



MQ Series Ball Mill

V-FLO GROUP OF COMPANIES LTD.

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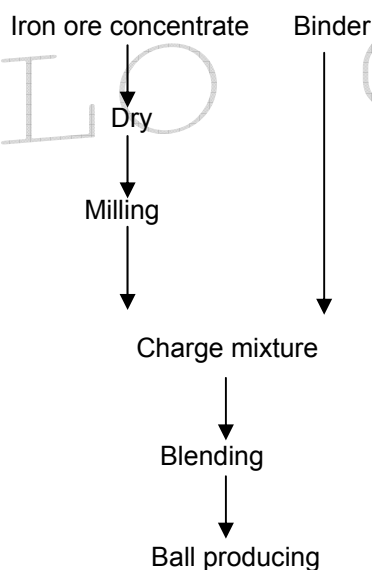
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1. Application of Ball milling process in Balling

The balling production has developed greatly in recent years, the total output of ball mine was 12,420,000ton in 1999, furthermore, one lot of shaft furnaces have been put into production in 2001. However, compare to the other countries, our production capacity can not meet the furnace requirements, in the meanwhile, the balling mine in China has many disadvantages, such as bad taste, uneven strength, lower quality, high energy consumption and lower productivity and so on. To improve the quality of the balling mine of our country, the balling manufactures should establish balling production material base, enhance the productivity of oxidation balling and handle the problems of direct reduction of balling material through measures of bring in balling mill equipment, increase fineness of the concentrate , reduce the volume of the binder.

Different from wet milling and dry milling respectively, the balling mill can get the suitable material for production of ball moisture. It can not only solve the composing of the accuracy and grain, but also improve the reverse polarity of producing the finished ball mixture, which has realized improving the strength of ball largely and reducing the usage of bentonite. Moreover, it improved working conditions and made the process easily. That's why the ball milling is the much perfect measures to control the raw material grain and improve the strength of green-ball. Concentrate can be milled separately or milled in mixture and the mixture can be milled partially or totally.

Milling means milling with concentrate and water. The **green ball** strength is increased because of the process. The wet materials twist and extrude during milling, the wet materials are extruded so that the diameter of capillary tube is decreased accordingly, the tubes are pressurized by pinching the moisture into the slight capillary tubes,. When milling the concentrate with the bentonite, with exception of the mixture being extruded consolidated, the essential point is that the process improves the blending level of mixture and make the bentonite well distributed so that improve the contact condition between bentonite and iron ore concentrate, exploit the cementation function of bentonite to the full, intensify the strength of the **green-ball**. The milling process procedure as follows:



2. The advantage of the Ball Milling

- (1) Intensify the fineness of the mixture and make the graininess of the mixture and structure reasonable.
- (2) Milling makes the mineral matrix defect increased, the increased new matrix defect raise the activity of the surface of mineral.
- (3) The material malleability is intensified through twisting and extruding in the course of milling.
- (4) When the binder has close contact with the ore grains, the adhesive force between binder and ore grains increase, the coarse grains are wrapped up into the internal of the ball through this adhesive force. Therefore, the strength of the green ball is intensified greatly, furthermore, it is much smoother and easy to be produced compare to the **green ball** un-milled.

Specific property as follows:

- The compressive strength and shatter strength of the pellet has increased in large extent after milling of the mixture.
- The shatter strength of the green pellet is keeping increased with the time goes on, but the compressive strength has limit value.
- The malleability of the material intensified when twisting strongly with the time goes on.
- The strength of milled green pellet is higher than the un-milled, the milled green pellet can use less than 1% bentonite contrast to the un-milled green pellet.

Conclusion: To refining the grain of the raw material, increase the quality of the green pellet and reduce the usage of the bentonite, milling the ball mixture is the practical measure to realize the above condition.

- a. using the ball mills, the technical ask for high enquiry about material size.
- b. The concentrate being milled can be used to produce the ball directly, which improve the performance of the concentrate, and promote and stabilize the ball production so that increase production and quality.
- c. The cost can be reduced to achieve more economic profits and environmental profits by making use of the ball mill in the shaft furnace pellet process.

3. The summary of development and production of ball mill

In the process of steel production, ball is the crucial procedure. Taking the bentonite as the binder, adding to the powder concentrate from the ore manufacture, the solid green pellet in 8-20mm will be shaped up through the procedures of **charge mixture**, drying, blending and making balls. Then put the green pellet into the shaft furnace, the balling is finished. It has been found that the balling ore has many advantages to improve the furnace charging structure, increase the utilization factor and reduce coal-ratio.

When material is milled after drying and before making balls, it makes the material blending and refining, enlarge the surface area of the material grains, expose many fresh surface, therefore, it improves the activity of the surface, blends the bentonite and magnetic iron ore powder well, so that adhere to the surface and gaps. The heat coming from the grinding surface can cut down the water of the material. The concentrate powder can be used to make the balls directly when adopting milling during the green pellet production process. The temperature of the

concentrate powder has increased before making balls which enables the balls making easily. On the other hand, grinding material gains getting thin, the unit volume increase obviously, surface activity improved, which is benefit for the material coring, besides, the cue ball is growing which shorten the balling time, improve the throughout and quality accordingly. Nowadays, many steel manufacturers have taken in the ball milling process by using the ball mill.

4. The contraction characteristic of damp mill

The main characteristic of damp mill: force feeding, discharged mine surrounding and Rubber lining.

Specific details:

- a. Driving mode: YR mode asynchronous machine is driving through reduction box; driving way select nylon coupling.
- b. big gear adopt skew tooth, driving stability, touch rate high. The rigidity of gear more than HB230, seal adopt double insurance, without any powder and foreign matter in the gear sleeve.
- c. small gear lubrication is numerical control motor oil blooming, stipulate time and scalar. Oil blooming on the gear, there are enough intensity oil blooming between gear and without any wear and tear.
- d. bear is bran-new contraction and adopt "handling mode" self-aligning bearing from America AC company. The weight light, self-aligning is good and easy to maintain, check up. There are $\varnothing 16 \times 1$ cooling copper pipe in the babbitt metal, cooling effect better. Main bear box welding contraction.
- e. bear lubrication adopt hydrostatic pressure start/stop, dynamical pressure lubrication, low pressure spray oil, equip high/low pressure combine oil station, **start process as follow:**
- f. main bear is "piston circle" seal, absoluteness credibility. Nodular castiron ring (press on the bear box) lubrication permanence, save oil, environment good, this technical is America patent.
- j. Adopt belt feeding force feeding, wearable good and use-life more than 1 year.
- h. adopt rubber plate use-life long, install convenience, low voice, have better strength and flexibility. It settled encrustation problem.
- i. Bi-plate is ZGMn13/Cr2 179~229HB, wearable good, drain hole is un-jam.
- j. Gudgeon adopt integer or fission construction, it lies on sweing ability on site.
- k. end cap and bowl have integer and fission bolt occlude. 100%NDT check up, after welding integer anneal, stress relieved.
- l. bowl of grinder length-diameter ratio, rotate speed, main electrical power ect reference majorization configuration, it adapt to grinding condition and have higher efficiency. It is accord with contry standard JB/T14065-93.
- m. stand-by and low speed driving equip need examine and repair; hoisting device---- oil jack for hoist and back overhaul/install; high/low pressure oil station for main bear lubrication; auto spray equip for lubricat big/small gear.
- n. Low pressure electric control system, adopt PLC across-the-aboard monitor Temp, pressure, flux and have accident alarm and inter-lock function.

Anyhow, Shenyang Heavy Industry Co. Ltd. owned rich experience on design, manufacture and inspection for mill machines. Integrate the technical abroad form like AC, MPSI, COPER, and FULLER from USA, EVT and Babucoik from Germany, GEC and Areston stein from Franch etc, we manufactured the word-class mills, which stand for the top class of china. The standard of Mill Design and Mill Manufacture published on 1993 by National Ministry of Machine-Building Industry was compiled by us.

5. Operational principle

The ball mill is kind of forced feed with single drum, discharged mine surrounding, with Rubber lining. The raw material enters into the drum pass by Department of mandatory feed from feed cover. The motor connect with the coupling, reducer and gearings sets drive the drum moving which contain medium of steel balls. The raw material impacted by the balls and grinded by the drum and linings, showing the fresh surface, fully mixed, and then discharged form the relief holes surrounding the drum, make the big raw material (40~45% minus 200 mesh) to the size required (80% minus 200 mesh). The raw materials became smaller and produce a strong power when they were hit, pressed and squeezed in the drum, which can improve the iron ball's quality and can also Reducing binder consumption of bentonite.

6. Attentions

- (1) Control the water content of the raw material. Water is necessary to enhance the effect of grinding and improve the performance into the ball, but it is also the important reason to cause material sticking.
- (2) Control the charge to ensure the proper fill rate and rate between material and balls, to avoid material sticking.
- (3) How to exclude the sticking phenomena? In the condition of proper weight of ball filled, and certain material, once happened sticking in feed entrance, steel balls and grate bars, which should be caused by too much water contained in the raw material that can be solved by adding more dry material. Once happened the serious sticking in feed entrance, and more longer more serious, but no sticking in exit and grate bars, which should be caused by the reason of feeding too much material quantity. You can just stop feeding to resolve such question. If happen the long term block, steel balls were pressed to the exit, the sticking should be serious. You can open the door of ball mill, using the drilling steel pock a trench, then close the door and start the machine without any feeding, the sticking should be solved soon.

7. Ball Mill Main Performance Parameter

Table 1 Ball Mill Main Performance Parameter

No.	Item	Unit	Data	Data
1	Specification			
2	Dwg. No,			
3	Diameter of the vessel	mm		
4	Working length of the vessel	mm		
5	Available capacity of vessel	m ³		
6	Max. loadage	material	t	
		Steel ball	t	
7	Rotation speed of vessel	r/min		
8	Main motor	model		
		power	kw	
		speed	r/min	
		voltage	v	
9	Main reducer	model		
		ratio	i	
		Input speed	r/min	
10	Low speed transmission device	Motor parameter		
		Reducer model		
		ratio	i	
		Input speed	r/min	
11	Belt feed device	Motor model		
		power	kw	
		voltage	v	
		Belt width	mm	
		Belt thickness	mm	
12	Spiral feed device	reducer Cycloid pin wheel		
		Output speed	r/min	
		Motor type		
		power	kw	
		speed	r/min	
		voltage	v	
13	Overall dimensions	mm		
14	Weight (not include motor and electric control)	t		
15	Grain size			
16	yield	t/h		

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φ3.5×6.2m Ball Mill Technical Parameter or
 scope of supply

No	Item	Description	Qty.	Manufacturer	Service life	material
1	Ball Mill					
a	Main bearing					
b	Gyration part					
c	Drive part					
d	Dumping cover part					
e	Belt feed device					
f	base					
2	Auxiliary machine					
a	Low speed transmission part					
b	Lift device					
c	High & love pressure oil chamber					
d	Spray lubricator					
e	PLC control cabinet					
f	Oil & water system					
3	Main motor					
4	Main reducer					

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9. Ball Mill **sell sales performances**

User	Quantity	Date
3245 damp mill		
Daye Iron mine	2	2000.10
XingTai Steel Plant	2	2000.11
SuZhou Steel Plant	1	2001.1
Xuanhua Steel Plant	2	2001.3
Chengde Steel Plant	1	2001.9
Chengde Jianlong Steel Plant	1	2002.2
Dongfang Steel Plant	2	2002.8
Lianyuan Steel Plant	2	2001.7
Nanchang Steel Plant	2	2002.9
Changzhou Zhongtian Steel Group Company	1	2003.7
Yonglian Steel Plants	1	2003.12
Hengchang pellet	2	2004.3
Shanxi Xinyu	1	2004.3
Gansu Jiu Steel	1	2003.11
3562 Damp Mill		
Chengdu Steel Plants	1	2000.7
Chuanwei Steel Plants	1	2002.11
Xingtai Delong	1	2002.8
Xuanhua Steel Plants	1	2003.5
Handan Zonghang	2	2003.5
Laiwu Mining	1	2003.6
Laiwu Jian Mine	1	2003.6
Xinyang Steel Plants	1	2004.3
Jinling Iron ore	1	2003.6
Liuzhou Steel Plants	2	2001.12
Yingkou Plate of Moderate Thickness	2	2003.2
Yongfeng Steel Plants	1	2003.6
Hebei Jingye Group	1	2004.4
Tangshan Ganglu Steel Group Company	1	2004.4
Tangshan Songting Steel Plants	1	2004.1
Tangshan Guofeng	2	2004.11

10. Brief Introduction

(1). Production capacity

Shenyang Heavy-duty and Electrical Equipment Co.,Ltd with integral production and technical organization, which has Heavy Machinery design research institute, large cast steel institute, Heavy Machinery technology research institute, Physical & Chemical Test Center and Calibration & Testing Center. It has achieved CAD design to develop new product and meet the customer's further requirements. Our corp. have constructed grinding coal, crushing coal and heat-cool technology lab, intensity anticorrosion precaution, number control, physical & chemical, and electric lab, its grinding lab has most standard test millings in China at present time, which won ShenYang science and technology third prize. It own more than ten manufacturing department: making steel, casting-steel, forging-steel, heat treatment, machine, metal framework, tool Hydraulic Pressure equipment, repairing-machine, dynamical, painting package and so on. The producing capacity is 100,100 ton steel, 20,000 ton casting steel, 20,000 ton forging steel, 10,000 ton mechanical part and 30,000 ton machine products.

Moreover, the corp has advanced equipment after many years' technology development. It has more than 2130 sets producing equipment, including more than 250 introduced from abroad, to process making, forging, casting, heat treatment, welding and machining.

Its producing equipments reaches the international advanced level of 1990s. It has advanced equipment in the heat-process: 40 ton electric cooker, 50 ton ladle refining, Ladle power injection device introduced from Sweden, Resin Bonded Sand Molding product line from Japan, V process produce line from Britain, 32MN forging pump press made by ourselves, full set of heat treatment equipment, 70MN Retaining Ring on Generator hydraulic pressure bulge devices made by ourselves(there are two sets on the world, one in France and one in Japan) and so on. It has 54 sets number control and digital display machines in machine-process: 10 meters Large Size Vertical Lathe, 13 meters?? It has developed welding devices: CNC cutting machine from Germany, co2shield welding and arc welding and so on. Moreover it has over 642 sets various advanced testing equipment and facilities, including EJ1000 three coordinate measuring machine, PFSU1600 gear tester, 6m length measuring machine, Model 6 taylor talysurf, 4DVscanning electronic microscope, direct reading spectrometer, USIP-11 ultrasonic instrument, 300EGS.2X ray crack detector, X ray fluorescence etc.

(2). Quality Assurance System

The corp. has promoted all round quality Management, has acquired ISO9001

(1994edition) certificate in 1996, IFA/MLA International mutual recognition certificate in 1998 and CCS mill certificate in 1993. and has gained security registry certificate for nuclear shielding of the second party inspection quality system tested by Fast breeder reactor construction headquarters in 1999 and ISO9001(2000Tversion) in 2002, which forward its quality management system go to a new step.

In the corp., Manager is in charge of the quality management of the corp is undertook by manager, led by the general engineers and quality control department, processed by the Quality Inspection & Test Center. There are testing center in each manufacturing department. Inspection and testing for each products (including material, purchased part, component, finished product) are based on the marking, specified stamp, brand, label plate, test records, test report and storing place. Quality checker must track and check each working operation, mark and record the testing result. In order to assure the quality of product, the working operation must stop without the checkers' signature.

Each product for delivery must have test report and acceptable certificate after result of test and test run is qualified.

- Quality Principle

Adopt advanced technology, strength quality management, manufacture qualified product, meet clients' requirements.

- Quality Aim

Product meet the quality requirements, Qualified Rate of Products: 100%

Develop new product to meet clients' requirements, sell rate of new product is over 85%

Timely and comprehensive after sell service, Customer satisfaction rate is more than 96%

- Implement Principles

Improve quality benefits rely on the staff

Strength management based on continuous improvement

Stop rule-breaking behavior by processing procedure

Ensure quality of product and management through elaborate operation.

(3). Equipment manufacture requirement

- Purchase for material and motor accord to procedure required in quality Manual, and they must have acceptable certificate and report with heat No, chemical analyses.
- Report for main components cover chemical composition, tensile strength, yield point, hardness, undamaged and machine Machining records.
- Parts with high requirements in size and Geometric Tolerance are processed with special machine to ensure accuracy.
- Continue running time for integral installation test, no-load test, no-load pressure must be more than 4 hours.

(4). Manufacturing technology Standards

Material, welding, casting, cutting process, installation, anti-rust painting and other processes shall confirm to the below technology standards.

- The material shall conform to technical parameters of relevant standard and be proven qualified after test.
- Test of the goods shall conform to JB/T5000.1-1998 Universal Technical Requirements of Ball Mill Test
- Cutting shall conform to JB/T5000.9-1998 Universal Technical Requirements of Cutting.
- Welding piece shall conform to JB/T5000.3-1998 Universal Technical Requirements of Welding.
- Flame cutting shall conform to JB/T5000.2-1998 Universal Technical Requirements of Flame Cutting.
- Steel-casting piece shall conform to JB/T5000.6-1998 Universal Technical Requirements of Steel-Casting Piece.
- Repairing welding of steel-casting piece shall conform to JB/T5000.7-1998 Universal Technical Requirements of Repairing welding of steel-casting piece.
- Forging shall conform to JB/T5000.8-1998 Universal Technical Requirements of Forging.

- Assembly shall conform to JB/T5000.10-1998 Universal Technical Requirements of Assembly.
- Tubing shall conform to JB/T5000.11-1998 Universal Technical Requirements of Tubing
- Coating shall conform to JB/T5000.12-1998 Universal Technical Requirements of Coating.
- Non destructive test of steel-casting piece shall conform to JB/T5000.14-1998 Universal Technical Requirements of Non Destructive Test of Steel-Casting Piece.
- Non destructive test of forging piece shall conform to JB/T5000.14-1998 Universal Technical Requirements of Non Destructive Test of Forging Piece.
- Method for manual ultrasonic testing and result analysis of steel welds shall conform to GB11345-89.
- Hydraulic system shall conform to JB/T6996-93 Universal Technical Requirements of Hydraulic System.
- Antitrust packing shall conform to GB4879-85.
- Marking for packing and transportation shall conform to GB191-90.
- Packing shall conform to JB/T5000.13-1998 Universal Technical Requirements of Packing.
- Quality of ball mill shall conform to JB/T1406-93 Ball Mills and Rod Mills and JB/T53542-99 Quality of Ball Mills and Rod Mills.

(5). After-Sell Service

- Keep customers' records, visit the users regularly.
- Answer users; technical consultation anytime and handle their problems.
- After equipment reach the site, we arrange experienced technician to assistant user to inspect, install and test the product in site. Technicians shall leave the site under condition of users' agreement and satisfactory.
- If there is something wrong with installation and operation, our technician handle in site anytime after users' notify. We are at your service.
- Supply related technical support to assist user to finish the repair and maintenance during heavy repair period.
- We shall supply the spares for equipments with lower price and high quality timely.
- Warranty period for product is one year after acceptable installation, test and inspection. We repairs the quality problems due to our design during warranty period .

11. Brief introduction of main parts and manufacturing requirements

(1). Main parts

- Mill Vessel

The vessel has two flanges at both ends with rubber lining fixed by bolts inside. Both ends of the vessel are connected with hollow shaft which is placed on the main bearing. Steam that occurs when the material is ground by the vessel comes out from discharge device at discharge end.

- Main Bearing

The main bearing is hybrid journal bearing that is lubricated by high pressure oil when it starts or stops, then oil film will appear by means of static pressure and hollow shaft will be raised. When it operates, oil film will appear by means of shaft journal. The main bearing is made of tin-base bearing alloy with contact alignment structure and piston sealing. Heat that appears when the vessel is moving is taken away by snake type water cooling pipes buried under shaft bushing.

- Main Transmission Gear

It is used to drive the vessel to move. The transmission form is as follows: Motor- Speed Reducer- Pinion- Wheel- Vessel. The wheel and the vessel are connected by bolts.

- Low speed Transmission System

The system is mainly used to repair ball mill or replace lining plate to drive ball mill vessel at low speed. Low speed transmission motor is controlled by hand with single direction running. There is interlock control between low speed transmission motor and ball mill main motor. So, they are not allowed to operate simultaneously. Control methods of the low speed transmission are divided into operation and repair that controlled by electronics control box.

- Belt Feed Device

Forced-feed of the ball mill is achieved by belt feeder with cantilever retaining structure. With equal feeding, it has the protection device for avoiding feeding deviation. Meanwhile, feeding speed and quantity can be controlled well. The feeder shall be wear resistant with at least one year life span. The function of free from sticking material shall also be guaranteed.

- High & Low Pressure Oil Chamber

It is used to lubricate hybrid journal bearing of ball mill vessel. When the ball mill starts or stops, high pressure oil will be used and hollow shaft will be raised, producing static oil film. When the vessel is moving with some speed, oil will be supplied to main shaft by low pressure oil pump and oil film will occur by moving of shaft journal, then lubrication of main shaft will be guaranteed.

- Jacking Device

The ball mill shall have a set of jacking device, motor, oil pump, hydraulic jack included for repair.

- Electric Control System

The electric control is especially designed for $\phi 3.5 \times 6.2m$ ball mill; The system achieves concentrate control of high & low pressure lubrication, spray lubrication, slow-transmission, spiral conveyor feed. The system guarantees convenient operation and flexible control for the machine as PLC programming control system is applied. The meter for sound & light electric control shows working status of all parts on control panel, sound & light alarming and automatic stop in case of breakdown. Start and stop of all parts can be controlled by operating buttons on the control panel door. Remote/close control and automatic/manual control are controlled by switches on the control panel door.

(2). Manufacturing requirements

I. the general

- The purchase of raw material and spare parts shall be finished according to Quality Manual. Quality certificate, heat no, lot no and chemical composition certificate shall be provided.
- For key part, chemical composition certificate, tensile strength test, yield strength test, non-destructive test, hardness test and operation record of test specimen shall be provided.
- Some special tolerance with high requirement, such as the tolerance of dimension and form and position shall

be processed by relevant machine tool to guarantee its accuracy.

- General assembly, no-load commissioning and pressure test shall be finished in the factory. Continuous operating time of no-load commissioning shall be no less than four hours.

II. Vessel

- The vessel shall be welded by welding wire with tensile strength no lower than 43 Kgf/mm². The welding seam shall not be across the tack hole.
- Longitudinal welding seams are not parallel to each other with angle of 60° and double groove welding.
- Nonparallelism between position ends inside of spigot of both flanges shall be no more than 0.35 mm.
- Ellipticity and bending of the vessel shall be no more than 4mm.
- Except flange reamed hole, no more than 1mm deviation of any direction from the symmetrical place is allowed for other tack holes
- Ultrasonic test on board and board end shall be made before steel board is used. Tested width is 150mm and steel board quality class shall not be inferior to class II for forging.
- Automatic welding shall be guaranteed for the vessel. 100% ultrasonic test shall be made on welding seams and test class shall be B and assessment class shall be II.
- Stress relief treatment shall be made after welding.
- Both spigots of hollow shaft connected with the vessel shall be processed on the lathe with axiality less than 0.2mm.
- Ultrasonic test shall be made after the hollow shaft is rough finished and magnetic particle test shall be made after fine machining.
- Working length of the vessel: 6200mm.
- Dia. of the vessel: φ 3500mm.
- Material of the vessel shall be no inferior to Q235A. Material of flange shall be no inferior to ZG270-500.

III. Main Bearing

- Bearing bush shall be mutually lapped with relevant components. There shall be at least two contacts (lower bearing bush) in every 25×25 mm².
- Shaft liner shall be mutually lapped with shaft cover. There shall be at least one contact (lower bearing bush) in every 50×50 mm².
- After the bush foundry is proven qualified and finished rough in pair, then oil pressure test on high pressure oil line and hole and hydraulic test on water cooling test will be performed. If there is no leakage, mould alloy. In the end, all parts of spherical bush shall be under fine machining in pair.

IV. Transmission

- Working backlash Δ between pinion and wheel: $1.4 \leq \Delta \leq 2.18\text{mm}$.
- Meshing connecting spot of pinion and wheel along length of tooth: $\geq 50\%$, tooth depth direction: $\geq 40\%$, and it is close to the middle part of tooth lateral.

- Radial run-out of tooth row is no more than **0.25 mm** pitch diameter per meter. Circular run-out of tooth row is no more than 0.35 mm pitch diameter per meter.
- Surface of tooth row shall be close to vessel flange. If any gap exists, it shall be no bigger than **0.25mm**. The gap between split tooth row is no more than **0.1mm**. Tooth pitch shall meet technical requirement of relevant documents with its extreme tolerance ± 0.005 modulus.
- Test gear working piece for tooth accuracy, tooth surface hardness, penetrating layer depth, centre distance after assembly, contact accuracy and backlash. Meanwhile relevant test certificate shall be provided.
- Material of wheel: no inferior to **ZG310-570**. Hardness shall be 217-255 after heat treatment.
- Material of pinion: forging **35 SiMn**,
Quenching and tempering **HB=227-269**
Surface quenching **HRC45-50**,
Depth of Hardening Zone: no less than **3mm**.
- Semifinished product shall be annealed for stress relieving. Chemical composition and mechanical performance certificate shall be provided.
- Perform non-destructive test after rough machining according to JB/T5000.6-98 Steel Casting. *Repairing* welding shall conform to JB/T5000.7-98.
- Make preparation for pre-assembly in the factory and make good marking for positioning.

V. Belt Feed Device

- Free feeding with strong feeding ability more **than 90t/h**.
- It is reliable and easy to be maintained with long life span.
- Variable frequency adjustable speed motor with **power 5.5KW**.

VI. Jacking Device

- Hydraulic jacking
- The jacking height is no less than 120 mm.

12. The material of ball mill main parts and manufacture technology

- (1) Material of wheel ZG45, heat treatment Hardness shall be 207-241HB,

Technology: casting----rough manufacture----flaw detection--- quenching thermal refining---把合---precision work---teeth cutter

- (2) Material of pinion: quenching thermal refining- 228-269HB, tooth flank 45-50HRC

Technology: casting----rough manufacture----flaw detection--- quenching thermal refining ---precision work--- teeth cutter--- Surface quenching

- (3) Material of input and output cover: ZG270-500 (Original ZG35)

Technology: casting---rough manufacture----flaw detection---precision work

- (4) Main bearing box: welding structure

(5) Material of bearing sleeve: CbPbSn5-15/HT30-54

Technology: casting mould---manufacturing---coiled pipe---casting babbit alloy--- precision work

(6) Material of output scoreboard: ZGMn13, 179~229HB

Technology: foundry---heating

(7) Mill vessel: Welding parts

Technology: preprocessing of steel plate----blanking---rolling steel plate ----panel---welding---flaw detection--- manufacturing

13. Check & acceptance and coating

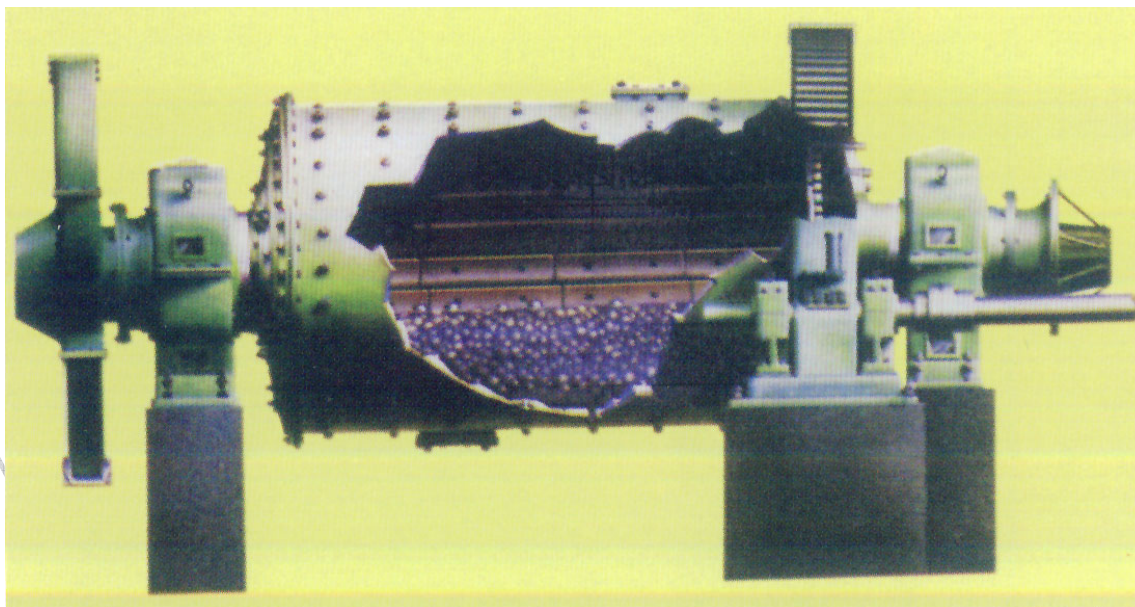
(1). Check and acceptance.

- Whether the check and acceptance of the seller's product (material, purchased part, component, finished product and other tested objectives) is qualified or not is judged by prescribed stamp, mark, label, test record, test report and fixed place. During the production process, quality controller shall follow up all the working procedures to guarantee quality of the finished product. Only when the finished product is proven qualified after commissioning with test report and quality certificate, it can be delivered.
- The buyer has the right to send his representatives to visit the factory for test and supervision during any step of production. The seller shall provide convenient condition for the test and the representatives of the buyer.
- If the production capacity is over 80% design capacity one month after installation and commissioning, reach design capacity (80t/h) two months, the ball mill is qualified. Check and acceptance standard of production capacity is based on average figure of one month's output.
- Check and acceptance standard of output size is to check size of the material before going into the ball mill and after coming out from the ball mill. The size shall be between design size and 200 with 10% improvement.
- Temperature rise of bearing during operation shall be no more than 35 °C and the highest temperature is no more than 70 °C.

(2). Coating

It shall be in strict accordance with JB/T5000.12-1998 to compile coating process and guarantee coating quality. The color shall be fixed by the buyer.

MQ Series Ball mill



II. Ball mill

1. Introduction:

Ball mill is an efficient tool for grinding many materials into fine powder. The Ball Mill is used to grind many kinds of mine and other materials, or to select the mine. It is widely used in building material, chemical industry, etc. There are two ways of grinding: the dry process and the wet process. It can be divided into tubular type and flowing type according to different forms of discharging material.

2. Application:

The ball mill is a key equipment for regrinding. It is widely used for the cement, the silicate product, new type building material, fire-proof material, chemical fertilizer, black and non-ferrous metal, glass, ceramics and etc. Our ball mill can grind ore or other materials that can be grinded either by wet process or by dry process.

3. Working Principle:

This ball mill is horizontal type and tubular running device, has two warehouses. This machine is grid type and its outside runs along gear. The material enters spirally and evenly the first warehouse of the milling machine along the input material hollow axis by input material device. In this warehouse, there is a ladder scale board or ripple scale board, and different specification steel balls are installed on the scale board, when the barrel body rotates and then produces centrifugal force, at this time, the steel ball is carried to some height and falls to make the material grinding and striking. After grinded coarsely in the first warehouse, the material then enters into the second warehouse for regrinding with the steel ball and scale board. In the end, the powder is discharged by output material board and the end products are completed.

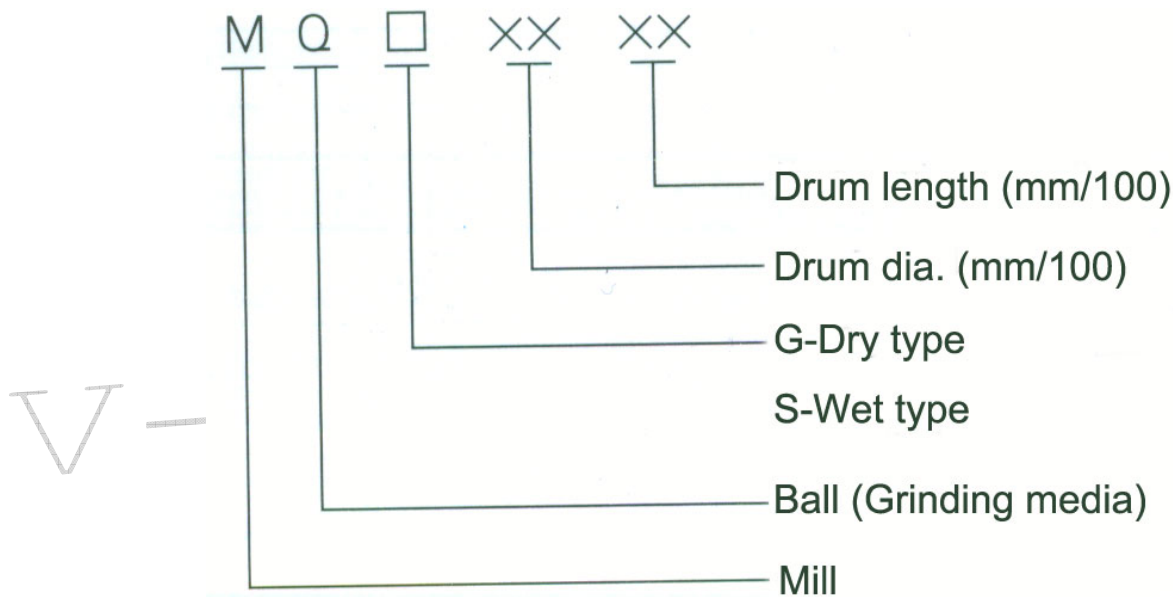
4. Features and benefits

This machine is made up of feeding part, discharging part, gyre part, transmission part, (decelerator, small transmission gear, generator, electrical control) and so on. The hollow axis adopts the cast steel and the lining can replace , the rotating big gear processes in the way of casting rolling gear. The barrel body is wearable well and bears wearable scale board. This machine run steadily and works reliably.

For barrel with diameter of 900~2100mm, main bearing adopt Spherical bearing. Barrel with diameter over 2700mm, use completely closed rocker type journal bearing make 120°self-centerring, planted Babbit water-cooling pipe with high-plumbum, low-stannum and low hardness, hydrostatic bearing structure, lubricated by high and low pressure united lubrication station. Using piston ring sealing way between main bearing and outside, helped with rubber and lubrication lipid to make good sealing. For structure of ball mill, it uses large gear radial sealing, automatic spray lubrication and other new technologies.

Large ball mill has low-speed transmission device, which can make rotate speed 0.15r/min set for barring gear, maintenance or loose load. It also has prop up device, which set for examine and repair using by propping the rotation parts.

Model specification



Performance parameter of MQS (Wet type)

Model		MQS									
		2721	2727	2736	3230	3236	3245	3639	3645	3650	3660
Drawing No.		K9232	K9236	K9237	K9225	K9226	K92212	K9216	K9218	K92112	K9214
Drum Dia. (mm)		2700			3200			3600			
Drum Length(mm)		2100	2700	3600	3000	3600	4500	3900	4500	5000	6000
Rotary		Left or Right									
Volume (t)		23	29	39	46	58	65	75	90	96	120
Capacity (t/h)		Decided by process condition					95-110	Decided by process condition			230
Motor	Model	JR 147-8	JR 148-8	TDMK 400-32	TDMK 500-36	TDMK 630-36	TDMK 800-36	TM1000-36/3600	TDMK 1250-40	TM1400-40/3250	TDMK 1600-40
	Power (kw)	260	310	400	500	630	800	1000	1250	1400	1600
	Speed (r/min)	735		187.5	167				150		
	Voltage (V)	3000		6000	6000						
Overall Dimension	Length (m)	9.28	9.9	11.9	13.7	14.3	16.1	15	15.2	17.6	17
	Width (m)	5.5		5.7	6.76		7.2		7.75		8.8
	Height (m)	4.5	4.4	4.5	5.1	5.2	5.7	6.3			6.5
Weight		62	66	77	107.7	114.7	126	145	159.7	158	189
Note		Motor weight NOT included in the weight above.									

Model		MQS							
		0909	0918	1212	1224	1515	1530	2122	2130
Drawing No.		K9272	K9273	K9261	K9260	K92513	K92514	K9245	K92411
Drum Dia.(mm)		900		1200		1500		2100	
Drum Length(mm)		900	1800	1200	2400	1500	3000	2200	3000
Rotary		Left or Right							
Volume (t)		0.96	1.92	2.4	4.8	5	10	15	20
Capacity (t/h)		0.22-1.07	0.44-2.14	0.17-4.0	0.4-5.8	1.4-4.3	2.8-9	Decided by process condition	
Motor	Model	Y225S-8	Y225M-8	Y225M-8	Y315S-8	JR115-8	JR125-8	JR128-8	JR137-8
	Power (kw)	17	22	30	55	60	95	155	210
	Speed (r/min)	720	730			725		730	735
	Voltage (V)	380							
Overall Dimension	Length (m)	4.75	5	5.2	6.5	5.77	7.6	8	8.8
	Width (m)	2.21	2.28	2.8		3.3		4.7	
	Height (m)	2.05		2.54		2.7		4.4	
Weight		4.62	5.34	11.4	13.43	13.9	17.4	42.2	45
Note		Motor weight NOT included in the weight above.							

Performance parameter of MQG (Dry type)

Model		MQG							
		0909	0918	1212	1224	1515	1530	2122	2130
Drawing No.		K9270	K9271	K9263	K9262	K92510	K92511	K9241	K2111
Drum Dia. (mm)		900		1200		1500		2100	2700
Drum Length (mm)		900	1800	1200	2400	1500	3000	2200	1450
Rotary		Left or Right							
Volume (t)		0.96	1.92	2.4	4.8	4	8	16	3
Capacity (t/h)		0.16-0.8	0.33-1.6	0.16-2.6	0.26-6.15	1-3.5	2-6.8	5-29	3
Motor	Model	Y225S-8	Y225M-8	JQO282-8	JQO292-8	JR115-8	JR125-8	JR128-8	Y280M-6
	Power (kw)	18.5	22	30	55	60	95	155	55
	Speed (r/min)	730				725		730	980
	Voltage (V)	380						220/380	380
Overall Dimension	Length (m)	3.12	3.62	5.1	6.5	5.655	7.48	8.07	6.315
	Width (m)	2.21	2.23	2.8		2.7		3.794	4.519
	Height (m)	2.02		2.5		2.7		3.794	4.519
Weight		4.39	5.36	10.5	12.545	13.48	18	46.9	22.6
Note		Motor weight NOT included in the weight above.							

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