

HOSOKAWA/MIKRO ACM Pulverizer

ACM series pulverizer actively used in a wide variety of industries

Plastics

Electrical materials

Minerals

Paints

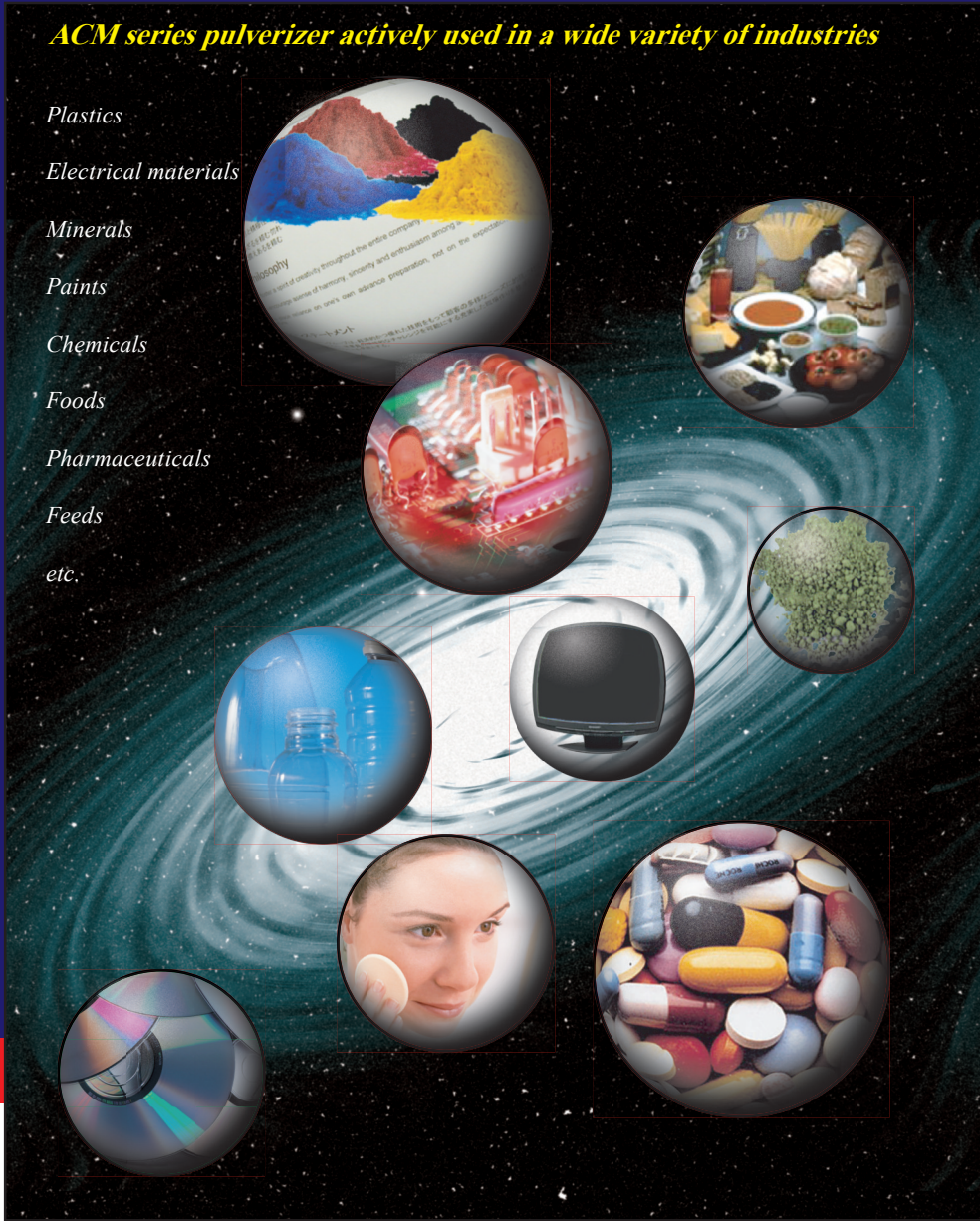
Chemicals

Foods

Pharmaceuticals

Feeds

etc.



Process Technologies for Tomorrow

HOSOKAWA MICRON CORPORATION



Process Technologiues for Tomorrow

HOSOKAWA MICRON CORPORATION

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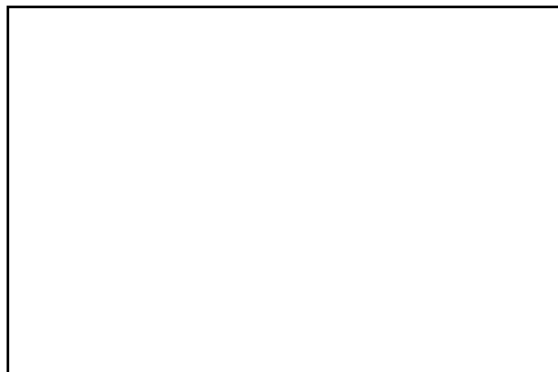
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HOSOKAWA MICRON GROUP



Hosokawa's globally based "powder processing technology" strongly supports you.

As a global trend international operations coping with local markets have been increasing. Accordingly needs to needs to follow also diversify, such like in conforming with various local regulations and guidelines. We have developed the world 3 point(Europe/Asia/America) operational framework and offer systems corresponding with local needs, ensuring quick introduction of the most advanced technology to local market, activating human exchanges.

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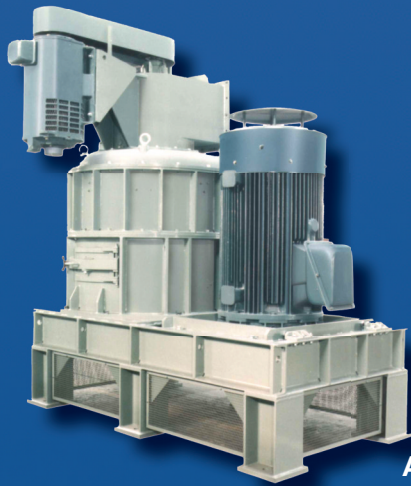
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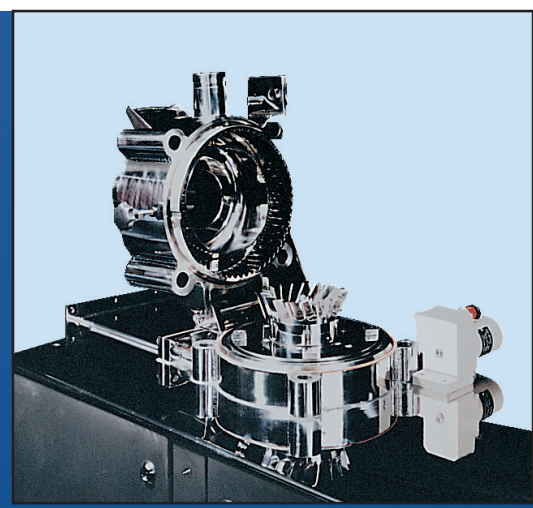
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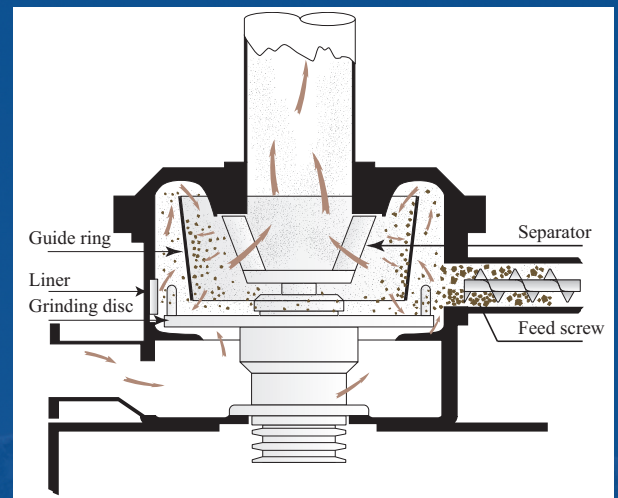


ACM-300



□ What's ACM Pulverizer?

ACM Pulverizer is the fine impact mill with a built in air classifier. Particles ground to the required fineness are immediately discharged out of the mill. In this way raw material is very efficiently ground without overgrinding, and very sharp particle size distribution can be obtained. The mill was originally developed to grind heat sensitive materials. Later a series of the mill have been released optimizing the design while keeping its superior performance.



□ Guideline to select models

ACM-H, HC : Higher grinding performance (capacity/fineness) with low noise and high cleanability. (HC : Ceramics model for metal contamination free)

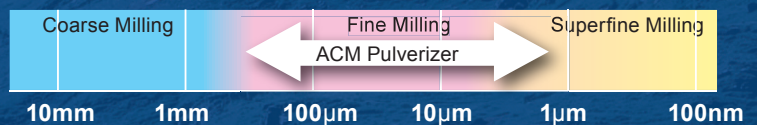
ACM-A : Suited to wide variety of materials. Abundant options to cope with the wear parts requirement.

ACM-2EC : Specialized for small and multi-purpose use.

ACM-SB : The best cleanability because of the split mill body.

□ Application range

The mill corresponds from super fine grinding range (a few microns) to fine micron range (a several hundreds microns). Particle size adjustment can be easily done by varying the classifier rotor speed, resulting in uniform particle size. Variety of options is available. The ACM copes with abrasive materials, heat sensitive materials, and fibrous materials with poor grindability. It is widely used in various industries such like plastics, food and pharmaceuticals and so on.



《Examples of major purposes of usage》

- Minerals and metals:
 - Enhancement of performance of battery materials.
- Foods : Improvement of texture through grinding
- Pharmaceuticals : Homogenization and solubility improvement
- Cosmetics : Improvement of texture
- Plastics : Homogenization of molding
- Powder paints :
 - Finer product size (under controlled temperature rise)
- Ceramics : Improvement product strength

POWDER AND PARTICLE PROCESSING

ACM Pulverizer ACM-H, HC



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ACM Pulverizer ACM-H, HC

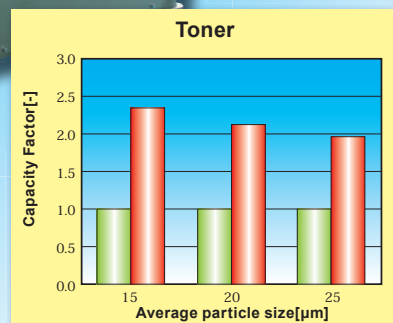
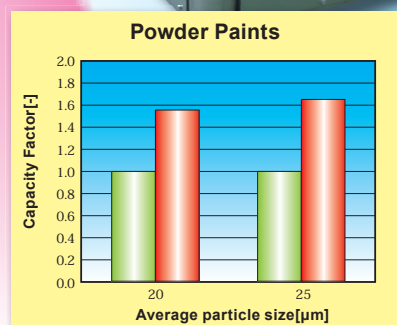
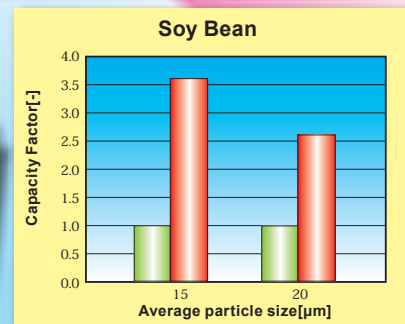
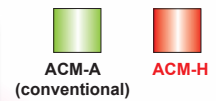
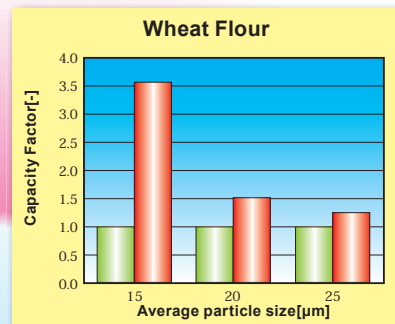
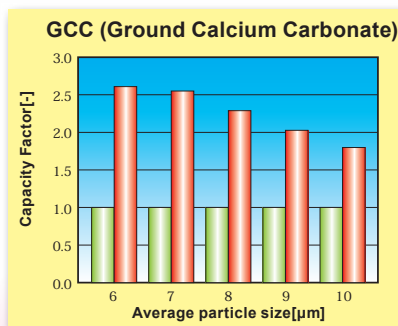
ACM Pulverizer H Type introduces newest designs to cope with demands of reduction of installation space, ease of operation and cleanability. Grindability improvement is apparent at very fine particle size range therefore it is possible to obtain even finer particles than ever. Introduction of Type H will make difference of high capacity, energy saving, easy cleaning, low noise and space saving. (HC is a ceramics model)

Realization of drastic reformation of the production line

□ Features

■ Amazingly high performance and energy saving

By speeding up of grinding rotor and optimization of structure, product capacity is successfully increased by 50-100%. 30-50% energy saving is possible. With improvement of these capacities operational cost is reduced which contributes to reduction of environmental load.



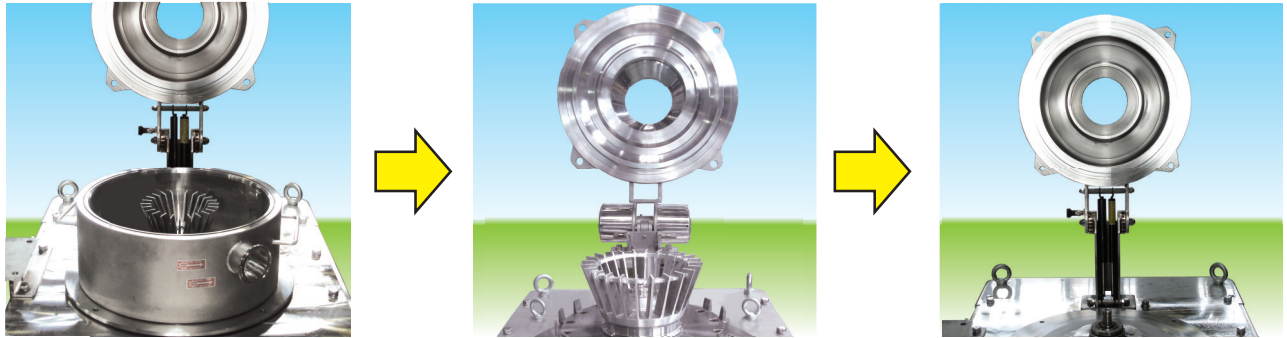
Amazing grinding performance



■ Easy disassembling and cleaning

It is possible to completely disassemble the mill components including casing manually. Therefore the mill is suitable for applications where frequent changes of process materials and colors

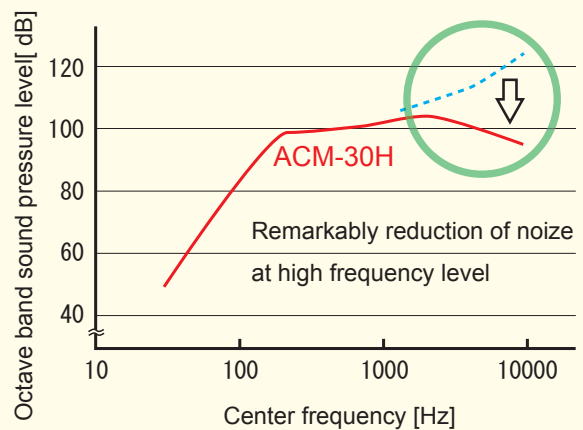
are required. ACM Type H improves efficiency of process material changes and reduce contamination risk by residue, contributes to quality assurance.



■ Noise reduction

The noise is greatly reduced by incorporating external casing which covers the mill casing, and by placing motors in the cabinet. The noise reduction is particularly high in high frequency area therefore it realize the operator friendly environment.

Noise Spectrum



■ Space saving

With the increased production capacity in some cases it is possible to use smaller models. Process air flow is reduced by 30% so the installation space requirement is very small with the use of smaller bag house.

□ Application

- Toner, Powder paints
- Various plastics
- Chemicals
 - Blowing agent, soda, rubber additives, pigment, dyestuff
- Mineral, inorganic material, metal oxides
 - Rechargeable battery materials, ceramics material, graphite
- Food, Organic Material
 - Starch, alginate, grains, sugars, additives

□ Specification

Model	ACM-	15H(HC)	30H(HC)	60H(HC)
Motor	Mill (kW)	11	22	45
	Classifier (kW)	1.5	5.5	11
	Feeder (kW)	0.2	0.4	0.4
Air volume	(m ³ /min)	15	30	60
Max. grinding rotor speed	(rpm)	7800	5800	3600
Std. classifying wheel speed	(rpm)	3210	2375	1637
Max. classifying wheel speed	(rpm)	7000	5400	3600
Dimensions	Width (W) (mm)	1350	1500	2040
	Depth (D) (mm)	750	860	1240
	Height (H) (mm)	1075	1400	1680
Approx. mass	(kg)	600	1100	3000

(Note) Standard classifying wheel speed is correspond to 10 μm cut point (specific gravity : 3 g/ml). Specification of ceramics model is correspond to ACM-H type.

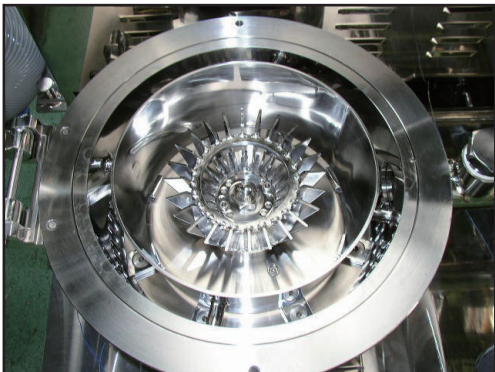
POWDER AND PARTICLE PROCESSING

ACM Pulverizer ACM-A



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ACM Pulverizer ACM-A



Application

Versatile Type A is used in a wide range of industrial fields such as in plastics, agrochemical, chemicals, foods, minerals and so on.

Various plastics

Phenol resin, cellulose, melamine resin, PVC, PE, Urea resin

Toner, Powder paints

Industrial materials

Cement materials, ceramics materials, catalyst materials

Chemicals

Soda chemicals, rubber chemicals, blowing agents, pigments, dyestuff, insecticides, surfactant, agrochemicals, pharmaceutical intermediate, detergent

Mineral, Inorganics, Metal oxides

Calcium carbonate, alumina, graphite, carbon, magnesium oxides, titanium compounds, nickel carbonate

Foods

Wheat flour, rice, soy bean, corn powder, starch, alginate, gelatin, tea, granular sugar, sugar, salt, agar-agar, sea weeds, carrageenan, spices (chili, curry powder)

Feeds

Fish meal, soy bean waste, bone powder, bran

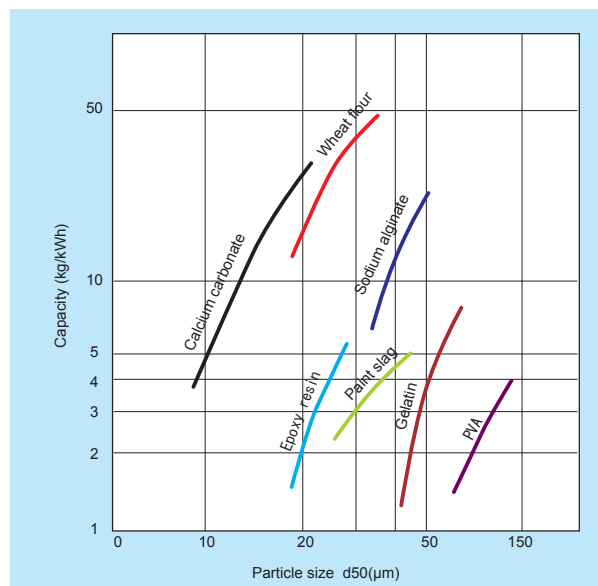
Features

High grinding performance

The newly developed vertical grooved hammers boosts higher grinding performance by effectively giving impact on raw material compared to a fine impact mill with normal shape hammers. Therefore a wide range of materials with variety of characteristics/shapes can be ground effectively.

Wide size adjustment range

The high performance of the bearing structure permits very high rotational speed of the classifier ensuring very fine products. Similarly if a coarse product is required, by the effective work of the guide ring the mill produce the product size which corresponds to the classifier speed. In this way a wide variety of products can be obtained in fine or coarse product ranges.





□ Option

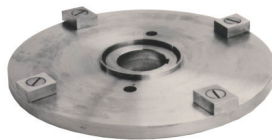
□ Grinding hammer

Vertical grooved hammer

High performance standard hammer

Bar disc hammer

Standard Hammer for large models. High strength, suitable for high load operation.



Pin disc hammer

Suitable for brittle materials which easily generates fine dust. Noise is lower than other hammers.



□ Liner

Vertical grooved liner

Standard liner for all models.



Smooth liner

Suppressing fine dusts generation. Usually used with a combination of Pin Disc Hammers.



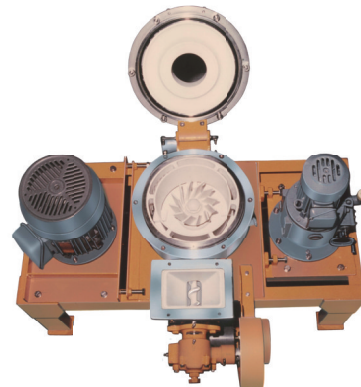
□ Classifier wheel

Long blade wheel Standard wheel for all models.



□ Ceramics version

For contamination free process or abrasive materials, ceramics for powder contact part as construction material is available.



□ Specification

Model	ACM-	10A	30A	60A	100A
Motor	Mill (kW)	7.5	22	45	75
	Classifier (kW)	0.75	3.7	7.5	11
	Feeder (kW)	0.2	0.2	0.4	0.75
Air volume	(m ³ /min)	15	45	90	150
Max. grinding rotor speed	(rpm)	6800	4500	2800	1500
Std. classifying wheel speed	(rpm)	3210	2500	1730	1500
Max. classifying wheel speed	(rpm)	7000	5400	3600	2200
Dimensions	Width (W) (mm)	1100	1300	1900	2700
	Depth (D) (mm)	1000	1300	2300	1400
	Height (H) (mm)	1200	1600	2400	2800
Approx. mass	(kg)	400	1000	2700	5500

(Note) Standard classifying wheel speed is correspond to 10 μ m cut point (specific gravity : 3 g/ml).

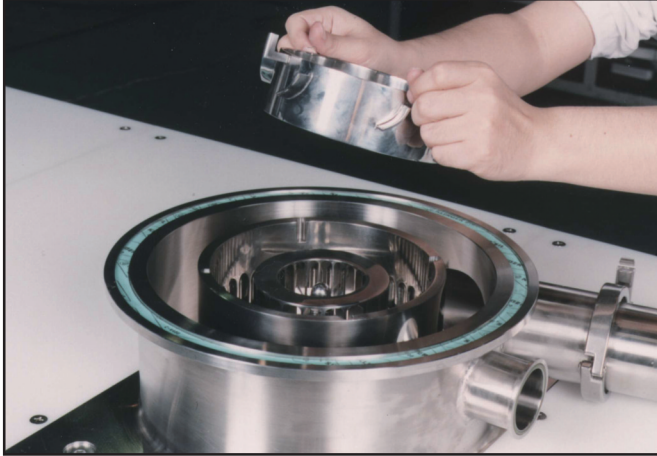
POWDER AND PARTICLE PROCESSING

ACM Pulverizer ACM-2EC



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ACM Pulverizer ACM-2EC



The mill is compactly unitized. It is suitable for frequent changes of process materials or R&D works.

□ Specification

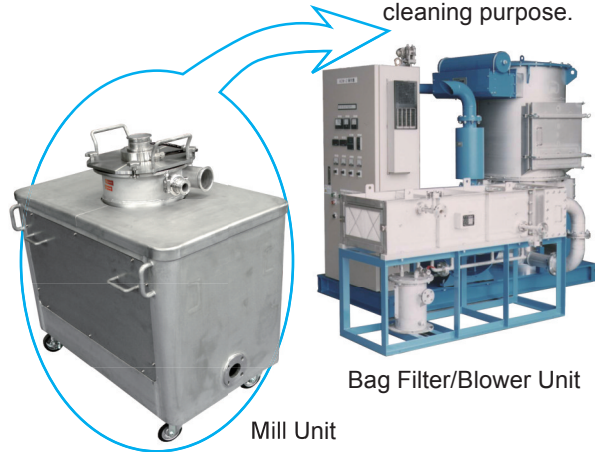
ACM-2EC	
Rotary Feeder	100A Semi-Sanitary Type, controlled by 0.2kW inverter
Grinding Rotor	Max. 10,200 rpm, Pin/Bar hammer, MD Liner, controlled by 3.0kW inverter
Classifying Rotor	Max. 5,000 rpm, Middle/long blades, controlled by 0.55kW inverter
Cyclone	200A Semi Sanitary Type
Puls-Jet Collector	PSCL-900/8-4, with filter area of 10m ²
Exhaust Fan	6m ³ /min, 5.5kW
Control Panel	Indoor Selfstanding, PLC control

□ Features

■ Easy disassembling and assembling

The unit can be disassembled without any tools, offering quick turnaround / clean downtime. The mill unit with casters can be moved easily for cleaning.

Easy portability for cleaning purpose.



Mill Unit

Bag Filter/Blower Unit

■ Clean top cut

The classifying rotor uses gap sealing air to provide a sharp cut on the top size.

■ Air purged shaft seal

Bearings are protected by the air purged sealing, this has two benefits; -

1. Protection of bearing
2. Prevention of melting of products

■ Compact

It consists with the compact mill unit and bag filter/blower unit.

■ Cooler grinding

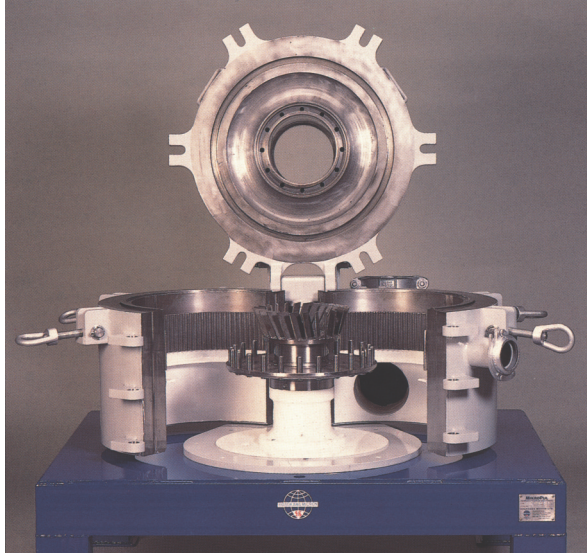
Suitable for materials of low melting point.

ACM Pulverizer ACM-SB

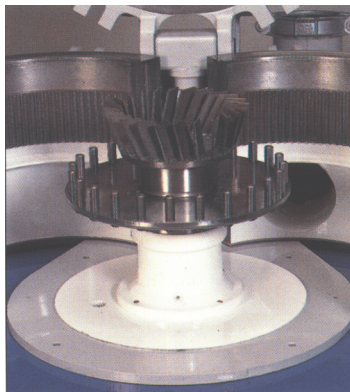


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ACM Pulverizer ACM-SB



The mill cover opens to allow both body sections to swing open. For product outlet and air inlet, ferrule connection is used for quick releasing. Internal access is so easy that the mill is suitable for such application like powder paints where frequent cleaning is required.



Pulverizing chamber

□ Features

■ Easy disassembling and cleaning

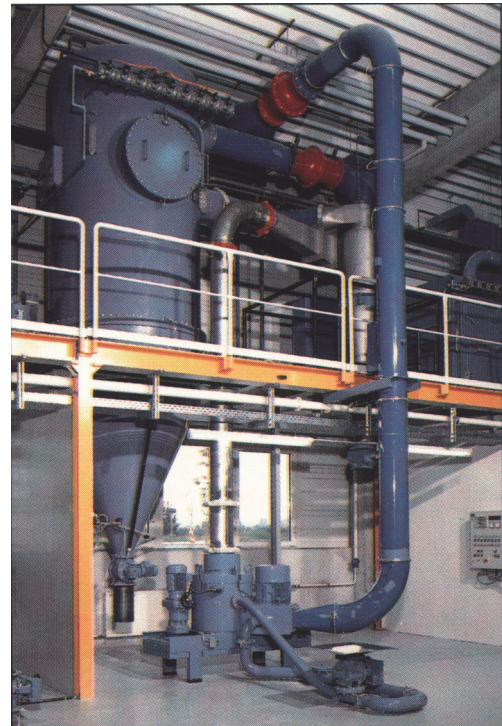
The split mill body completely opens for easy access to internal.

■ Air purged classifier

High efficiency classifier design with air purging enables the ACM SB to produce ultra fine materials.

■ Explosion resistant

The ACM SB is designed for PSR 11(Pressure Shock Resistance 11 bar). This gives additional safety when handling materials which are classified as being potentially explosive, such like powder paint.



ACM-25SB

□ Specification

Model	Mill (kW)	Classifier (kW)	Typical Capacity (kg/h)
ACM-10SB	7.5	1.1 - 2.2	200 - 250
ACM-15SB	11	1.1 - 2.2	250 - 350
ACM-20SB	15	2.2 - 5	350 - 450
ACM-25SB	18.5	2.2 - 5	450 - 550
ACM-30SB	22	4 - 7.5	550 - 700
ACM-40SB	30	4 - 7.5	700 - 900

POWDER AND PARTICLE PROCESSING

Application



□ Typical applications

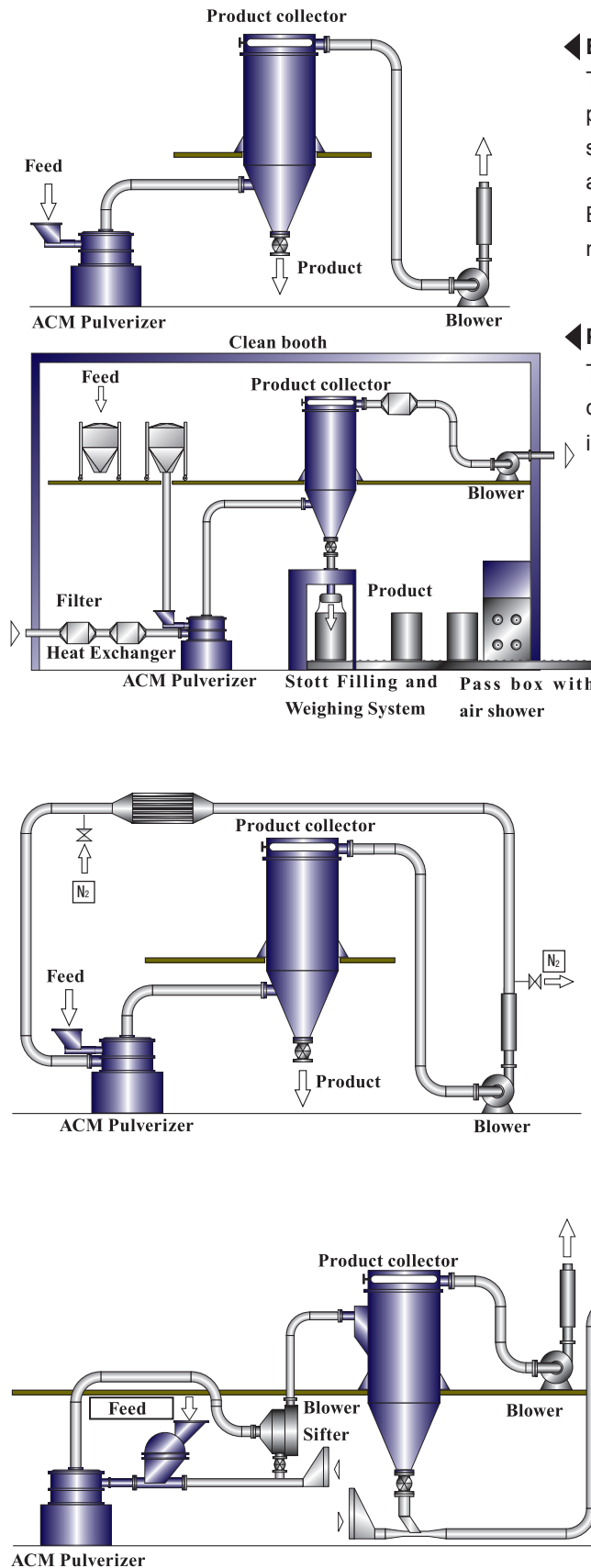
Type	Feed	Feed size	Product size d_{50} (μm)	Model	Capacity (kg/h)
Electric materials	Graphite	max. a few mm	30	10A	150
	Lithium carbonate	$d_{50}=50\mu\text{m}$	7	10A	50
	Battery Materials(Metal Oxides)	max. dozen mm (lump)	10	10A	300
	Toner	20%<500 μm	20	10A	50
	Toner carrier	max. a few mm	50	10	60
	Color toner	max. 2mm (flake)	20	30H	105
	Antimony Oxides	$d_{50}=40\mu\text{m}$	9	10	70
Paints	Powder Paint	max. a few mm (flake)	20	15H	130
	Paint Wastes	max. 3mm	35	30	40
	Pigment	$d_{50}=20\mu\text{m}$	10	10A	50
Foods	Alpha Starch	$d_{50}=100\mu\text{m}$	50	10A	100
	Wheat Flour	$d_{50}=80\mu\text{m}$	15	15H	40
	Chitosan	max. 5mm (flake)	50	10	4
	Tea Leaves	$d_{50}=2.5\text{mm}$	20	10	90
	Alginate	$d_{50}=180\mu\text{m}$	30	30	100
	Red Pepper	2 ~ 3mm	250	30	80
Feeds	Soy bean protein	$d_{50}=50\mu\text{m}$	20	10A	40
	Fish Meal	max. 3mm	50	10	70
	Defatted Soy Bean	$d_{50}=5\text{mm}$	60	10	800
	Rice Bran	33%<75 μm	30	10	30
Minerals	Precipitated Calcium Carbonate	$d_{50}=5\mu\text{m}$	3	10A	300
	Ground Calcium Carbonate	about □1mm	6	30H	60
	Strontium nitrate	max. 10mm	10	10A	100
	Magnesium Hydroxides	max. a few mm (lump)	2	10	120
	Slaked Lime	max. dozen mm	10	10A	200
Pharmaceuticals	Chinese Medicine (Licorice)	a few mm long (fibrous)	30	10A	20
	Sorbit	$d_{50}=3\text{mm}$	50	10	10
	Glucose	$d_{50}=150\text{mm}$	75	10	230
Plastics	CMC	8%<180 μm	80	10	20
	Polylactic acid	max. a few mm (pellet)	80	10A	20
	PET	max.a few mm (pellet)	15	2EC	20
	PVC	$d_{50}=140\mu\text{m}$	53	10	10
	Silicone	max. dozen mm (lump)	10	10A	30
	Phenolic Resin	max. a few mm	20	10	220
	PTFE	max. 30mm (flake)	40	2EC	20
	Melamine Resin	$d_{50}=80\mu\text{m}$	10	10A	150
	Super Absorbent Polymer	$d_{50}=2\text{mm}$	150	10	180
Chemicals	Alumina	$d_{50}=50\text{mm}$	8	10	30
	Activated Carbon	$d_{50}=30\mu\text{m}$	20	2EC	20
	Cerium Oxides	max. a few mm (lump)	10	10	50
	Coke	max. a few mm	10	10A	30
	Wax	some hundreds μm	150	10	120
	Blowing Agent	$d_{50}=30\mu\text{m}$	10	10A	100

NOTE: The above data are for reference only

Flow sheet



□ Flow sheet

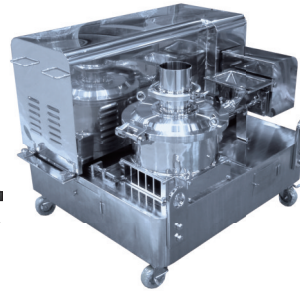


◀ Basic flow

The basic flow of the system results in the milled product processing through the air classifier being pulled by the air suction of the blower. The milled product is then separated and collected from the air in the product collection filter. Based on this flow, system is set up with a variety of combination to match the purpose.

◀ Pharmaceutical production system

The mill is specially designed for easy disassembling and cleaning, and clean environment design is recommended in consideration of surrounding atmosphere. Recently even for processing standard materials, in view of protection of workers and maintenance of product quality, the system and design for pharmaceutical production is being used in other industries.



◀ Inert gas circulation system (Left)

This is used when standard atmospheric conditions can result in ignition danger or product deterioration for material such as metal oxides. The oxygen content must be monitored and checked to maintain a controlled environment. Inert gas circulates in the system therefore consumption of the gas is cut down.

▼ Spice production system (Below)

Incorporating a blower sifter, it is possible to obtain required fineness very effectively. Subsequently heating process is added to quality preservation in handling foods.