# PALLMANN

## Processing Technology

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PALLMANN company was founded in 1903 and has continued to operate as a fully family owned company in the tradition and expertise of seven generations of flour millers and mill designers. Solid and sound technical knowledge, skilled craftsmanship and intensive striving for optimum technical and economical solutions – these are also today typical characteristics of a Pallmann specialist.
As pioneers in the field of size reduction, Pallmann has made an important contribution to today's State of the Art of size reduction and material preparation techniques, also resulting in numerous patents of their own.

More than ever before, the technical solutions of PALLMANN contribute to an optimized utilization of existing resources and to increased productivity.

We are working in highly competitive markets, the technical requirements to be met are rising. Only top products will survive. We are searching and developing to make your production more profitable and help you to stay ahead!

PALLMANN specializes in size reduction and offers the widest range of machines and complete systems for successful preparation of all soft to medium hard, brittle, tough, elastic or fibrous materials.

More than 1000 machine types guarantee optimum solutions for a wide variety of different applications. Many years of specific experience of our engineers and reliable results out of more than 45.000 size reduction tests performed in our large Research and Technology Center are a unique basis for safe investment decisions.

Fig.1

Fig.2

In its headquarters at Zweibrücken, PALLMANN operates the world's largest Research and Development Center for size reduction techniques and is working there on development projects that will determine the markets of tomorrow.
PALLMANN offers you the opportunity to test your material and to establish solid data based on which you can make your proper investment decisions. Come and see for yourself in how many different ways we put our experience to work for you.

Fig.
1. Technology Center
2. Laboratory

**Desagglomerating**
**Crushing**
**Shredding**

**Granulating**
**Cutting**
**Chopping**

**Grinding**
**Pulverizing**
**Fiberizing**

**Cryogenic Grinding**
**Wet milling**
**Dry Grinding**

**Agglomerating**
**Classifying**
**Separating**

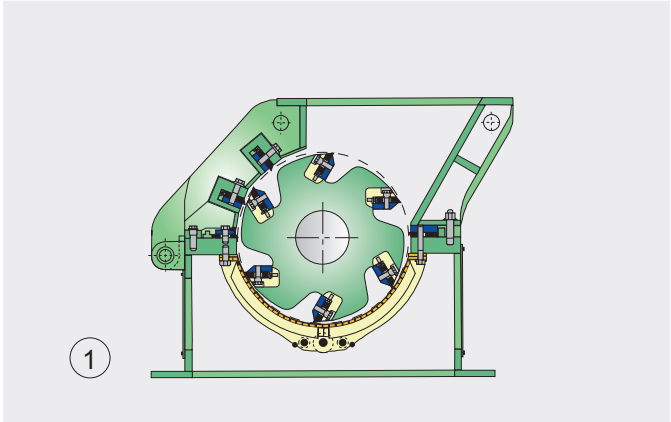
# TOP PERFORMANCE IN SIZE REDUCTION

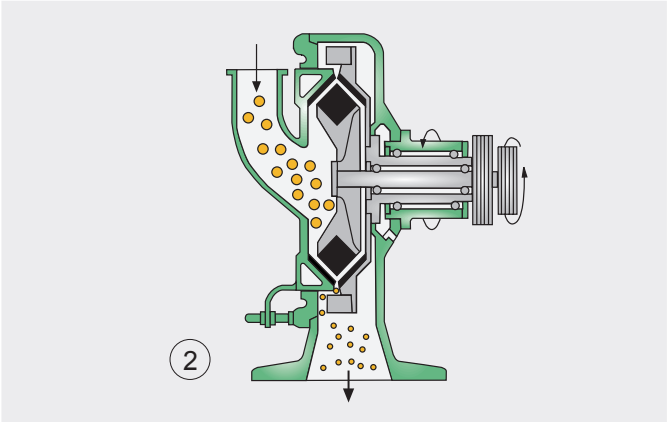
## Knife Mills

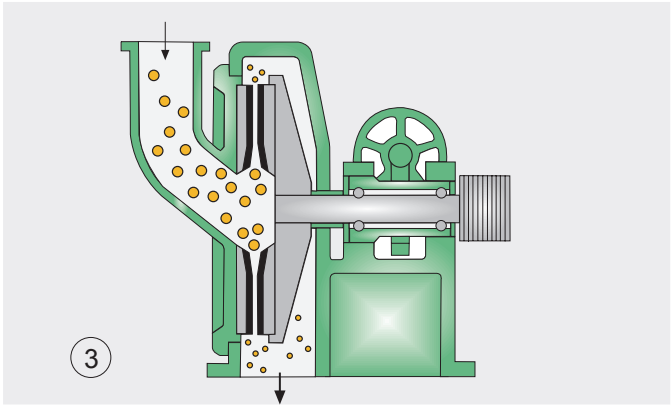
Material is fed to the cutting chamber via a chute. Size reduction takes place between rotor- and housing knives. The granular size of the end product is determined by an exchangeable screen installed in the lower part of the housing.
Used for size reduction of elastomers, plastic film, fibers, rubber, cellulose, leaves, frozen meat vegetable or fruit.

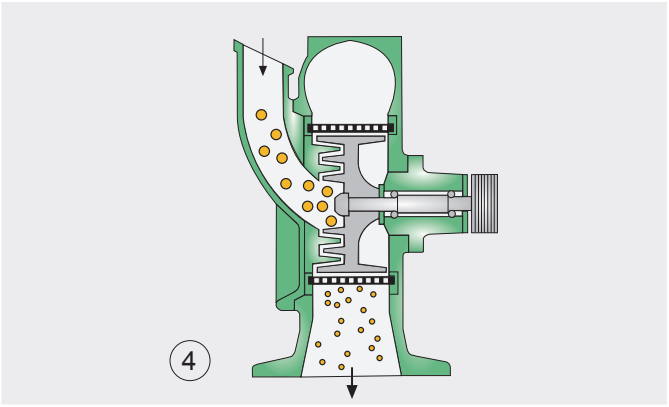
## Turbo Mills

Size reduction through impact and friction effects as well as high-turbulent air whirls. Airflow through the mill determines the material retention time in the grinding chamber and thus also the degree of disintegration.
Medium-fine to finest grinding and fine-defiberization of soft to medium soft materials to final particle sizes of up to d50 = 5 my.



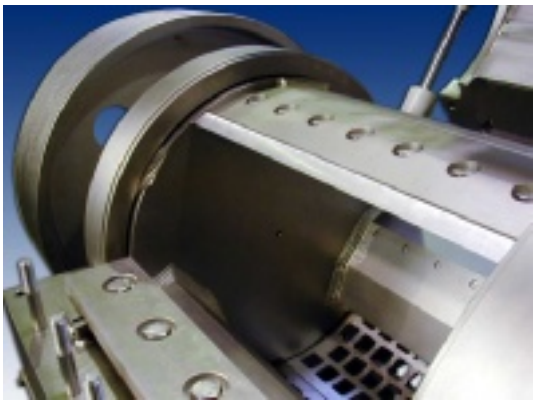




## Disc Mills

Size reduction takes place by cutting and shearing action between toothed segments or alternatively with high pressure refining discs.
Pulverizing of plastics like HDPE, LLPE, PVC, PP, production of rotomoulding powder etc.
Fine size reduction of fibrous materials, leather, corn, rice, glover and annual plants.

## Beater Mills

The material is reduced between a rotating and a stationary grinding disc. Mixing of different materials is possible due to high shearing effect.
Grinding and pulverizing of dry, moist, greasy, crystalline or fibrous materials, breaking up of agglomerates, shredding, granulating, defiberizing.



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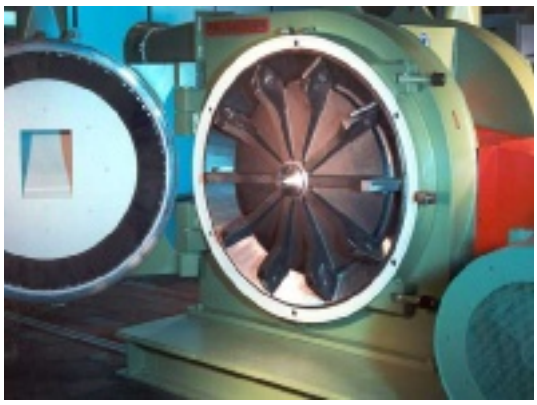

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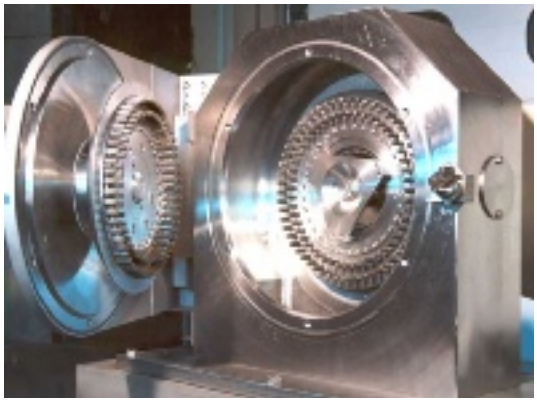


4

## A wide range of applications for the preparation of:

**Medium hard Minerals**
Gypsum (raw or plaster), bentonite, clay (dry or fresh) talc, graphite, muscovite, diatomite, chalk, bauxite, barite, slate, anhydrite, marble, bitumen, asphalt.

**Coal**
Brown coal, peat, coke.

**Color**
Organic and inorganic pigments, iron oxide, red lead, ochre.

**Pharmaceutical products**
Drugs, leaves, herbs, ergot, cinchona bark, manioc, bark, roots, cocoa nutshells, additives for medicines.

**Salt**
Phosphate, fertilizer, mirabilite, sea salt, mineral salt

**Chemical products**
Aluminum sulfate, nitrate of ammonia, magnesia, detergents, soap powder, soda, ammonium sulfate, sodium bicarbonate, dry potassium, plant protective, weed killers, insecticides, fungicides, herbicides.

**Plastics**
Polystyrene, acrylic glass, cellulose acetate, phenolic resin, PVC (hard and soft), polyethylene, polyamide, polyurethane, polyester, polypropylene, Teflon, plastic foams, plastic scrap of all kind, rubber bales.

**Fat Products**
Spices, fish, fish meal, meat, soap, bones, nuts, malt culms, kernels, pig and cow hides

**Resin and pitch**
Colophonium, bitumen, natural resins, tar, hard pitch

**Food Products**
Grain of all kind, noodles, corn, cacao, potatoes, starch, pectin, lucern, rice, sugar, gelatin, candy, vegetables, frozen products

**Fiber-Products**
Wood shavings, chips, cellulose, bagasse, leather, cork, textiles, cardboard, flax, bamboo, hemp, reed, tobacco, leaves, herbs, bark.... and many, many other products

**Recycling**
Electronic waste, copper, aluminum, wire waste, old tires, aluminum scrap.

# CRUSHING


Fig.1

For crushing of soft to medium hard materials, PALLMANN offers a wide variety of single, double and multiple shaft crushers, safety crushers, pre-crushers, cam breakers, finger breakers, lump breakers, bale openers, drum shredders and roller mills with serrated and smooth rolls. Depending on the application on hand, these machines are supplied with a split housing, external bearings and packing glants.

Pre-breaking, coarse and fine reduction of all soft to medium hard materials at high throughput rates. Pre-breaking step in front of a pulverizer. Desagglomeration of base chemical products and agglomerates for the processing as metering, conveying, mixing, bulk storage and for speeding up reaction times. Production of powders with low amount of fines from brittle to crystalline materials.

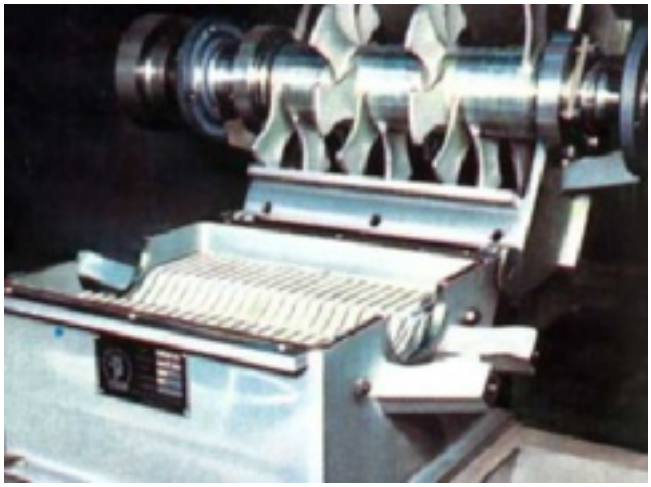


Fig.2

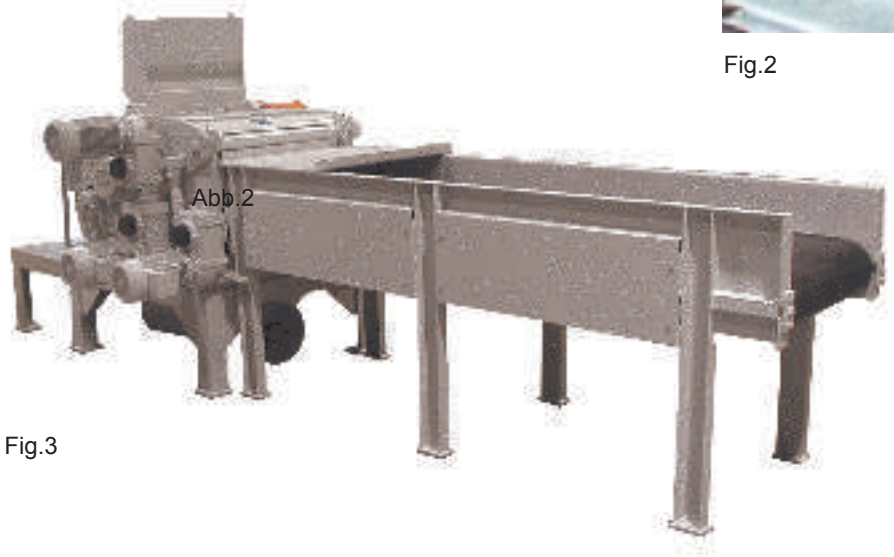



Fig.3

Fig.
1. Pre-breaker, type PBEW
2. Crusher, type PBD
3. Chipper, type PHK
4. Knife Mill, type PS 6-9
5. Precision Knife Mill, type PS 5-10

| Type | | PBEW 8-25 | PBEW 10-35 | PBD 32/43 | PVB 550x700 | PDWB 200-500 | PHK 120x700 | PHK 200x1400 | PHK 300x1050 |
|---|---|---|---|---|---|---|---|---|---|
| Scale-up factor | F=ca. | 1.0 | 1.7 | 1.0 | 1.9 | 1.0 | 1.0 | 2.5 | 3.0 |
| Infeed opening | mm | 2300x2500 | 3300x3500 | 330x462 | 550x700 | 200x510 | 120x700 | 200x1400 | 300x1050 |
| Motor | max. kW | 55-75 | 132-160 | 7,5 | 11 | 2.2+2.2 | 45-75 | 75-110 | 110-160 |

# GRANULATING

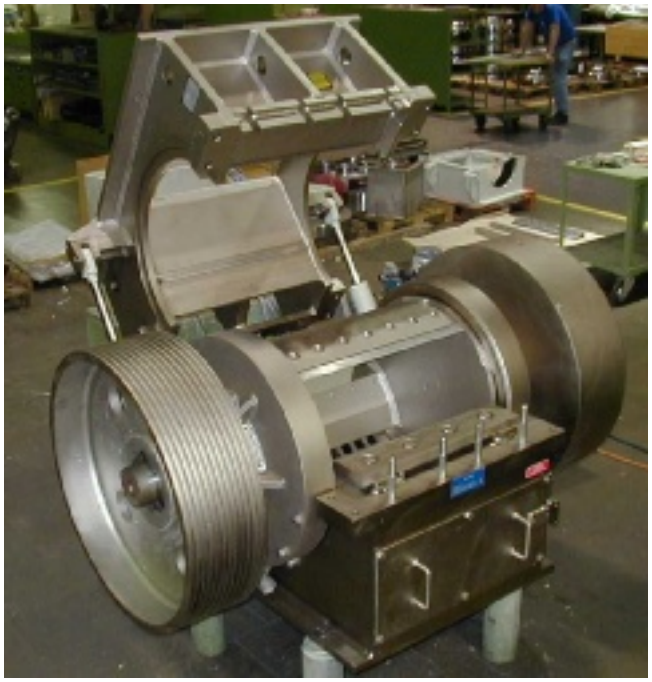


Fig.4

PALLMANN supplies complete lines of granulators, chippers and knife mills for the size reduction of materials which can be cut. Depending on the type of material and the requirements, different infeed systems are to be used: belt conveyor, feed rollers, load controlled feeding with vibratory feeder. The machines are equipped with open or closed rotors with straight cut, slanted cut and scissors cut.

The feed stock is conveyed to the cutting chamber automatically or manually and reduction is performed between the rotor- and the housing knives which are pre-adjusted outside the machine. The granular size of the end product is determined by the screen mesh size chosen.

Fig.5

Where conventional techniques reach their limits, PALLMANN offers innovative solutions such as high speed knife mills for pulverizing of cellulose, granulators for the production of clean cut rubber chips, shredders for the size reduction of soft metals and scrap from the electronic industry, heavy duty granulators for polycarbonate purgings, cable waste, animal waste and leather waste.

| Type | | PS 4-5 | PS 4-10 | PS 6-9 | PS 8-12 | PS-H 800x1100 | PS-H 1000x1400 | PS-C 5-10 | PS-C 5-12.5 |
|---|---|---|---|---|---|---|---|---|---|
| Scale-up factor | F=ca. | 1.0 | 2.0 | 2.7 | 4.8 | 4.4 | 6.5 | 2.5 | 3.1 |
| Infeed opening | mm | 400x500 | 400x1000 | 440x925 | 620x1230 | 815x1120 | 1020x1425 | 1000 | 1250 |
| Motor | max. kW | 18.5-45 | 37-75 | 75-90 | 110-160 | 75-132 | 110-160 | 45-75 | 55-90 |

# PULVERIZING

## The right mill for each requirement

PALLMANN offers a large line of turbo mills, pin mills, universal mills, classifier mills, disc mills, hammer mills, screen mills and double stream mills for many different applications and materials for the chemical, pharmaceutical and feedstuff industry as well as the mineral, wood and plastic industry. PALLMANN engineers and supplies complete installations for any required capacity.


Fig.1

Fig.2

Fig.3

Universal Mills, type PX are used for disagglomeration, preparing, coarse, medium fine up to 5 micron. All soft to medium hard materials (hardness 3 according to Mohs) for dry, moist or wet grinding, even of fatty, adhesive materials.

The feed stock comes centrally into the grinding chamber. Size reduction is done according to the requirements: either between rotating impeller and stationary grinding path or between rotating impeller and stationary screen ring. The ground material is either sacked underneath the machine or mechanically or pneumatically conveyed.

A lot of easily exchangeable grinding elements make the Universal Mill highly flexible for a large number of size reduction problems.

Fig.
1. Grinding installation with Pin Mill, type PX
2. Dust collector with blower and muffler
3. Double Stream Mill
4. Counter-rotating Pin Mill, type PPST
5. Pin Mill in monoblock design
6. Cryogenic Pin Mill

| Type | | PX 315 | PX 500 | PX 630 | PX 1000 |
|---|---|---|---|---|---|
| Scale-up factor | F=ca. | 1.0 | 2.4 | 4.0 | 8.6 |
| Rotor diameter | mm | 315 | 500 | 630 | 1000 |
| Motor | max. kW | 18.5 | 45 | 75 | 160 |

## Pin Mills, Type PST and PPST

Pin Mills, type PST are used for fine to finest grinding of dry, brittle, or hard grind materials to a fineness of d50 = 5 micron.

Centrical infeed by dosing mechanism and magnetic separator. Grinding is done by impact and whirling between the concentrically mounted pin rows of the rotating and the stationary discs. Particle size is determined by speed, number and type of pins.

Pin mills, type PPST are high-speed, counter-rotating machines are working without a screen. Pin rows, concentrically fixed on rotor- and stator discs, mirconize the particles.

Special designs for cryogenic applications are available.

Fig.4

Fig.5

- Easy access to the grinding chamber due to large door
- Very fine powder due to high speed
- Special design for cryogenic grinding

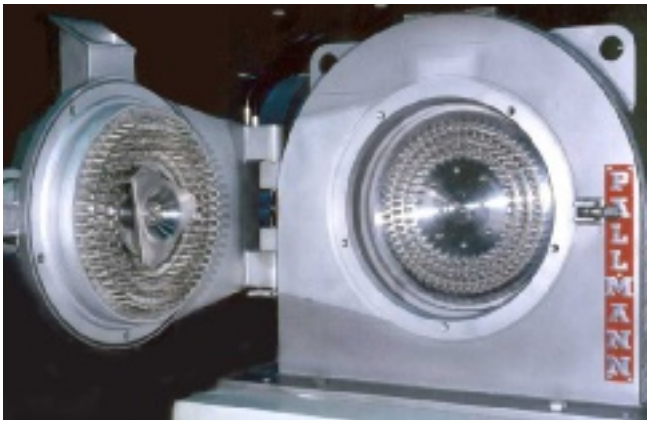


Fig.6

| Type | | PST 315 | PST 500 | PST 630 | PST 1000 | PPST 250 | PPST 315 | PPST 400 | PPST 630 |
|---|---|---|---|---|---|---|---|---|---|
| Scale-up factor | F=ca. | 1.0 | 1.5 | 2.0 | 3.3 | 0.7 | 1.0 | 1.6 | 3.7 |
| Rotor diameter | mm | 315 | 500 | 630 | 1000 | 250 | 315 | 400 | 630 |
| Motor | max. kW | 22 | 37 | 55 | 75 | 11+22 | 15+30 | 30+45 | 75+75 |

# PULVERIZING

## Turbo Mill, type PP

Fig.1

The screenless, counter-rotating PALLMANN Turbo Mill, type PP occupies a special position amount the well-known grinding systems.
There is hardly an other mill with such a versatile application: Grinding, fiberizing and mixing of dry, moist to pasty materials, also together with liquids and grinding of heat-sensitive thermo-plastics.

Size reduction of particles, speeded up by the impeller, is done by impact, friction, whirling or shearing according to their quality and the profiles of the exchangeable grinding elements.
Main advantages of the Turbo Mills are high wear resistance, easy adjustment of the desired fineness by setting the gap, gap sifting and good accessibility.

## Turbo Mill, type Ref

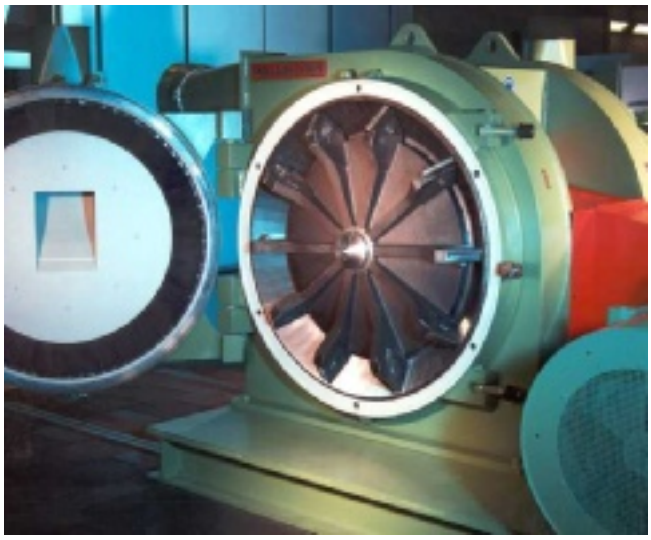


Fig.2

The Turbo Mill, type REF is used for medium to finest grinding and fiberizing of soft to medium hard materials (about 3 according to Mohs) to particle size up to 5 micron.
The particle size desired can be adjusted by different grinding elements and the air flow through the mill.
Like all PALLMANN mills, its construction has proven to be extremely sturdy and reliable and has stood the test in hardest continuous operation.

According to the GMP- and FDA-regulations and to the standards of the pharmaceutical industry, PALLMANN offers machines and installations for the pharmaceutical, drug, food and feedstuff industry. which match the strict CIP and SIP specifications.

| Type | | PP4S | PP6S | PP8S | PP12S | REF 4 | REF 6 | REF 8 | REF 12 |
|---|---|---|---|---|---|---|---|---|---|
| Scale-up factor | F=ca. | 0.6 | 1.0 | 1.7 | 2.9 | 0.6 | 1.0 | 1.7 | 2.9 |
| Rotor diameter | mm | 400 | 600 | 800 | 1200 | 400 | 600 | 800 | 1200 |
| Motor | max. kW | 7.5+15 | 11+30 | 18.5+45 | 22+75 | 22 | 45 | 75 | 132 |

## Double Stream Mill, type PSKM

Double Stream Mills, type PSKM are used for gentle pulverizing of dry or moist, soft to medium hard materials. They are used for fiberizing cellulose materials, wood and annuals plants. They ensure cool grinding at high throughput capacities and narrow particle size distribution.

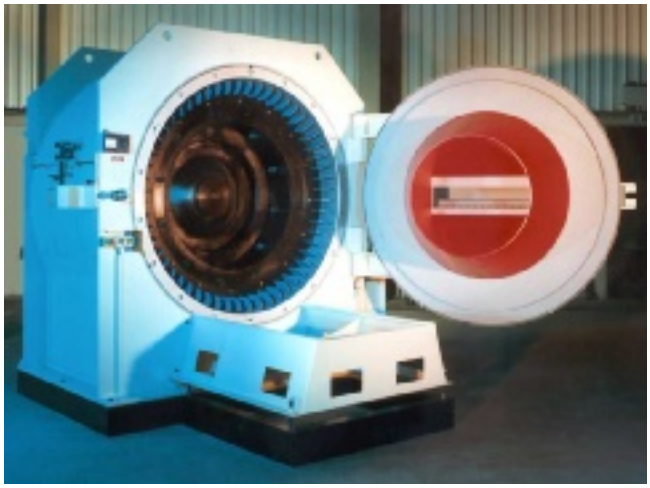


Fig.3

## Contra-Selector Mill, type PPS

Contra-Selector Mills, type PPS feature a rotating screen basket with an impeller on the inside. They are preferred for pulverizing of greasy, sticky and moist products.
Thus, materials like press cakes, detergents, pigments, cellulose ether or spices, can be processed to fine powders under ambient conditions.

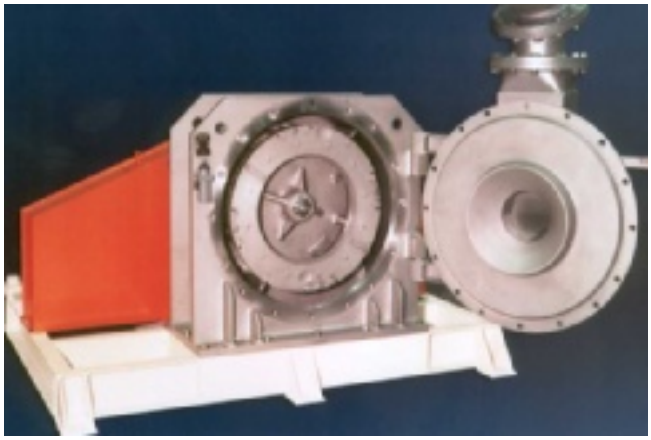


Fig.4

Fig.
1. Turbo Mill, type PP
2. Turbo Mill, type REF
3. Double Stream Mill, type PSKM
4. Contra Selector Mill, type PPS

| Type | | PSKM 8-460 | PSKM 10-530 | PSKM 12-600 | PSKM 14-660 | PPS 6-180 | PPS 8-240 | PPS 10-300 | PPS 14-420 |
|---|---|---|---|---|---|---|---|---|---|
| Scale-up factor | F=ca. | 1.0 | 1.3 | 1.6 | 2.3 | 1.0 | 1.7 | 2.7 | 5.0 |
| Rotor diameter | mm | 800 | 1000 | 1200 | 1400 | 600 | 800 | 1000 | 1400 |
| Motor | max. kW | 110 | 160 | 250 | 315 | 55+30 | 110+55 | 160+90 | 400+250 |

# PROCESS MACHINERY

## Turbofiner, type PLM


Fig.1

The Turbofiner, type PLM is a high-capacity size reduction machine for fine grinding of wet, pasty, heat-sensitive, organic and inorganic products into free-flowing powders. They are also used for grinding and drying in one step.

The fineness of the material is determined by the retention time of the material in the grinding zone, the speed of the rotor, the grinding tools and the pattern of the profiles on the grinding path or in combination with a screening machine.

## Refiner, type PR


Fig.2

For wet and dry defibration of organic materials and for the production of free-flowing pulps which can be conveyed by either pump or by steam pressure, PALLMANN has developed the Refiner, type PR. The machine can be equipped with steel discs, toothed discs or corundum discs.
Setting and maintaining of the refining gap and pressure are done hydraulically. These machines are working successfully all over the world e.g. for high quality defibration of leather waste, such as chrome split leather, chrome shavings or punchings for the production of LEFA board, for defibration of cardboard and wood and even for fine grinding of rice, corn and soy for starch production.

Fig.
1. Turbofiner, type PLM
2. Refiner, type PR
3. Rotorcutter, type PZC
4. Palltruder®, type PFV

| Type | | PLM 800 | PLM 1250 | PLM 1400 | PLM 1800 | PR 6 | PR 8 | PR 10 | PR 14 |
|---|---|---|---|---|---|---|---|---|---|
| Scale-up factor | F=ca. | 1.0 | 2.4 | 3.0 | 5.0 | 0.6 | 1.0 | 1.5 | 2.5 |
| Rotor diameter | mm | 800 | 1250 | 1400 | 1800 | 600 | 800 | 1000 | 1400 |
| Motor | max. kW | 45-90 | 132-200 | 160-315 | 250-560 | 37-55 | 75-110 | 90-132 | 140-250 |

## Rotorcutter, type PZC

The Rotorcutter, type PZC can process all cuttable products to cubes, strips or slices.
Fields of application are the processing of frozen meat, fish and offal for the preparation of dog- and cat food, the size reduction of frozen fruit for the production of ice-cream, dairy products and fruit-juice as well as all kinds of vegetables and fruit.

The Rotorcutter is equipped with a robust machine housing and a generously dimensioned bearing for the demanding industrial, around the clock operation.

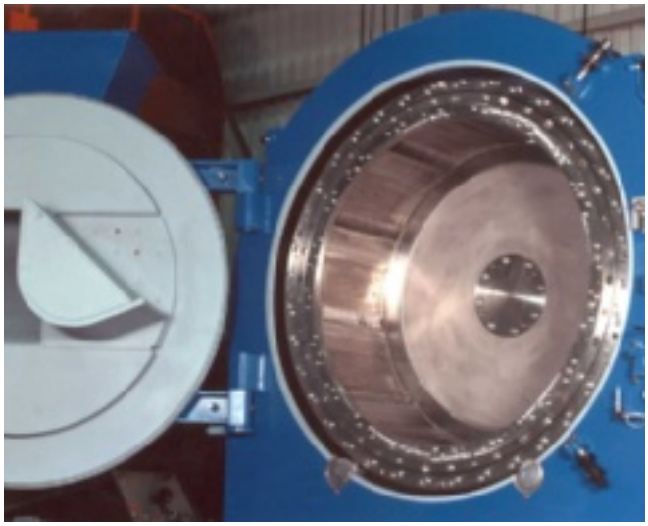


Fig.3

## Palltruder®, type PFV

For the production of compounds from thermo-plastics and rubber with fillers of any kind in different mixing ratios, PALLMANN has developed the Palltruder®

Plastic powders, film, fibers and foam as well as rubber granules or powder with inorganic or organic fillers in powder or fiber form such as limestone, talc, wood flour, cellulose powder, paper, leather, textiles, sugar cane bagasse, cotton sticks, rice hulls etc. can be processed into free flowing, homogenous granules with the Palltruder® .

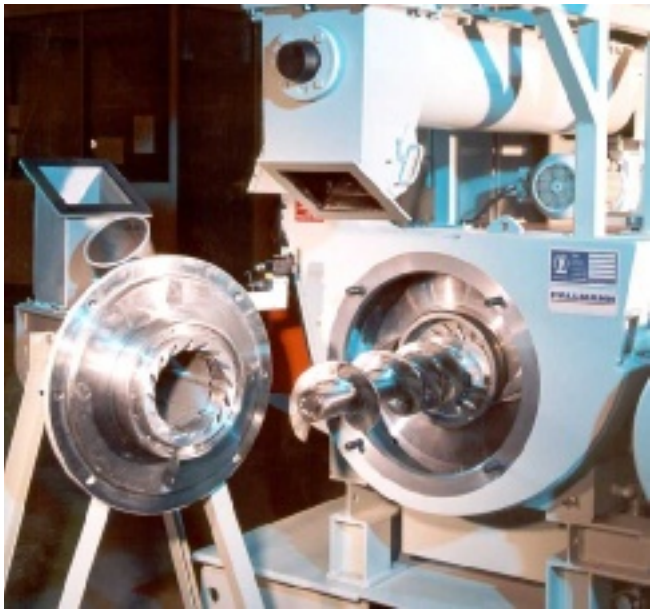


Fig.4

| Type | | PZC 8-300 | PZC 14-525 | PFV 120 | PFV 200 | PFV 250 | PFV 315 | PFV 400 | PFV 600 |
|---|---|---|---|---|---|---|---|---|---|
| Scale-up factor | F=ca. | 1.0 | 3.0 | 0.2 | 0.2 | 1.0 | 1.3 | 1.8 | 4.4 |
| Rotor diameter | mm | 800 | 1400 | 120 | 200 | 250 | 315 | 400 | 600 |
| Motor | max. kW | 55+15 | 160+37 | 22-30 | 45-55 | 55-90 | 75-132 | 90-160 | 315-500 |

# MILLS FOR LABORATORY AND PILOT PLANTS

## Universal Mill, type PXL

The Universal Mill, type PXL 18 is utilized for processing of chemical materials, pharmaceutical products, food and feedstuff, fertilizers, drugs, spices, pigments, dairy products, minerals, cellulose and wood.
This mill covers the full range of size reduction from coarse to superfine grinding down to minus 20 micron and product hardness up to 3 according to the Mohs scale.

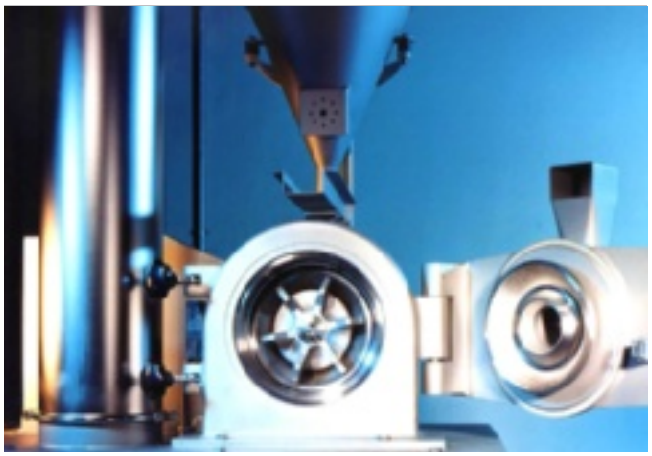


Fig.1

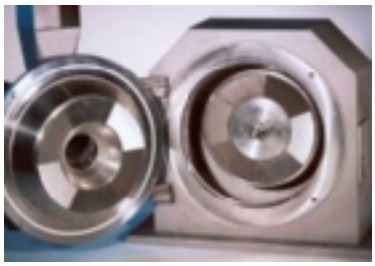
Due to the unique and wide selection of interchangeable grinding components and due to numerous possible combinations, there are hardly any limits to the field of applications for the Universal Mill, type PXL 18

**Interchangeable grinding components**

- Pin disc set
- Knife mill set
- Disc set PKM
- Turbo impeller
- Double stream impeller
- Wing beater
- Grinding track
- Screen ring
- Turbo mill set REF
- Circular beaters

Pin disc set

Knife mill set



Disc set PKM

Turbo impeller

Wing beater

## Universal Mill, type PPXL

The Universal Mill, type PPXL is a counter rotating mill used for pulverizing of greasy, sticky and moist materials under ambient temperature or for cryogenic grinding. Numerous grinding inserts are available and make the application s for this mill very versatile.

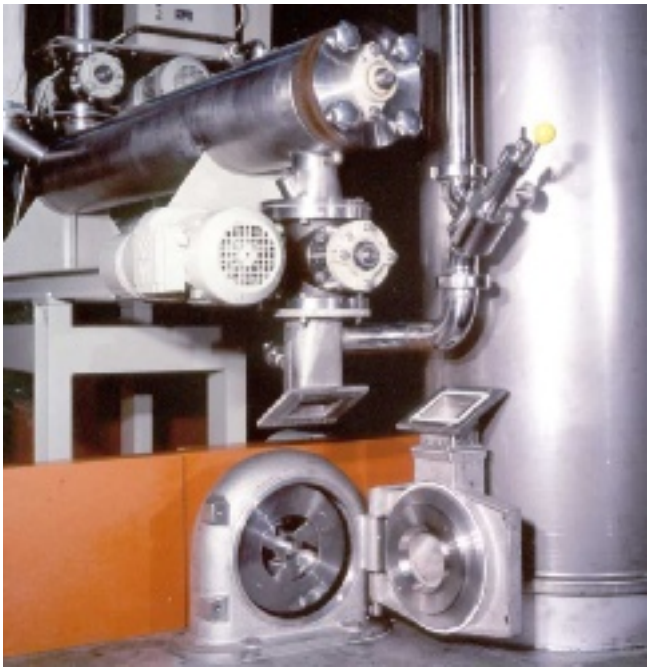


Fig.2

**Decisive advantages**

- Easy access for cleaning and exchanging of the grinding components
- Machine housing in welded design
- Bearing assembly flanged to the rear wall of the housing
- Bearing seals gas-flushed

**Special designs available**

- Product contact parts made of stainless steel
- Polished surfaces
- Explosion pressure resistant up to 10 bar
- Designed for operation under inert atmosphere and cryogenic grinding

Fig.
1. Turbo Mill, type PXL 18
2. Laboratory Mill, type PPXL 18
3. Disc Mill, type PKM
4. Cone to measure flowability
5. Sreen to measure particle size

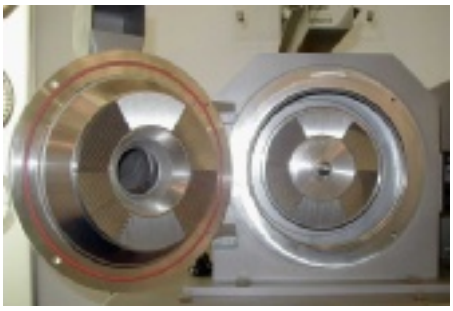


Fig.3

Fig.4

Fig.5

| Type | | PXL18 | PPL18 |
|---|---|---|---|
| Scale-up factor | F=ca. | 1.0 | 1.0 |
| Rotor diameter | mm | 180 | 180 |
| Motor | max. kW | 7.5 | 3.0+1.5 |

## The PALLMANN Group of Companies

The PALLMANN Group of companies is a leading manufacturer for size reduction machines and systems for the process industries. PALLMANN Maschinenfabrik develops and manufactures machines and complete systems according to customer requirements or as standard solutions for the preparation of almost any material as well as recycling products. In its headquarters in Zweibrücken, PALLMANN operates one of the world's largest research and technology centers as well as a training- and service center. More than 130 different test machines are available for the preparation of a wide variety of materials. A downstream laboratory analysis of the test material as well as the preparation on a production scale is possible. In addition to the manufacturing facilities in Europe, North- and South America, the PALLMANN group of companies operates a world-wide spare parts- and service network.


## The PALLMANN Program

**Engineering and Service:**

Design and manufacturing
Research and development
Production scale testing
Laboratory analysis
Worldwide service
Spare parts
Controlling
Process Control
Installation & Start-up
Overhaul & Repair

**System solutions for:**

Pulverizing
Granulating
Agglomerating
Recycling

**Products:**

Agglomerators
Pulverizing Systems
Disc Mills
Turbo Mills
Pin Mills
Laboratory Mills
Universal Mills
Complete Grinding Systems
Knife Mills
Profile Shredders
Rubber Granulators
Pipe Crushers
Air-Swept Mills
Impact Mills
Industrial Granulators
Cryogenic Grinding Systems

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