

## **Introduction**

SCM series super-micro mill is on the bases of our company's production experience for more than 15 years. We absorb advantages from the same trade abroad and at home. We review, research and try on 12 kinds of mills and horizontal hammer crushers. And finally we developed this high-efficiency and low-cost super thin mill by investigation and trial.

## **Feature**

### ◆ High efficiency

In same condition of finished particle size and power of motor, the output is 40% higher than airflow mill and whisk mill.

### ◆ High using rate of the quick-wear part

In same condition of material and finished particle size, the lifetime of the quick-wear part is longer than that of impact crusher and turbine crusher. It can be generally one year.

### ◆ High safety

Because there are no axle tree and bolt in the grinding antrum, there will be no wear out of bearing and sealing part, also no loose of bolts.

### ◆ Environmental protection

It will lighten pollution and noise by using dust cleaner and muffler, which achieves environmental protection requirement.

## **Application**

SCM super-micro mill is equipment which produces thin powder and super thin powder. It is applicable to non-flammable and non-explosive materials with hardness less than 6, such as calcite, chalk, limestone, dolomite, kaolin, bentonite, talcum, talc, magnesite, illite, pyrophyllite, vermiculite, sepiolite, attapulgate, rectorite, diatomite, barite, gypsum, alum earth, graphite, fluorite, variscite, potash ore, and floatstone.

**Technical Parameter**

parameter name	type	SCM6015	SCM8021	SCM1027
Roller number		15	21	27
Diameter (mm)		Φ600	Φ800	Φ1000
Ring number		2	2	2
Main unit speed(mm)		235	235	235
Max. feeding size (mm)		10	10	10
Final size (mesh)		325-2500	325-2500	325-2500
Capacity (kg/h)		350-2500	600-4000	900-6000
Overall dimension (m)		10×2×5.5	12.4×2.5×5.8	14.5×3.8×6.3

Note: if any parameter or appearance changes, in accordance with introduction with delivery.

Name		Unit	Specification and technical data		
			SCM6015	SCM8021	SCM1027
Motor of main unit	Model		Y250-4	Y250-4	Y250-4
	Power	Kw	37	55	90
Adjustable motor of classifier	Model		Y180M-4	Y180M-4	Y180M-4
	Power	Kw	11	18.5	30
Motor of elevator	Model		Y100L-4	Y100L-4	Y100L-4

	Power	Kw	3	3	3
Motor of blower	Model		Y225M-2	Y225M-2	Y225M-2
	Power	Kw	30	45	75
Hammer crusher	Model		250-400	250-400	250-400
	Power	Kw	5.5	5.5	5.5
Vibrating feeder	Model		GZ1F	GZ1F	GZ1F
	Power	Kw	0.06	0.06	0.15
Unload valve	Model		ZJD-1:40	ZJD-1:40	ZJD-1:40
	Power	Kw	0.75	0.75	1.1
Impulse dust cleaner	Model		BMC72-11	BMC72-11	BMC72-11
	Power	Kw	3	3	3

Note: if any parameter or appearance changes, in accordance with introduction with delivery.

### **Composition of the Complete Sets**

The whole system of SCM consists of main unit, deceleration machine, classifier, blower, hammer crusher, dustpan elevator, electro-magnetic vibrating feeder, impulse dust cleaner, piping device, cyclone collector device, classifier, high-pressure motor and muffler.

### **Structure Characteristic**

Axletree seat and effuser air-in are built on the main seat. The antrum of mill is on the effuser air-in. Multi-layer dial set on the main axle lies in the middle of grinding antrum. There are several rollers distributing evenly on each dial. A gear reducer and

motor are set on the main seat, while the powder collector is set on the top of the antrum mill.

### **Working Principle**

The main motor drives main axle and every layer rotating by reducer. Dial drives numbers of rollers rolling and rotating in the ring by pintles.

Big materials are crushed into smaller particles by hammer crusher. Then they are sent to store house by elevator. The electro-magnetic vibrating feeder send the materials evenly to the middle of the upper dial. Under the function of the eccentricity, the materials scatter to the side of the circle and fall into the ring to be pressed, crushed and milled into pieces by rollers. After the first crush, materials fall into the second and the third layer. The pumping of the high-pressure centrifugal blower put the outside air into the machine. The coarse powder will be brought into the classifier. The rotating turbine in the collector makes the coarse particles fall back for regrinding. The fine particles will come into the cyclone collector with the airflow and discharged by the discharging valve on the bottom of the collector. They are the final products. The airflow with little dust will be discharged through blower and muffler after being purified by the cyclone collector.

### **The Installation and Debugging of the Whole Set**

#### **I . The installation of the whole system**

##### **i . The prepare before installation**

1. The grinding mill should be kept seriously before installation. The surface open to the outside shall be coated with rustproof grease in order to resist the solarization and drench. The maintenance system should be set up.

2. According to the dimensions shown on the installation diagram, the workshop and foundation must have enough height and suitable installation position. The foundation of the pulverizer shall be constructed with high-mark cement and reinforcing steel bars. The wiring pipes and cable ditches must be well prepared in advance. When the concrete foundation is completed, it is required to have 15-day maintenance period.

3. A lifting facility with the capacity of 5-6 ton must be equipped for repairs and maintenance.

4. If the pulverizer has been operated for over 6 months since delivery, the central shaft system of the main unit, transmission device, grinding roller and oil tank of the classifier must be cleaned and examined. After completion of cleaning and checking, these components shall be lubricated sufficiently.

##### **ii . Installation of the pulverizer**

1. Firstly, put the main unit, reducer and base on the centre position.
2. Sling up the main unit and put it on the top of the reducer to connect it with the axle connecting. Meanwhile, regulate the two half-clutches of C and D with their axial difference less than 0.2mm. The non-parallel degree shall be kept within 5-8mm.
3. The location and height of the piping system shall be in conformity with the blueprint. Any random change is prohibited. All the pipe connections must be sealed well and no air leakage is permitted after fixing. The electrical device must be correct and reliable. A trial operation must be carried out after installation of all parts.

## II. Debugging

The unloaded trial of the main unit shall not exceed 1 hour. If there is no unusual noise, the material can be fed.

### **The Operation Rules of Pulverizer**

◆ Before the pulverizer is started, check if the feeding materials are in accordance with feeding size. Adjust the rotating speed of the classifier to achieve the requirement of the final product. Finally, start the machine according to the sequence:

1. Turn on the dustpan elevator;
2. Turn on the hammer crusher;
3. Turn on the adjusted electrical motor after the hopper is fed with the material;
4. Turn on the blower;
5. Turn on the main unit; meanwhile turn on the vibrating feeder.

At this time, the grinding mill is started. The operation procedure can be stated as follows:

Turn on the elevator----crusher----classifier----blower----main unit----feeder----adjusted motor----air compressor----discharging valve.

◆ The whole set should be turned off with the following sequence:

1. Turn off feeder to stop the material feeding;
2. Turn off the main unit after about one minute;
3. Turn off the blower after blowing off the residual particles;
4. Turn off the adjusted motor;
5. Turn off the air compressor and the discharging valve.

The sequence of turn-off is as follows:

Feeder----main unit----air blower----classifier

Note: the material will be transported to the hopper by an elevator when the material in the hopper reaches a certain quantity. It depends on the quantity of the stored material to stop the crusher first and then the elevator.

If any part of the machine generates abnormal noises, or the load is suddenly raised up, turn off the machine immediately for checking and troubleshooting to prevent serious accidents.

### **The Lubrication System**

In order to guarantee the normal operation of the whole system, please oil the machine according to the instruction listed below. The lubricating location and the grease name are stated in the following diagram:

Lubricating location	Form of lubrication		Name of lubrication	Name of Lubrication drops	Interval of lubrication	remarks
	Manual Work	Oil tank				
Transmission Device with Wheel axle		△	HJ-40 Machine oil	1	Keeping the oil level	Changing every 3 months
Central shaft of the main unit	△		No. 3 MOS compound calcium based grease	1-3	One month	Replaced by calcium based grease
Shaft of adjusted electrical motor	△		No. 3 MOS compound calcium based grease	6-8	1-3 days	Replaced by calcium based grease
Bearing base of classifier	△		No. 3 MOS compound calcium based grease	2	One month	Replaced by calcium based grease
Turbo-box of elevator		△	HJ-40 Machine oil	1	Keeping the oil level	Changing every 3 months

### **The Electrical Control Part**

The motor control system of the pulverizer is centralized in the controlling cabinet. Every unit of the system is with mutual interlock. The feeder is automatically controlled. The feeding volume is controlled by the current variant of the main unit. 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 the motor of the main unit, classifier and feeder.

In the starting control system, the reduced voltage start is used for the capacity over 30 kw while the direct start is for that below 30 kw. And the Y start is adopted for the blower and the delta start is for the main unit. The delta start is connected with normal operation. The control is composed of contactor and relay in an automatic switching. The time delay is usually set with an extension of about 10 seconds.

For the motor with the delta start, there are nine connectors on the stator winding. They are U1, U2, U3, V1, V2, V3, W1, W2, and W3. No mistakes are allowed in numbered terminal connections between motor and the control cabinet. In case the connector motor is damaged, it can be replaced by a common motor with six connectors at the same power and speed. But this can only perform as the start and control.

### **The Control and Automatic Feeding of the Vibrating Feeder**

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

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

2. Non-load trial should be taken out 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. After running for several hours, see if the amplitude current is stable; then open the valve to feed, see if the feeding current is stable. The amplitude is allowed to fall down 0.5mm. If the amplitude current is at the rated value but cannot meet the requirement of the feeding volume, hang the vibrator at a 20° decline position to meet the feeding requirement.

3. When the current change of the main motor exceeds the rated value, the feeding will be stopped, with the blower working under normal condition. When the current declines, the feeding continues. The automatic feeding is realized by the connection and cut of the current relay with the silicon-controlled voltage device. If the blower is out of order, the feeding will also be automatically stopped. There are two coils in DL-12/6 over current relay. When these two coils are in series connected, the working current can be regulated from 1.5-3A. When they are parallel connected, the working current can be regulated from 3-6A. when the pulverizer is under normal working condition, the coils should be in series connection because the current on the relay

caused by the current mutual inductor will not be over 3A.

4. When the automatic feeding is started, turn the main switch on the control cabinet into an automatic position. Slowly, turn the resistor R1 knob on the control cabinet to the rated value and remain stable. Meanwhile, move the sliding arm on the current regulating relay according to the rated value to change the action current of the relay. When the current goes higher than the rated value, the constant-closed contact will be cut off, and the contact will be closed immediately when the current declines a little. In this way, the pulverizer will be always kept in an optimal working condition. The non-load and over-load running are avoided and the efficiency of power production is guaranteed.

5. Adopt YVP series frequency-conversed speed regulated motor. The control is through the frequency converter button on the switch board.

### **The Repairs and Maintenance of the Pulverizer**

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

2. In order to guarantee the pulverizer in a normal working state, a safety operation system for the repair and maintenance of the equipment must be established. Only in this way can the pulverizer be guaranteed to have a long serve life.

3. If the sound of the pulverizer is abnormal shut down and check it immediately. See whether there is foreign matter entering into the mill, or some connection bolt becomes flexible.

4. The operation of the adjusted electrical motor and adjusted device should go on according to the manual strictly.