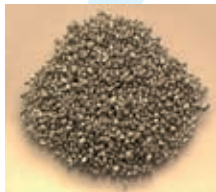
Al-Fraction  
> 5,0 mm



Al-Fraction  
4,0 - 5,0 mm



Al-Fraction  
2,0 - 4,0 mm



Al-Fraction  
1,0 - 2,0 mm



Al-Fraction  
0,5 - 1,0 mm



Al-Fraction  
0,35 - 0,5 mm



Mix-Fraction < 0,35 mm

## 10. Business activities

### 4. Simultaneous grinding and drying

particularly of heat-sensitive and/or organic products with a very high thermal yield and a much lower degree of investment as with usual pneumatic dryers. A number of TurboRotors are exclusively operating as dryers for simultaneous deagglomeration of mechanically concentrated suspensions. Referred to the several product properties we distinguish:

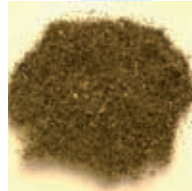
Simultaneous grinding-drying process commonly used for pre-dewatered products from decanters, filter presses and sedimentation plants.

#### Beetroots



initial moisture: 12 % final moisture: 5 %

#### Sea algae



initial moisture: 84 % final moisture: 11 %

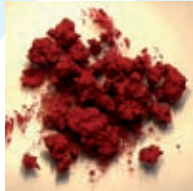
#### Elder fibres



initial moisture: 90 % final moisture: 5 %

## 10. Business activities

### Pigment Rubín



initial moisture: 75 %



final moisture: 1,5 %

### Pigment Blue



initial moisture: 50 %



final moisture: 0,4 %

### MC



initial moisture: 60 %



final moisture: 3 %

## 10. Business activities

### **Simultaneous spraying-grinding-drying process**

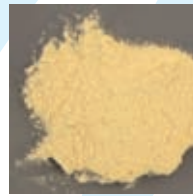
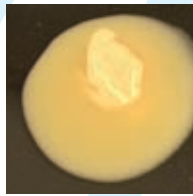
a new technology for the treatment of liquid products like suspensions and emulsions, which has been developed and proved in our pilot plant and brought into industrial scale.

#### Spirulina



initial moisture: 90 % final moisture: 5 %

#### Wheat protein



initial moisture: 80 % final moisture: 8 %

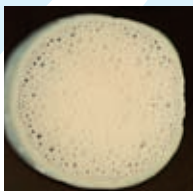
#### Wheat dew



initial moisture: 50 % final moisture: 8 %

## 10. Business activities

Latex



initial moisture: 50 - 60 %



final moisture: 0,2 %

Pigment Green



initial moisture: 65 %



final moisture: 0,9 %

Pigment Yellow



initial moisture: 65 %



final moisture: 0,7 %

Silica gel



initial moisture,  
ungelatinised: 70 %



initial moisture,  
gelatinised: 70 %



final moisture:  
4 %

## 10. Business activities

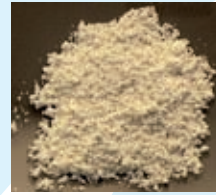
### 5. Grinding, mixing or coating

unusually carried out with mixtures of different products from the food industry, cosmetics and pharmaceuticals industry. Furthermore, micro-nised minerals are coated with stearates or organic food with hydrated fats or waxes.

#### Calcined Caolin

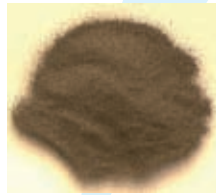


Feed



Powder 1% Silan coated

#### Al-Powder



Feed



Powder 0,5% Stearic Acid coated

### G-35

- Nabisco
- TU Bergakademie Freiberg
- Forschungsinstitut für Leder und Kunststoffbahnen Freiberg
- TU Clausthal Zellerfeld
- FH Zittau
- Anchor
- Daimler Benz
- Ristra Indolab

### G-55

- Kosaka
- Fraunhofer Institut
- TIGRE
- Bitang
- Bunge
- CFF
- General Mills
- Sera
- Vredestein

### G-90

- Angelini
- AFT
- FIC
- Tanyong Manis
- TIGRE
- Alpha Compound
- Fortilit
- Bifa
- Emsland Stärke
- Roquette
- Hildebrand Mühle
- Intersnack
- KRÖNER STÄRKE
- MCP
- Premier Granules
- Retroplast
- Südchemie
- Uponor

### G-130

- Eckert Werke
- TIGRE
- CWA
- Hoesch Granules
- Omnicon
- Pillet
- Politejo
- Primex
- SWF
- US Granules

### G-150

- Trentec
- Skannebrennerier
- Caldic
- Faxe Paper Pigments
- FMC
- Grain Millers
- Nan Ya

### G-180

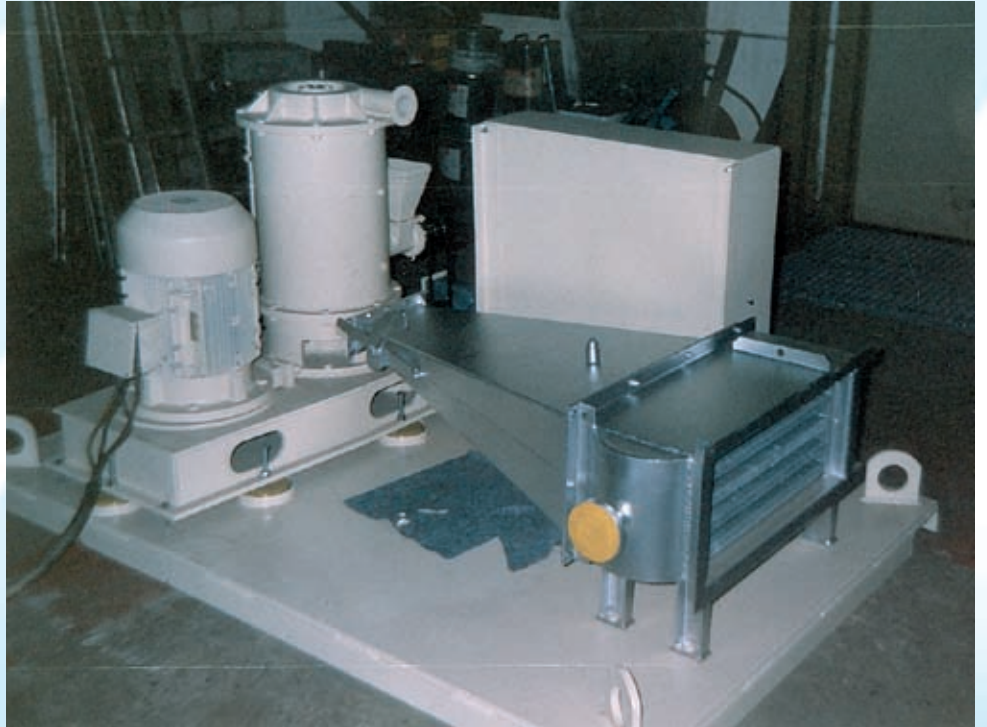
- AVEBE
- Bunge
- AGRO
- Hamlet Protein
- Sacchetto
- Solbar Hazor
- WTG

### G-200

- Sacchetto
- PRIMEX
- IKO Fill

## 11. References

G-35

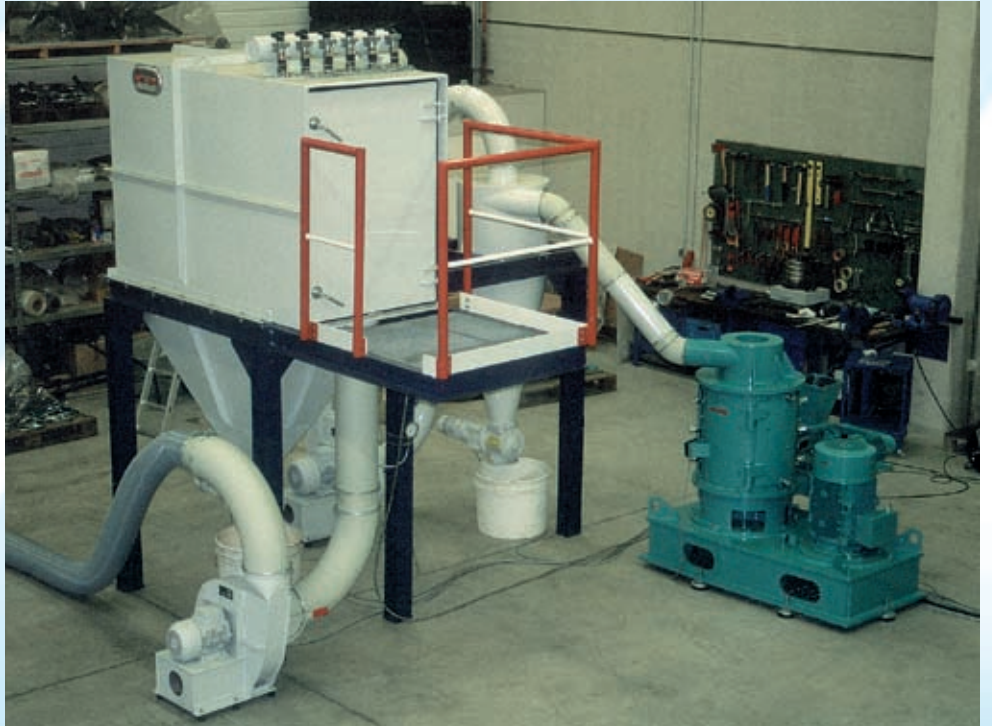


Nabisco



## 11. References

G-55



Kosaka



## 11. References

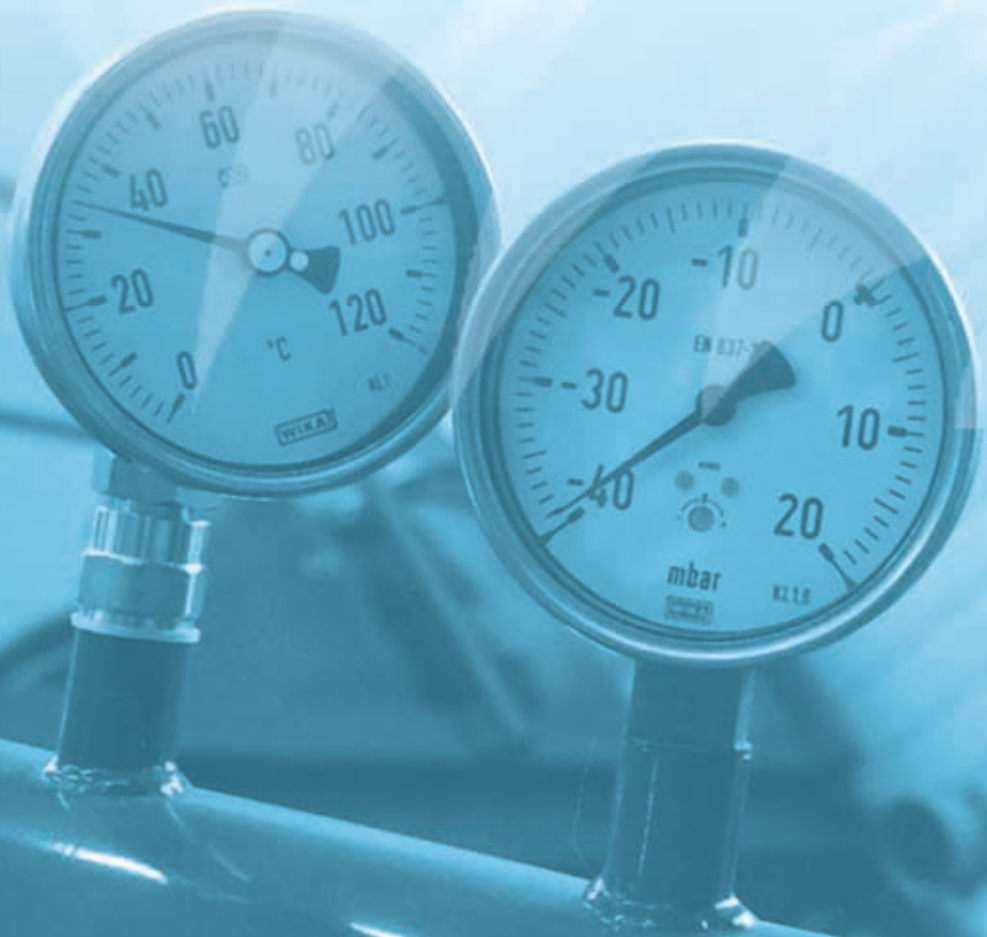
### Anlage



AFT

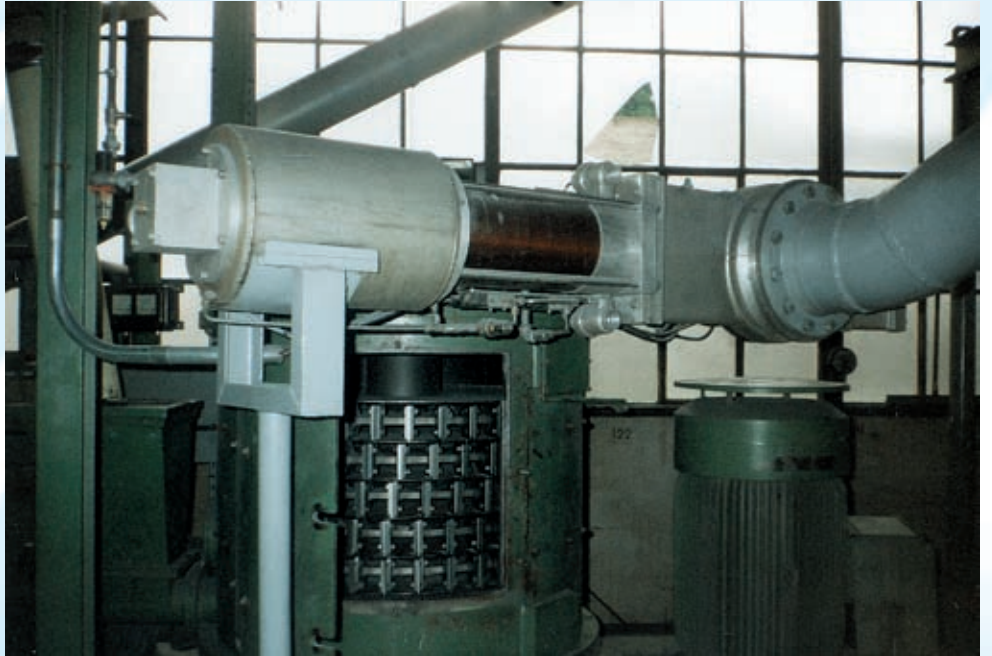


Angelini



## 11. References

G-130



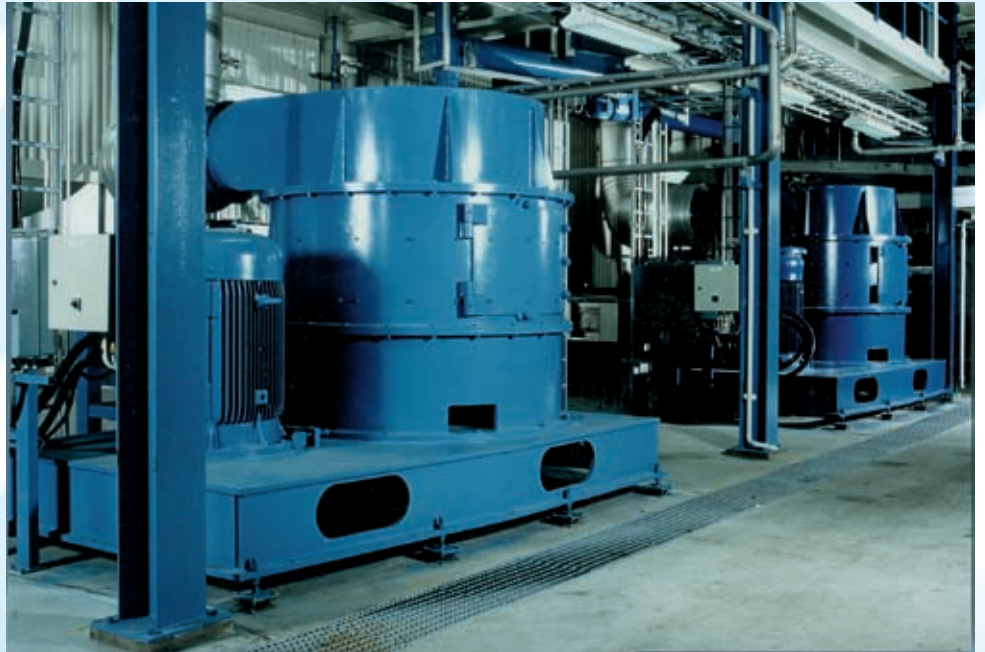
Eckert Werke



A&S Biotech

## 11. References

G-150



Skannebrennerier



Skannebrennerier



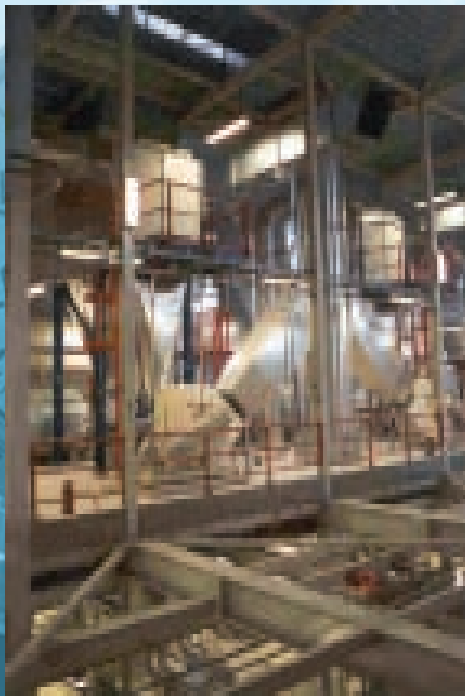
Trentec

## 11. References

G-180



AVEBE



## 11. References

G-200



Sacchetto



Primex