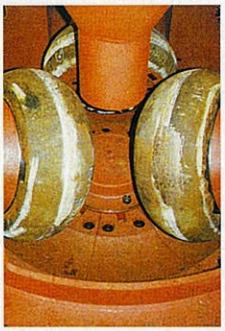
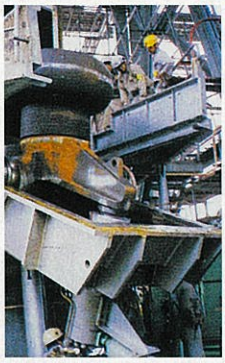




KVM Type Vertical Mill

EARTHTECHNICA CO., LTD.

Accomplishment of Energy Saving in the Milling Process

A single Pressure Type Mill Providing the Three Functions of Milling, Classifying and Drying

EARTHTECHNICA CO., LTD. (ETCL) designs and manufactures machinery for a very extensive range of industries including contributions to such specialized fields as; power generation, iron manufacturing, cement manufacturing and the chemical industry. Its development and expertise in manufacturing not only extends to key installations in various plants but also to peripheral equipment.
In the milling industry, ETCL has to date manufactured and delivered over 1,000 mills for use in the treatment of raw materials, ETCL has thus accumulated invaluable know-ledge and experience in every field and developed a high reputation for their broad technological competence and reliability.
By unifying this extensive experience with a thorough study on energy saving in the milling process, ETCL has developed the "KVM Type Vertical Mill". This innovative single pressure type vertical mill provides not only milling and classifying but also the drying process.

Special Features

1. Ideal Milling Mechanism

Three comparatively large milling rollers are installed at the same interval, and they are kept at a subtle clearance from the groove of the milling table. This mechanism attains high milling efficiency. Moreover, the impact brought about by foreign matters is absorbed by springs or an accumulator and thus noiseless operation is made possible.

2. Minimal Abrasion at the Milling Part

Special material, of superior abrasion resistance, originally made by Kawasaki Heavy Industries is applied to the milling part (the roller and the table). Near the center of the table where compression milling is carried out, the relative slippage between the milling roller and the milling table is small and the peripheral speeds of the two are comparatively low. Accordingly, raw material is caught securely and the material unit of abrasion is reduced.

3. High Milling Efficiency and Low Electric Power Consumption Rate

The milling area for the unit hour is large, and the raw material crushing capacity is favorable. High milling efficiency is therefore obtained, and the amount of classified coarse particles circulating in the mill is reduced which consequently lower the power consumption rate.

4. Easy Adjustment of Particle Size

The adjustment of the particle size can be completed easily, in the case of a coarse type separator, by adjusting the opening of the classification vanes, and in the case of a fine type separator, by changing the revolution speed of the selector. In either case, the classification efficiency is very high and an excellent product can be obtained at low cost.

5. Good Load Response

As the residual volume of milled particles in the mill is less than that in other mills, the response against the load fluctuation is superior.

6. Automatic Operation

Due to the instrumentation system that controls the differential pressure of the mill's inlet and outlet, the air quantity and the temperature of the gas automatic operation is possible.

7. Low Vibration and Low Noise

In the milling section, three sets of milling rollers rotate statically. In addition, as the pressurized roller is equipped with a stopper mechanism which prevents the roller from touching the metal of the table, no-load milling cannot occur thus vibration and noise are reduced.

8. Small Installation Area

Compared with other mills, the area required for installation is much smaller.

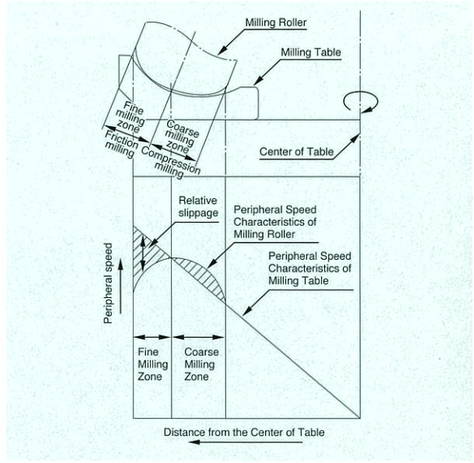
9. Easy Maintenance

The structure of the mill makes maintenance easy, the milling rollers are hydraulic and they can be replaced by reversing them outward, plus the table liner is composed of bolted segments.

Milling Principle

The KVM type vertical mill attains efficient milling by utilizing two milling principles: "compression milling" to mill comparatively large particles, and "friction milling" to pulverize smaller particles. As indicated in the figure below, in the "coarse milling zone" on the inner side of the roller where charged raw material is first caught, compression milling is carried out by making the relative slippage between the roller and the table small. On the other hand, in the "fine milling zone" on the outer side where milled particles are further pulverized, friction effect is raised by making the relative slippage greater.

The roller and the table accomplish quiet and stable operation without vibration, irrespective of the load amount, because the roller synchronizes with the rotation of the table at the rounded part, and because the table is grooved to bring about optimum layer pressure.



Milling Roller

You can select the material of the milling roller from various abrasion resistant materials of ETCL origin.

The lives of especially hard facing rollers can be greatly prolonged, and after life it is possible to re-use them with recovery welding.

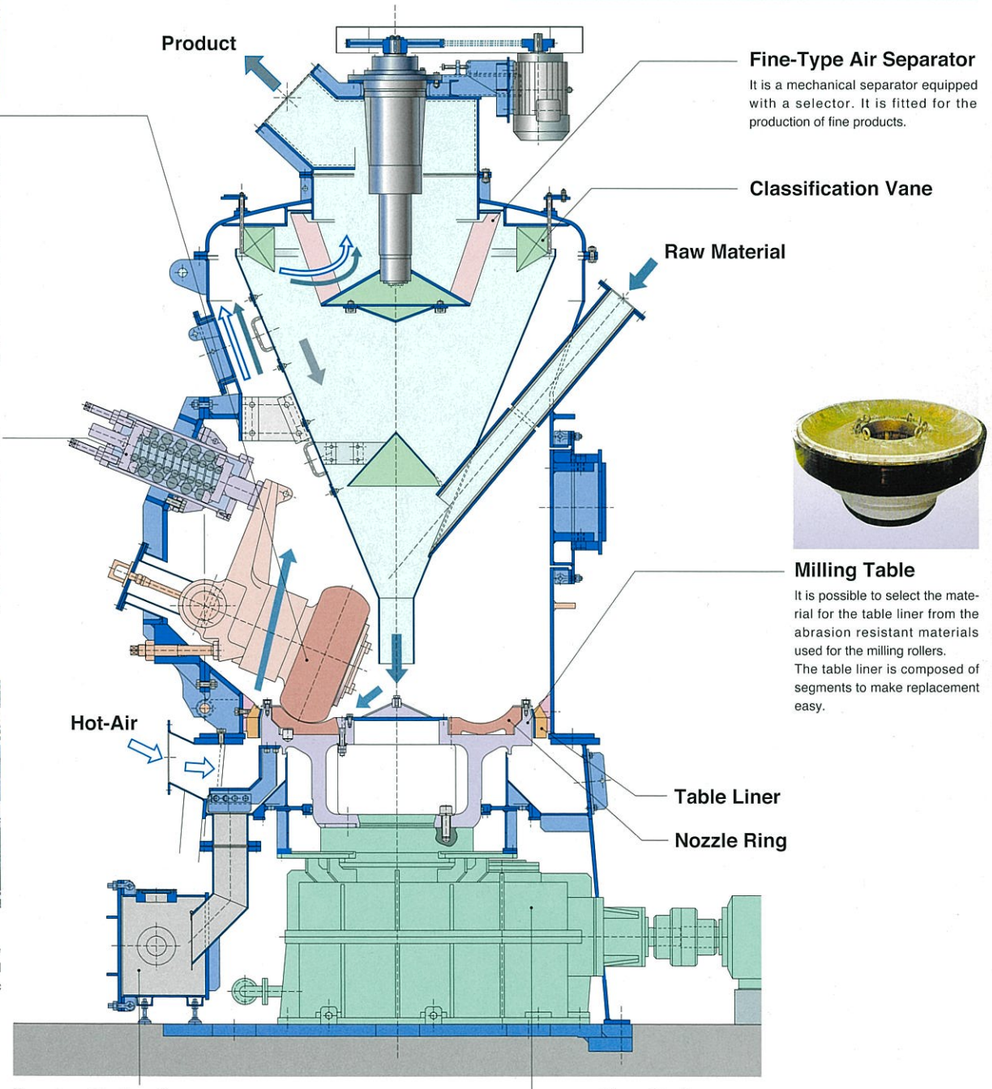
To treat raw materials which cause high abrasion. It is possible to apply ceramic lining to the abrasion part.

Pressurizing System

There are two types of pressurizing systems: that of the double coil spring method, and that of the hydraulic cylinder method. Either method can be selected depending on the properties of the raw material, the particle size required of the product and the operation method.

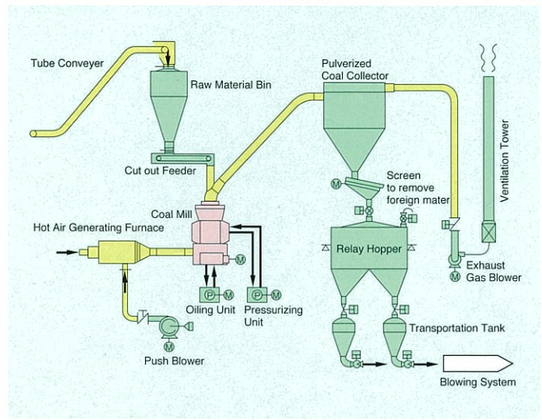
Roller Arm

The milling roller is fitted to the roller housing with the cylindrical roller bearing and the automatic aligning roller bearing.



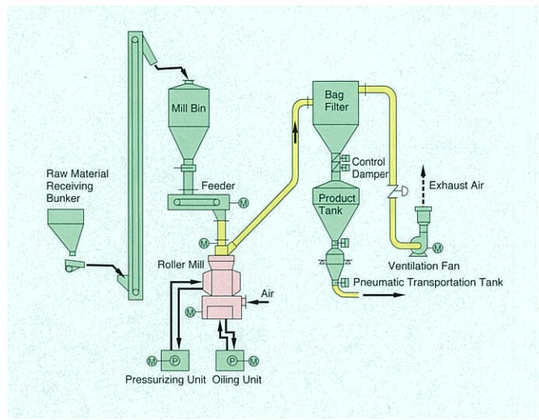
Examples of Systems

1. Pulverized Coal Injection System



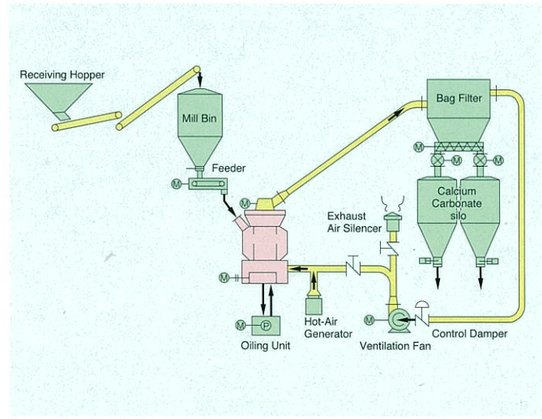
- AS the raw material has a high moisture content, the negative pressure method of one-pass hot air is introduced draft.
- As the hydraulic pressurization method is applied to the mill, it is possible to change the pressurizing power to three stages depending on the amount of raw material supplied, plus the system operates smoothly even with a low load.
- As the raw material easily catches fire, the system is structured so that no coal is left in the system and an N_2 purging unit is attached to the storage lank.

2. Hot Metal Pretreatment System



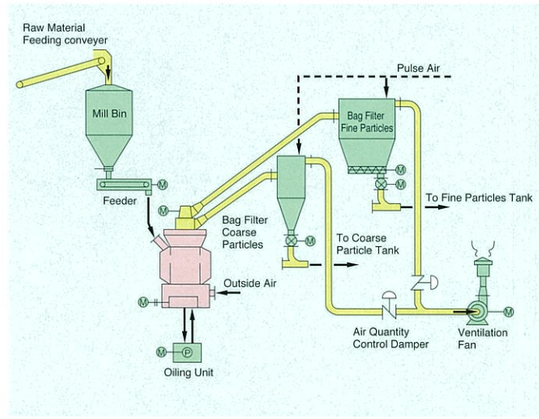
- As the raw material has a low moisture content, the method of one-pass air inhalation is introduced to create draft.
- As the raw material is hard, high pressure is applied to the roller with the hydraulic cylinder.
- The classifier is a rod revolving type thus it has excellent abrasion resistance.
- As the raw material causes high abrasion. ceramic or hard facing steel sheets are applied to the abrasion parts of the mill, the duct, and the bag litter.

3. System for producing Calcium Carbonate



- In this system, a hot air generator is installed to remove the moisture content of the raw material stored in the open air, and gas is circulated in order to utilize thermal energy effectively.
- A vane-type separator of high efficiency is applied to the mill for classification.
- The product is transported pneumatically to the calcium carbonate silo directly the mill.
- As the instrumentation system to control the air quantity, the pressure and the temperature has been installed, no-man operation is possible.

4. Bentonite Milling System

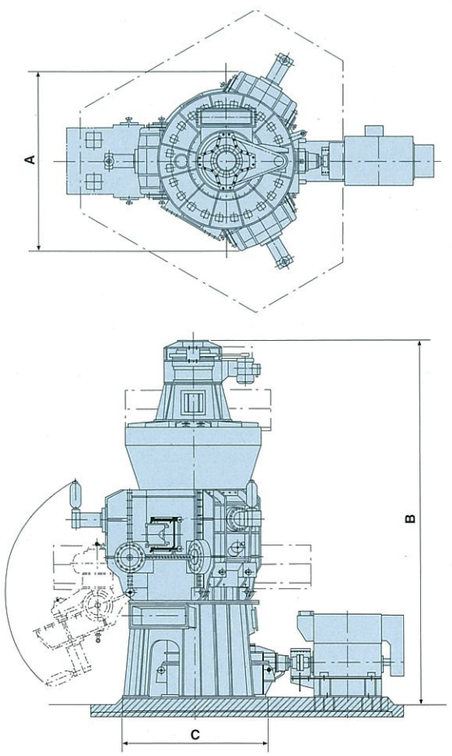


- As the raw material is dried in the pretreatment process. the negative pressure method of one-pass air inhalation is introduced to the draft.
- Two lines are equipped to make it possible to produce line particles and coarse particles and coarse particles and coarse particles simultaneously.
- Even it the raw material is contaminated with a large quantity of sand, the sand will be exhausted to the coarse particle side. The product of high quality can therefore be produced on the line particle side.
- As the instrumentation system to control the air quantity and the pressure has been installed, no-man operation and production management with CRT are possible.

Capacity

Model	Motor kw	Capacity (t/h)
KVM–305	1,220～2,190	
KVM–295	1,120～2,000	
KVM–285	1,030～1,840	
KVM–275	940～1,680	
KVM–265	860～1,530	
KVM–255	780～1,380	
KVM–245	700～1,250	
KVM–235	640～1,100	
KVM–225	570～1,000	
KVM–215	500～900	
KVM–205	450～790	
KVM–195	400～700	
KVM–185	360～620	
KVM–175	300～550	
KVM–165	260～460	
KVM–155	220～400	
KVM–145	190～330	
KVM–135	160～280	
KVM–125	130～220	
KVM–115	110～170	
KVM–105	95～150	
KVM–100	75～130	
KVM–90	55～95	
KVM–80	45～75	
KVM–70	30～55	
KVM–60	22～37	
		2 3 5 10 20 30 50 100 200

Dimensions



Model	A	B	C
KVM–305	8,310	14,330	6,910
KVM–295	8,040	13,870	6,690
KVM–285	7,770	13,410	6,470
KVM–275	7,500	12,950	6,240
KVM–265	7,240	12,490	6,020
KVM–255	6,970	12,020	5,800
KVM–245	6,700	11,500	5,580
KVM–235	6,430	11,100	5,350
KVM–225	6,165	10,630	5,130
KVM–215	5,895	10,107	4,910
KVM–205	5,625	9,705	4,680
KVM–195	5,360	9,245	4,460
KVM–185	5,090	8,785	4,240
KVM–175	4,825	8,320	4,015
KVM–165	4,555	7,860	3,790
KVM–155	4,290	7,395	3,570
KVM–145	4,020	6,935	3,350
KVM–135	3,750	6,470	3,120
KVM–125	3,485	6,010	2,900
KVM–115	3,215	5,550	2,780
KVM–105	2,950	5,085	2,460
KVM–100	2,680	4,625	2,230
KVM–90	2,415	4,160	2,010
KVM–80	2,145	3,700	1,790
KVM–70	1,875	3,235	1,560
KVM–60	1,610	2,755	1,340

(UNIT : mm)

For Your Inquiries

For inquiries on the KVM type vertical mill, please indicate the following items clearly.

1. The name of raw material.
2. The properties of the raw material
   dimensions, particle size distribution, true specific gravity, apparent specific gravity, moisture content, hardness, grindability, specific heat, abrasion property, adhesive or not, explosive or not, and other properties requiring special mention.
3. The properties of the product you require
   dimensions, particle size distribution, moisture content, and other properites requiring special mention.
4. Milling capacity you require.
5. The ambient temperature
   annual highest, lowest and average temperatures.
6. The voltage and the frequency of the power source.
7. Every thing which requires special attention in designing and manufacturing.
8. Pre-process and after process.
9. Installation conditions
   place, area, height and arrangement conditions.
10. Accessories and the range of estimate you require.

＊We have a testing facility in our Yachiyo Works.
Please send us a sample (1-2 tons) if you would like to receive comprehensive data.

ATTENTION FOR YOUR SAFETY

For your safety operation, please read well "Operation manual" before you operate the products. If proper handling is not done, it may causes death or injury due to accident, fire, electric shock, trouble and so on.

ATTENTION ON THE BROCHURE : Drawing and specification shown in the brochure may change depending on the specification of the products. And please note that the contents of this brochure sometimes change for improvement without notice.
The pictures shown are taken for the brochure. The actual coloring, accessories of the product may vary.

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