

 **JOYAL**
Three-ring Micro Powder Mill



Grinding

• Application

The JOYAL Three-ring Micro Powder Mill(ultrafine mill) is for super-fine grinding materials with hardness less than 6 in Moh's scale and humidity less than 6 percent such as kaolin, limestone, calcite, marble,talcum, barite, gypsum, dolomite, bentonite mud,mica, pyrophyllite, sepiolite, diatomite, graphite, alunite, fluorite, potassium feldspar, phosphorite, pigment and so on. The granularity of the end products is 325-2500 meshes (0.044-0.0055mm).



Three-ring Micro Powder Mill

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● Features

1. High-efficiency and low consumption

With the same end-products fineness and motor power, its output is over 1 time of that of Jet Mill, Mix Mill, and Ball Mill.

2. Easy-damaged parts with longer working life

The grinding roll and ring are made of special materials. Generally, their work life is more than one year, but, which could come up to over 3 years, when it processes calcium carbonate and Calcite.



Three-ring Micro Powder Mill



3. Security and Reliability

Because there are no rolling bearing and bolts in the grinding chamber, we can not see the problems of bearings and sealings easily damaged and machine destroyed due to the bolts looseness.

4. Cleansing and Environment Protection

Adoption of Pulse dust collector and muffler reduces the industrial dust pollution and noise, which reaches the National Standard.

Working Principle

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1.

The main bearing and each dial are driven by electromotor of main equipment through reducer, and numbers of rings and rolls which are rolling in the ring channels are driven by dial through plunger.



2.

After being crushed by hammer crusher, the big materials become small ones and they are sent to the storage bin by elevator. The electromagnetic vibrating feeder sends them to the middle of first dial evenly; the materials will be driven to the edge of dial by centrifugal force, and fall into the ring channels and are pressed, crushed and ground by the grinding rings and rolls.



3.

Then the materials fall into the second and third ring and crushed and ground. The high pressure centrifugal blower inhales air from the outside and blow the materials which are ground in the third ring to powder Separator.

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4.

The rotating turbo in the powder Separator makes the coarse materials return to the mill and reground, while the fineness mixes with the air and be drawn to the cyclone and be discharged from the discharging valve which is in the bottom of it. The air which mixed with very little fineness are purified by impulse dust catcher and discharged by blower and muffler.



Main Specifications

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Mode	Roller Numbers (pcs)	Ring Diameter (mm)	Ring Numbers (pcs)	Max. Feeding Size (mm)	Output Size (mm)	Capacity (kg/h)	Motor Power (Kw)	Overall Dimension (mm)
ZYM60	15	ø600	1	10	0.044-0.005	350-2500	37	10000×2500×5500
ZYM80	21	ø800	1	10	0.044-0.005	600-4500	55	13000×3000×5800
ZYM100	27	ø1000	1	10	0.044-0.005	900-6500	110	18000×4000×8600
ZYM100A	36	ø1000	4	20	0.044-0.005	1000-7500	110	18000×4600×8600

Whole System



The whole system of Three-ring Micro Powder Mill consists of main frame, reducer, classifier piping device, blower, jaw crusher, dustpan elevator, electromagnetic vibration feeder, and electric switch box motor etc.

Features of Whole System

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Features of Whole System

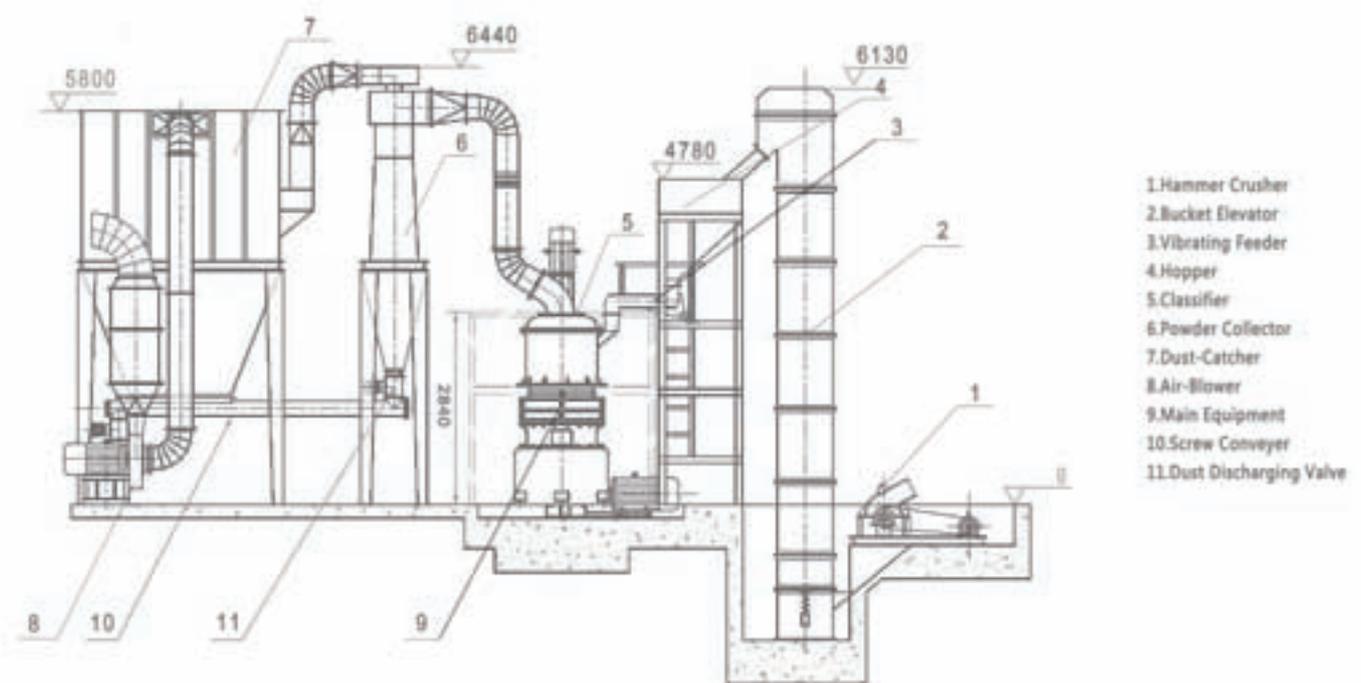
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1. The whole Mill is of a standing structure. It features of small occupying space and strong integration capability. It can form up an independent production system from lump materials crushing to finished powder and packaging.
2. All the finished particles produced by the pulverzier have a good uniformity of fineness. 98% of the particles can meet the required fineness and go through the sieve, i.e. the passing rate is 98%. This is the advantage that other power grinding equipment cannot exceed.
3. The transmission device of the main unit is equipped with a closed gearbox that runs smoothly and reliable. The key components of the mill are made of best quality steel, so the whole system is durable, stable and reliable.
4. The electrical system of the mill is centrally controlled and the advanced model is rationally selected with high automation. Basically, an unmanned operation can be realized in the pulverizing workshop. The light weight and compact vibration feeder can feed the material uniformly. It is easily adjustable, energy saving and convenient for operation and maintenance.



Grinding Plant



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Basic Units	Item	Unit	Specifications & Technical Parameters	
			ZYM80	ZYM110
Motor of main unit	Model Power	kw	Y250M-4 55	Y2-315-6 110
Motor of classifier	Model Power	kw	Y180M-4 18.5	Y2VP200L-4 30
Motor of elevator	Model Power	kw	Y100L-4 3	Y100L-4 3
Motor of blower	Model Power	kw	Y225M-2 45	Y280M-2 90
Motor of hammer crusher	Model Power	kw	PC 300×400 11	PC 600×400 18.5
Electromagnetic vibration feeder	Model Power	kw	GZ1F 0.06	GZ1F 0.06

Note: the crusher is optional according to different situations, such as the hardness of material, feeding quantity and etc.

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START Engine:

Before the powder grinding is started, check if all the maintenance doors are closed tightly and the gap between jaw plates of the crusher accord to the particle size of the feeding material., and the rotating speed of the classifier shall be adjusted in conformity of the required fineness of the finished powder. At last, turn on the machine according to the sequence below:

1. Turn on the dustpan elevator; 2. Turn on the jaw crusher; 3. Turn on the classifier after the hopper was fed with materials; 4. Turn on the blower (It starts with no load. You can load when the blower runs normally); 5. Turn on the main frame. And immediately turn on the electromagnetic vibrating feeder, after that, the powder grinding is started. The sequence of operation is outlined as follows:



TURN OFF Engine:

Turn off the machine in the following sequence:

1. Turn off the feeder and stop feeding materials;
2. Turn off the main frame in one machine;
3. Turn off the blower after blowing off all the residual particles;
4. Turn off the classifier finally.

The sequence of turning off the machine is outlined as follows:



Note: The material transported to the hopper by an elevator. When the material in the hopper reaches a certain quantity, stop the crusher first and then the elevator. This operation depends on the quantity of the stored material

5. In order to guarantee the production safety, the mill must not be lubricated during the normal operation. If any part of the machines generates abnormal noises, or the load is suddenly raised up, turn off the machine immediately for checking and troubleshooting to prevent serious accidents. Before restarting the machine, take out the residual material first. Otherwise, the current will become strong as to affect the startup operation.

■ The Lubricating System

In order to ensure the normal operation of the whole system, please lubricate the machine according to the following instructions. Meanwhile pay attention to changes in gear box of oil, turbine oil tank height, that is, oil-soaked worm gear not less than 1 / 2. The oil height of reducer is not less than 300 mm from the bottom up. The height of oil pools on the oil standard of classifier is not less than 80 mm. Lubricating parts and oil names are stated in the following table:



■ The List of Lubricating System

Lubricating Parts	Lubrication Form		Name of Lubricating Oil	Lubricating Points	Interval of lubrication	Remarks
	Manual	Oil tank				
Central shaft of the main frame	√		No. 3 MOS2 compound calcium based grease	2	1-3 days	Replaced by calcium based grease
Grinding rollers	√		No.3 MOS2 compound calcium based grease	10	2shifts	Replaced by calcium based grease
Bearing base of blower	√		No.3 MOS2 compound calcium based grease	2	1 month	Replaced by calcium based grease
Bearing base of classifier	√		No.3 MOS2 compound calcium based grease	2	Half a month	Replaced by calcium based grease
Bearing base of elevator	√		No.3 MOS2 compound calcium based grease	2	1 month	Replaced by calcium based grease
Turbine box of elevator		√	HJ-4 machine oil	1	Keeping the oil level	Changing oil once every three months
Reducer		√	HJ-4 machine oil	3000hours		Maintenance, cleaning, oil changes
Oil Pool of classifier		√	HJ-4 machine oil	3000hours		Maintenance, cleaning, oil changes



■ The List of Lubricating System

The motor control system of the mill is centralized in the controlling cabinet. Every unit shall be started sequentially in accordance with the operation procedure and rules. In this control cabinet, most of the motors are generally asynchronous motors except classifier and feeder.

1. The starting of the main unit and blower

In this control system, the reduced voltage start is used for the motor with the power over 30KW while the direct start is for that below 30KW. In this system, blower with star delta starter, the main unit is used to start the Yanbian triangle.

The star delta starter is connected with normal operation. The control circuit is composed of contactor and time relay. In an automatic switching, the customer can make adjustment according to the start. The time relay is usually set with an extension of over 6 seconds, which can be also adjusted by the customer.



2. The control and automatic feeding of the vibrating feeder

The structure of electric-magnetic vibrating feeder is a two particle fixed-directional forced vibration system. It consists of a feeding channel connected with a fork armature. It hangs under the material tank and with some free moving space. It cannot be blocked and bumped by other objects to avoid noises during the operation.

(1) After installation of the electro-magnetic vibrating feeder, loose the screws (upper three and lower one) on a positioning connection fork. After loosening the screws, fix the nuts, open the rear cover of the vibration feeder, and check if the gap between iron core and gap bit is within 1.8-2.1mm. The two parts should be parallel and clean. All the screws should be screw down firmly. Finally, put on the cover and fix it.

(2) No-load trial run with power on. Adjust the amplitude resistor R1 in the electrical control cabinet slowly from small to big with the amplitude ranging within 1.8-2.5mm and the current of 1.2A. Keep running for several hours to see if the amplitude current is stable. If it is normal, open the door of material tank for material feeding and check if the current of feeding material is stable. The amplitude is allowed to fall down 0.5 mm. If the amplitude current is at the rated value but cannot meet the requirement of the feeding capacity, hang the vibrator at a 20 degree position to meet the feeding requirement.

3. Control of Classifier

JDLA buncher transmission is used for the classifier. The control is carried out by the bottom of the electro-magnetic slide controller on the control cabinet. When the button is pressed, the squirrel-cage motor will be started first. Then close the slide power switch and turn the knob of rotating speed to make the classifier to reach the speed that matches the required fineness (powder particle size). The powder fineness can be controlled in this way.

Repair & Maintenance

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1. During the application of the mill, some personnel shall be arranged to take responsibility of management. The operators must be qualified with the required technical knowledge. Before the installation of the mill, the persons related to the operation should receive technical training and fully understand the operating principle, performance and regulations of the pulverizer.

2. In order to guarantee the mill in a normal working state, a Safety Operation System for the Maintenance of the equipment must be established. Only in this way can the pulverizer be guaranteed to have a long-term and safe operation. Meanwhile, it is necessary to have the required repairing tools, lubricant and grease, spare parts and accessories.

3. After some period of running, the mill should receive an examination and repairing. The components vulnerable to worn out, such as grinding roller, grinding ring, relieving tool etc. should be repaired or replaced. Before and after the operation, a careful examination should be carried out for the connecting screws, bolts and nuts on the grinding rollers so as to find whether they are loose or sufficiently lubricated.

4. The grinding rollers should be replaced when roller device works more than 500 hours. When replacing grinding rollers, all the rolling bearings in the roller sleeves must be cleaned, and the damaged parts should be replaced. Powerful injector and grease gun can be as oiling tool.



The Model Number of All the Bearings and Name and Quantity of the Quick-wear Parts.

For the mill and wearing parts, you can refer to these two tables in order that the customer can select them conveniently.

Table wearing Parts

No.	Name	Quantity	Material	Specifications
1	Liner	1	HT200	
2	Dowel pin	12	MC Nylon 60	56
3	Dowel pin	12	MC Nylon 60	30
4	Spade	5	Welded with armor plate	
5	Spade base	5	ZG35	
6	Grinding roller device	5	Assembly	
7	Rubber sleeve	10	Special rubber	
8	Grinding roller	5	ZG65Mn	
9	Grinding roller shaft	5	No. 45 steel	
10	Crosspiece shaft	5	No. 45 steel	
11	Grinding ring	1	ZG65Mn	
12	Blower vane	6	Wearable armor plate	
13	Spade with bottom plate	1	ZG35	
14	Oil seal of framework	2	Top of main shaft	190×240×18
15	Bottom end cover of grinding roller	5	ZG35	
16	Oil seal of framework	2	Bottom of main shaft	130×160×15
17	Oil seal of framework	5	Grinding roller grade 3	115×150×14
18	Oil seal of framework	10	Grinding roller grade 2	115×150×14
19	Sealing ring	5	Industry wool felt	
20	Blade of classifier	60	Wearable armor plate	
21	Wind guard board	12	Wearable armor plate	
22	Wedge shaped belt	6		C-3150
23	Wedge shaped belt	4		B-3150

The Model Number of All the Bearings and Name and Quantity of the Quick-wear Parts.

For the mill and wearing parts, you can refer to these two tables in order that the customer can select them conveniently.

Table of Rolling Bearings

No.	Bearing Type	Specifications(mm)	Quantity	Relevant unit
1	2234	170×310×52	1	Up the main frame
2	3526	130×230×64	1	Down the main frame
3	8332	160×270×87	1	At the bottom of the main frame
4	7617	85×180×64	1	Decelerator
5	53618	90×190×64	1	Decelerator
6	7620	100×215×78	2	Decelerator
7	7626	130×280×99.5	2	Decelerator
8	7616	80×170×62	5	Above the grinding roller
9	3620	100×215×73	5	Below the grinding roller
10	310	50×110×27	1	Inside of the classifier
11	111311	55×120×29	1	Outside of the classifier
12	7315	75×160×40.5	1	Above the classifier
13	7312	60×130×34	1	Below the classifier
14	6308	40×90×23	4	Dustpan elevator
15	7208	40×80×20	2	Dustpan elevator Turbine decelerator
16	6208	40×80×18	2	Dustpan elevator Turbine decelerator
17	3616	80×170×58	2	Blower



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