PALLMANN

Preparation of Plastics

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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

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 Research and Technology Center are a unique basis for safe investment decisions.

Fig. 1 PALLMANN headquarters
Fig. 2 PALLMANN do Brasil
Fig. 3 PALLMANN Mahlwerke
Fig. 4 Research and Technology Center

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Desagglomerating
Crushing
Shredding

Granulating
Cutting
Chopping

Grinding
Pulverizing
Fiberizing

Cryogenic Grinding
Wet milling
Dry Grinding

Agglomerating
Classifying
Separating

Injection Moulding

The economical size reduction for inline- as well as offline-recycling of sprues and thin-walled rejects from tough elastic to brittle plastics requires special knife mills.

Compact design with a low feed height, reliable and quiet during continuous operation, quick and easy cleaning when changing products, reasonably priced and low operating costs.
PALLMANN Ultra-Granulators™, series L, LX and K are specifically designed for the requirements of the injection moulding industry.
Feeding can be performed by means of sprue puller systems, with conveyor belts and part separators or by hand.
The product is discharged into a collecting bin, designed for standard vacuum-conveying systems or pneumatic vacuum-pressure conveying systems.

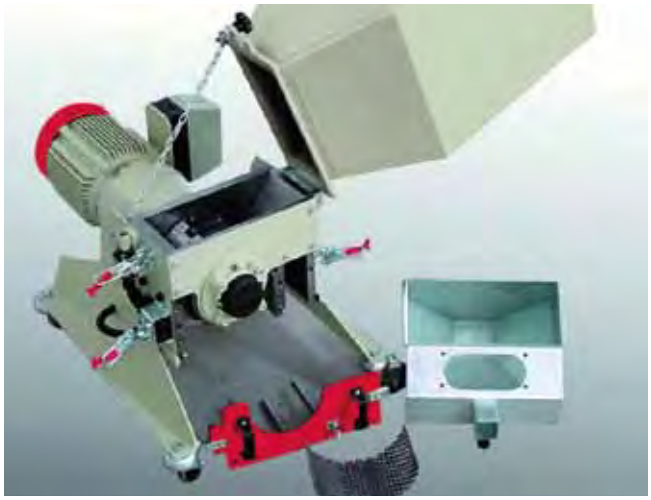

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Fig. 1 PALLMANN Ultra-Granulator™, series PS-L
Fig. 2 Plastic sprues
Fig. 3 PALLMANN Ultra-Granulator™, sound-insulated
Fig. 4 PALLMANN Ultra-Granulator™, series PS-LX
Fig. 5 Plastic rejects

Technical Data

Type		PS-L 180x120	PS-L 180x300	PS-LX 300x400	PS-LX 300x800	PS-K 200x300	PS-K 300x300	PS-K 400x500
Infeed Opening	mm	350x250	350x350	400x400	400x800	206x306	306x306	408x508
Rotor diameter	mm	180	180	300	300	200	300	400
Rotor type		T 3	T 3	T 3	T 3	SS 2	SS 3	SS 3
Motor	kW	2,2	4	7,5	15	4-7,5	7,5-15	22-45
Throughput rate	kg/h	20-30	50-90	80-120	160-240	90-120	160-260	250-800

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Fig. 1 PALLMANN Ultra-Granulator™ series PS-H
Fig. 2 PALLMANN Ultra-Granulator™ series PS-T with draw-in device
Fig. 3 System set-up PS-T for skeletons

Blow-moulding

For the economical size reduction of blebs and rejects, occurring during the blow moulding process, PALLMANN offers specially developed Ultra-Granulators™, series K and H.
A compact design and integrated sound insulation allow installation directly next to the production machine or as a centrally located unit.

Thermoforming

During the manufacturing of thermoformed packaging materials, skeletons occur continuously that are size reduced directly inline using PALLMANN developed Ultra-Granulators™, series T.
The start-up film waste and/or skeletons are directly fed into the Ultra-Granulator™ via draw-in device whereby an upstream reversing system transforms the advance cycle of the thermoform-line into a continuous feeding of the Ultra-Granulator™
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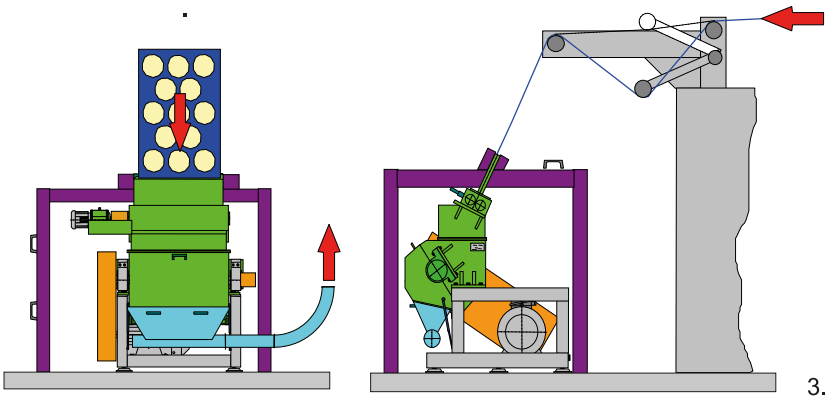

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Technical Data

Type		PS-K 300x500	PS-H 400x700	PS-H 500x900	PS-H 600x900	PS-H 800x1100	PS-H 1000x1400	PS-T 300x900	PS-T 500x900	PS-T 500x1400
Infeed Opening	mm	306x508	408x715	508x915	610x915	815x1120	1020x1425	405X850	508x850	508x1350
Rotor diameter	mm	300	400	500	600	800	1000	300	500	500
Rotor type		SS 3	FW 4	FW 4	FW 6	FW 6	SD 9	SD 3	SD 5	SD 5
Motor	kW	11-22	30-55	45-75	45-75	75-132	110-160	15-30	37-55	75-90
Throughput rate	kg/h	180-300	300-1100	400-1600	500-1800	800-2900	1100-4000	400-650	650-1300	1000-1650

Size reduction of pipes

Production waste as well as rejected pipes, pipe bends, socket ends etc., occurring during the manufacturing of plastic pipes, can be economically size reduced, at low cost, with PALLMANN pipe crushers.
Depending on the feed material and the local conditions, the material can be fed horizontally or via a feed chute, installed at ground level, with an integrated load-controlled pusher. For these cases, the PALLMANN pipe crusher, type PSR is used. If the machine is installed in a basement or in a pit, feeding can be performed by means of a hydraulic tipping chute. For this application, PALLMANN pipe crushers, type PS-R are used. Both series stand out due to their robust design, easy accessibility and simple handling. Material feeding is performed load-controlled by current consumption of the main motor.

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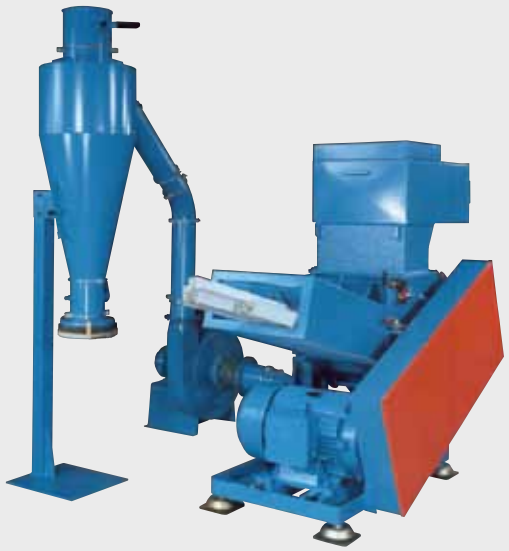

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Size reduction of profiles

Production waste and cut-offs from the manufacture and preparation of items such as windows, shutters, siding profiles etc., are size reduced using the PALLMANN Ultra-Granulator™, series PSP. The horizontally fed profiles are automatically drawn in by means of the specially designed rotor. Short waste pieces can be fed either by conveyor or from the top. Size of the granulated material is determined by the screen hole size.

Size reduction of sheets

Waste and rejects, occurring during the manu-facturing and processing of sheets, whether massive or foamed can be size reduced by means of PALLMANN Ultra-Granulators™, type PHK into granules of defined size. A controlled material feeding via the upstream conveyor belt with a simul-taneous horizontal feeding is possible due to the integrated draw-in rollers.

Fig. 1 Pipe Crusher, series PSR with tipping chute
Fig. 2 Pipe Crusher, series PSR
Fig. 3 Ultra-Granulators™, series PSP
Fig. 4 Ultra-Granulators™, series PHK

Technical Data

Type		PSR 8-6	PSR 12-8	PSR 16-12	PSP 400x500	PSP 500x700	PHK 120x700	PHK 220x900
Infeed Opening	mm	360x560	755x750	1000-1150	185x460	245x650	120x700	220x900
Rotor diameter	mm	600	1200	1600	400	500	400	600
Rotor type		FW 6	FW 8	FW 10	SW 8	SW 8	F 5	F 5
Motor	kW	75-90	132-160	160-250	37-45	37-55	45	75-110
Throughput rate	kg/h	600-2000	1200-3600	1600-5000	400-1200	600-1500	500-3000	1000-6000

Size reduction of rubber

For the economical size reduction of natural and synthetic rubber of any kind in form of bales, sheets or chips, vulcanized or unvulcanized, with or without textile reinforcement, PALLMANN offers Ultra-Granulators™, series PS-C.

PALLMANN has specifically designed guillotine rotors, in completely open design without central rotor shaft and with high rotor inertia. Thanks to the patented feeding system, also extremely difficult temperature-sensitive materials can be reduced in size.

Well proven metering and recovery systems are available for any type of application. Standard one-, two- or three-step size reduction systems can be offered. We specialize in custom-designed complete production lines.

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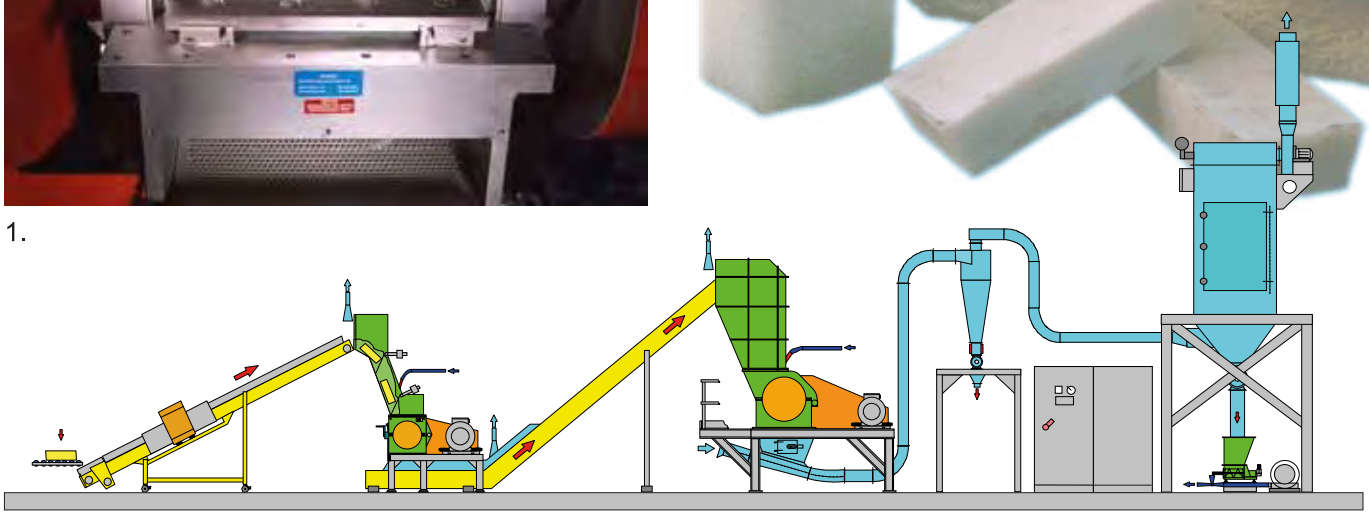

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Tailor made Systems

Besides the standard systems for the size reduction of rubber bales, PALLMANN supplies individually designed preparation systems for any other type of application in the rubber industry.

PALLMANN Ultra-Granulators™, series PS-C are used whether rolled sheets are to be size reduced or granules of rubber floor manufacturers are to be produced.

By using different feed systems such as conveyor belts, live roller conveyors, vibratory feeders or draw-in roller systems, the feed material in a wide variety of forms and sizes can be fed into the PALLMANN Ultra-Granulator™, series PS-C. Material storage bins, before and after size reduction, allow a fully automatic and therewith cost-effective operation of the system without tying up valuable personnel resources. The employment of a lifting device, i.e. vacuum gripper, assists the operator in preparing the bales for later size reduction.
Proven sound proofing measures for noise reduction can be offered based on individual requirements.

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Switch and control systems in proven conventional technology (VPS) and programmable (SPS) technology are part of our standard scope of supply.

Fig. 1 Cutting chamber with guillotine rotor
Fig. 2 Ultra-Granulator™, series PS-C 6-6
Fig. 3 2-step rubber granulator system
Fig. 4 Ultra-Granulator™, series PS-C 8-12

Technical Data

Type	PS-C	4-5	4-7.5	4-10	6-6	6-9	8-6	8-9	8-12
Infeed opening	mm	510x500	510x750	510x1000	560x630	560x930	820x625	820x930	820x1250
Rotor diameter	mm	400	400	400	600	600	800	800	800
Rotor type		G3	G3	G3	G3	G3	WG6	WG6	WG6
Motor	kW	37-55	55-90	75-110	55-90	90-132	90-132	110-200	132-250
Throughput rate Pre-cutting	kg/h	800-4000	1100-5500	1500-7000	1200-6500	1700-9000	1500-8000	2200-11000	3000-15000
Throughput rate Granulating	kg/h	200-2000	300-2500	400-3750	350-3000	450-4000	450-3500	600-5300	800-7000

Film recycling

Rationalization of production and recycling of high value raw materials are some of the most important goals of any future-oriented film producer.

The utilization of PALLMANN Ultra-Granulators™, series PS-F is an important building block of a modern, efficient production organization. Film recycling requires the know-how of specialists. PALLMANN offers specific know-how for continuous, trouble-free recycling of trim waste as well as of film rolls, film packets, loose and tangled film and sheets.

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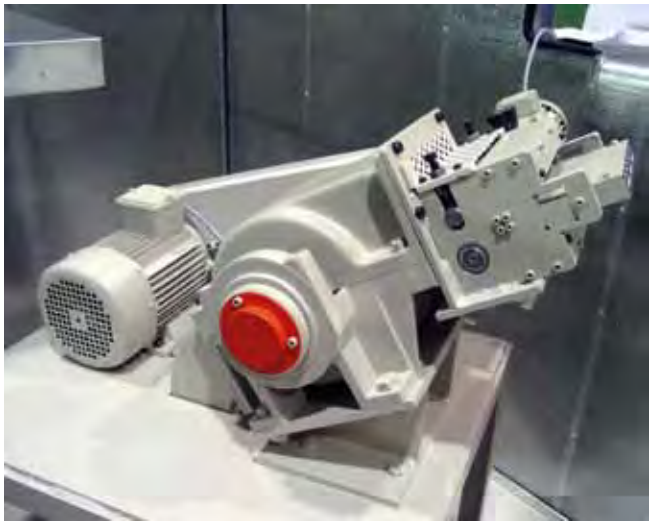

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Technical Data

Type		PSF 200x150	PS-F 4-5	PS-F 4-7,5	PS-F 4-10	PS-F 6-9	PS-F 8-12	PS-F 8-15	PS-F 12-20
Infeed Opening	mm	100x150	350x500	350x750	350x1000	550x900	750x1200	750x1500	1200x2000
Rotor diameter	mm	200	400	400	400	600	800	800	1200
Rotor type		GS 2	GS 3	GS 3	F 5	FW 6	FW 8	FW 12	SD 15
Motor	kW	2,2	18,5-45	22-55	75-110	75-110	110-200	132-200	160-250
Throughput rate	kg/h	100-1000	150-660	220-990	320-1480	400-1780	700-3000	900-3750	1500-7000

Industrial Granulators

At this day and age there is a steadily increasing demand for larger plastic parts in any field of the plastic- and chemical industry. The thereby resulting valuable recycling of these material quantities requires the utilization of larger and more efficient Ultra-Granulators™.

PALLMANN's decades of experience in manu-facturing these machines guarantees decisive competitive advantages. PALLMANN supplies Ultra-Granulators™ specifically adapted to each application, that reliably size reduce anything which can be cut.

PALLMANN Ultra-Granulators™ , series PS-I, are, corresponding to the requirement, generally designed in fully welded steel construction, the rotors are stress-relieved, precisely manufactured and electro-dynamically balanced.

Fig. 1 Knife Mill for edge trimmings, type PSF 200x150
Fig. 2 Ultra-Granulator™, series PS-F 4-5 with draw-in device
Fig. 3 Ultra-Granulators™, series PS-F 12-20
Fig. 4 Ultra-Granulator™, series PS-I 8-12
Fig. 5 Ultra-Granulator™, series PS-B 800x1250

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Technical Data

Type		PS-I 6-6	PS-I 6-9	PS-I 8-6	PS-I 8-9	PS-I 8-12	PS-I 8-15	PS-I 12-12	PS-I 12-18
Infeed Opening	mm	600x600	600x900	800x600	800x900	800x1200	800x1500	1200x1200	1200x1800
Rotor diameter	mm	600	600	800	800	800	800	1200	1200
Rotor type		FW 6	FW 6	FW 6	FW 6	FW 6	FW 6	FW 8	FW 8
Motor	kW	55-75	75-90	75-132	90-132	110-160	132-200	132-200	200-315
Throughput rate	kg/h	300-1200	500-1800	450-1600	600-2400	750-3000	900-3600	750-3600	1200-6000

Pulverizing Systems

The steadily increasing demand for powders and rubber of any kind as well as the constantly expanding requirements with regards to flowability, particle size distribution and grain structure call for pulverizing systems of most modern technology.

PALLMANN pulverizing systems for plastic and rubber operate on a special processing principle. Granulated material is fed into the mill by means of suitable dosing systems. A suction system optimally designed for this application draws the ground material out of the mill. For fully automatic, round the clock operation, the systems are equipped with specially developed controls for temperature and current consumption.

Different screening systems are used to achieve the desired powder qualities. Coarse material from the screen is reintroduced into the mill via a closed-loop system.
The finished product is weighed in bags, filled into containers or conveyed to downstream processes and silo systems. Standard systems for installation on the production floor are available. An individual installation in multi-story buildings is possible at any time depending on the local conditions.

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Fig. 1 Feed granules
Fig. 2 Standard pulverizing system with Polygrinder® type PKM 800
Fig. 3. Pulverized plastic powder
Fig. 4 Compact pulverizing system, type PKMM 600V18
Fig. 5 Pulverizing system with Polygrinder®, type PM 300
Fig. 6 Pulverizing system without screening, type PKM 450

With the Polygrinder®, type PM, high quality powders are gained for masterbatch production and compounding.
The user can process a wide spectrum of materials such as PE, PP, PA, PC etc. at ambient temperature. The interior of the mill is smooth and without any dead corners thereby guaranteeing easy and quick cleaning when changing material or colors.

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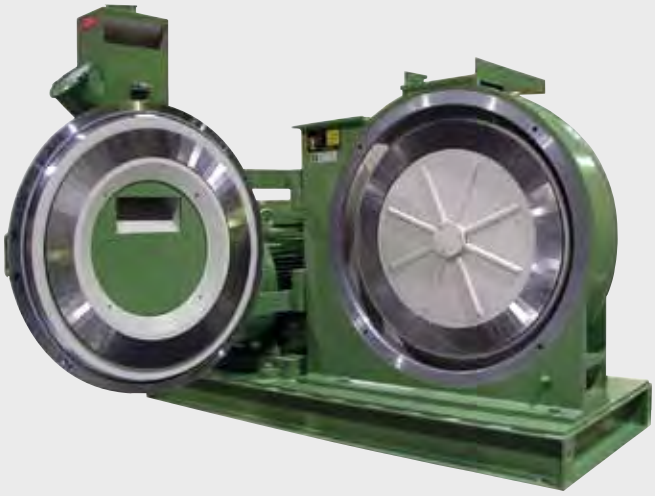
Technical Data

Type		PP 4S	PP 6S	PP 8S	PM 300	PM 500	PKM 300	PKM 450	PKM 600	PKM 800
Grinding chamber ∅	mm	400	600	800	300	500	300	450	600	800
Motor	kW	7,5+15	11+30	18,5+45	30-37	45-55	37	55	90	132
Troughput rate	kg/h	20-100	90-200	180-360	100-300	250-950	150-200	250-350	450-650	750-1200

Turbo Mill, type PP

Finest powders with excellent flowability are used in the textile and metal industry for surface coatings. PALLMANN is the number 1 contact address for the pulverization of these thermoplastics, as they are normally very difficult to pulverize due to their high MFR. These plastics are mainly LDPE, HDPE, PE and EVA. Many of these materials can be pulverized on PALLMANN special mills under ambient temperature with no need for any cooling agents. The economic efficiency is foremost. Compact and efficient systems solve this task.



Polygrinder®, type PKM

The PALLMANN Polygrinder® is used for the pulverization of plastics such as HDPE, LLDPE, PP, PVC, ABS, PA PES etc. The mill is mainly used in the rotational moulding industry, during the production of masterbatch as well as during the recycling of granules from pipe- and profile waste. The Polygrinder® produces high quality powders with high bulk density, narrow particle size distribution as well as an ideal flow time.

Technical Data

Type		PP 4S	PP 6S	PP 8S	PKM 300	PKM 450	PKM 600	PKM 800
Power factor	F=ca.	0.6	1.0	1.7	0.4	0.6	1.0	1.8
Rotor diameter	mm	400	600	800	300	450	600	800
Motor	kW	7.5x15	11+30	18.5+45	37	55	90	160

Turbofiner®, type PLM

The Turbofiner® is a high-capacity size reduction mill for the production of finest powder qualities from soft to medium hard materials. If the Turbofiner® is additionally equipped with a hot gas producer, the material can be ground and dried in one step.

Typical materials for the pulverization in the Turbofiner® are elastomers and plastics, composites and recycled materials.

Precision Knife Mill, type PS

Precision Knife Mills allow the processing of film in form of rolls, edgings and loose material, cellulose, linters, textiles as well as natural- and synthetic fibers, thereby producing finest powders with a smooth particle surface and high bulk density. Furthermore, Precision Knife Mills are used for the recycling of valuable material such as soft metal chips and foamed material.

Technical Data

Type		PLM 800	PLM 1000	PLM 1250	PLM 1400	PLM 1800	PS 5-10	PS 5-12,5
Power factor	F=ca.	1.0	1.6	2.4	3.0	5.0	1.0	1.25
Roto diameter	mm	800	1000	1250	1400	1800	600	800
Motor	kW	45-90	90-132	132-200	160-315	250-560	37-55	75-110

The Plast-Agglomerator

The proven system for the continuous production of free flowing granules from thermoplastics of any kind.
The standard Plast-Agglomerator system consists of the following processing steps: Granulating, pneumatic conveying, storing, feeding, agglomerating, hot-melt granulating, pneumatic vacuuming, pre-cooling, air classifying, transport and cooling. Depending on the material and specific application, these units are put together to an optimum system and the system concept is adapted to the requirements. The Plast-Agglomerator, type PFV is available in different sizes with throughput rates from approximately 20 to over 4000 kg/h.

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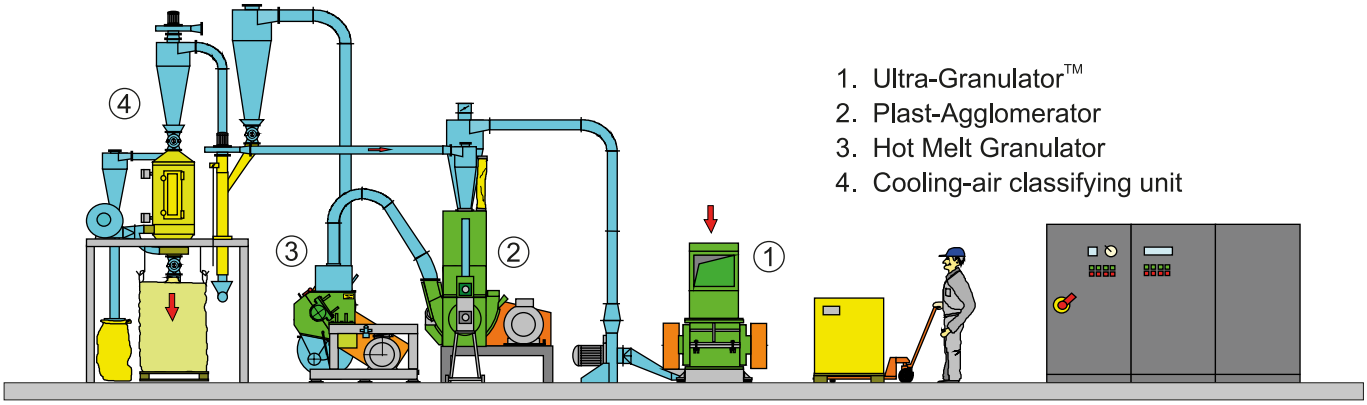
Characteristics

- Excellent free-flowing agglomerate with high bulk density
- Material-gentle agglomeration by means of frictional heat
- Fully automatic start from a cold condition
- Low space requirement due to compact design
- Fully automatic continuous operation

Fig. 1 Plast-Agglomerator, type PFV 315
Fig. 2 Schematic of a Plast-Agglomerator System
Fig. 3 Agglomeration chamber, open
Fig. 4 Schematic of the agglomerating process



1. Ultra-Granulator™
2. Plast-Agglomerator
3. Hot Melt Granulator
4. Cooling-air classifying unit

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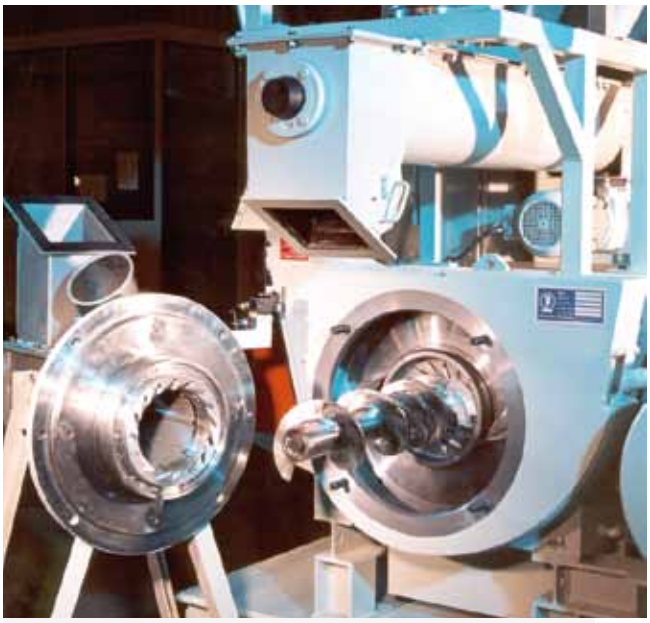

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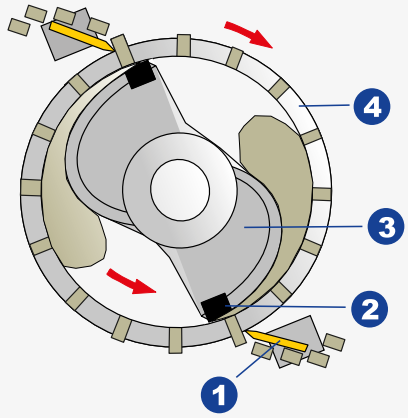

1. Knives
2. Pressure piece
3. Agglomerating vane
4. Die

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Principle of operation

From a feed hopper, an auger feeds the material to the agglomerating chamber. Agglomeration is done in a fraction of a second, right below the melting point of the material. The agglomerated material is pressed through the holes of a die.

The retention time in the agglomerating chamber is only a fraction of a second.
Material exiting the die is cut by rotating knives and then conveyed by air to a cyclone separator into the hot-melt granulator. Here, the material is granulated to equal-sized granules. The hole size of the selected screen determines the size of the granules.
Depending on the material and the application, fines can be separated and returned to the agglomerator by means of a gravity sifter. Additional cooling of the granules can be obtai-ned by using a granules cooler.
The functions of the single system components are controlled from a centrally located control box.
An overload control automatically regulates the material infeed to the agglomerator. The system is controlled by means of stored program control (PLC).

Technical Data

Type		PFV	120	200	250	315	400	600
Drive, pre-cutting mill		kW	7,5-15	7,5-22	18,5-45	30-75	75-110	110-160
Drive, agglomerator		kW	22-30	45-55	55-90	75-132	90-160	315-500
Cool water consumption		l/h	400-800	700-1100	700-1100	700-1100	700-1100	900-1300
Drive, hot-melt granulator		kW	3-3,5	15-22	22-30	30-45	45-75	75-90
Total, installed capacity		kW	45-65	88-120	120-189	165-280	243-379	549-799
Throughput rate, i.e								
Film	450 g/l	kg/h	400-120	150-250	350-500	500-700	700-1000	1600-2000
Fiber	430 g/l	kg/h	60-60	100-150	250-450	350-550	750-700	900-1300
Foam	450 g/l	kg/h	60-80	150-200	300-500	500-700	700-900	1000-1500

Wood-Plastic-Composites

PALLMANN has set new standards in the production of wood plastic granules with the development of the Palltruder®.
An improved product quality, higher throughput rate and a broad processing range characterize Palltrusion™ technology.
The Palltruder® produces an optimum end product: Granules with reproducible quality affecting a wide material spectrum – at low cost.

The granules produced, Pallwood®, are further processed in additional production processes such as extrusion, injection moulding, pressing, i.e. P-Fix®, etc. into high quality end products.

Wood flour

Plastic granules

PALLWOOD®

End products:

Profiles

Injection-moulded parts

Panels

Technical Data

Type	PFV	250	400	600
Drive Palltruder®	kW	75-90	200-250	400-500
Cool water consumption	l/h	300-500	500-700	1.000-1.400
Throughput rate	kg/h	200-500	500-1.200	800-2.000

The mixing ratio, the type of plastic and the natural fibers as well as their moisture content are decisive for the throughput rate to be achieved by the system.
The effectiveness of the Palltruder® is improved by the integration of intelligent, gravimetrical sensor technology. The quality of the granules produced is kept constant by stabilization of the mass throughput.

Fibers from natural materials – especially wood flour, plastic chips or flakes, fibers or powders as well as lubricants and other additives are equally dosed into the Palltruder®.
Frictional heat and high pressure, produced by a screw ending in a special pressure disc work the plastic into the natural fibers.
Rotating knives at the outside diameter of a die cut the palltruded material into free

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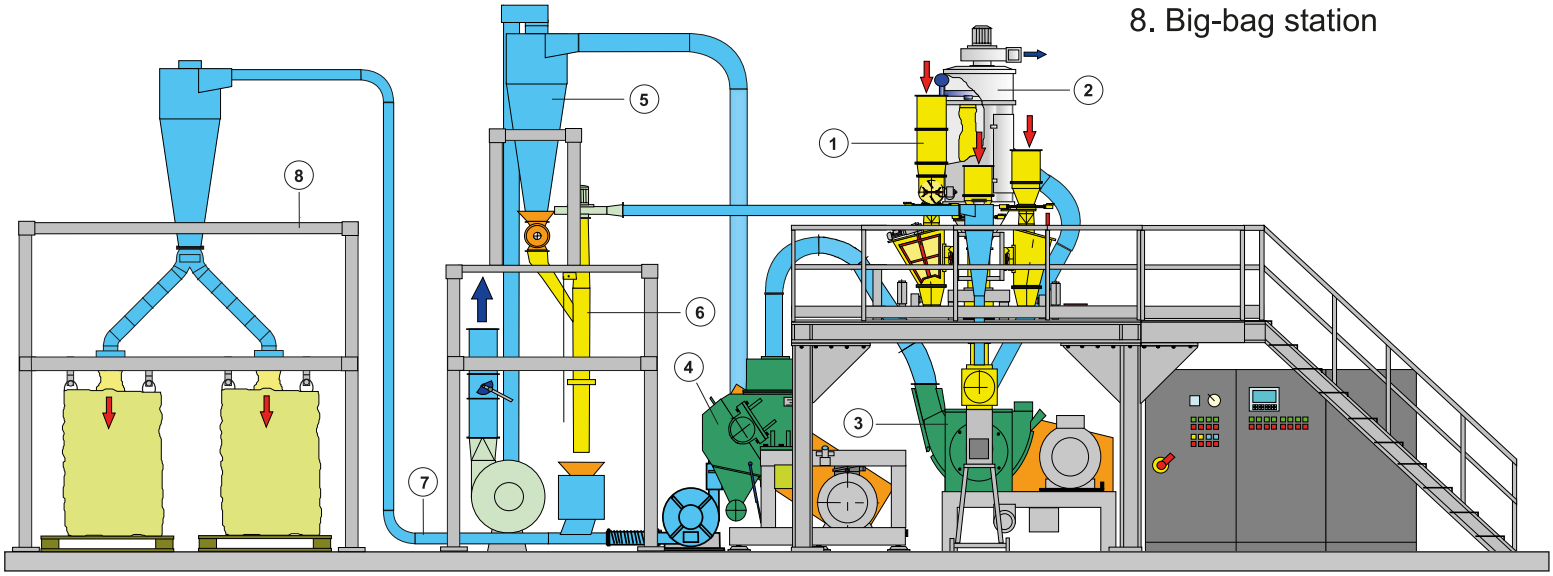
Fig. 1: Palltruder®, type PFV 250
Fig. 2: System schematic Palltruder®,type PFV 400

1. Metering system
2. Steam vacuuming
3. Palltruder®
4. Granulator
5. Cyclone
6. Sifter
7. Pneumatic transport
8. Big-bag station



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The PALLMANN Group of Companies

The Pallmann Group of companies is the leading manufacturer for size reduction machines and systems for the plastic and recycling industry.
Pallmann Machinenfabrik develops and manufactures machines and complete systems according to customer requirements or as standard solutions for the preparation of almost any plastics 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 worldwide 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
Classifier Mills
Universal Mills
Complete Grinding Systems
Knife Mills
Profile Shredders
Rubber Granulators
Pipe Crusher
Air-Swept Mills
Impact Mills
Industrial Granulators
Cryogenic Grinding Systems

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