

“ Licensed by Kurimoto Japan ”

CRUSHING and GRINDING, SCREENING EQUIPMENT

MADE IN INDONESIA



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SIKO Crushing and Grinding Equipment

Crushing and grinding equipment are used for size-reduction of a variety of materials. The selection of these type of crushers are based on the material hardness and required reduction ratio, and the economics of the equipment in terms of investment cost and operating cost. At SIKO, we have the capability to design and produce various kinds of crushing and grinding equipment at competitive prices.

SIKO Screening Equipment

Screening is used to separate mixtures of particular solids by size. In screening system, grizzlies are applied to handle large lumps, punched plates are used for intermediate sizes and woven screen for smaller sizes. At SIKO, we can design and produce various type of screening equipment at competitive prices.

1.Mills

Ball Mill and Rod Mill

Ball mills and rod mills are most commonly used for grinding materials. These mills are operated by placing material to be reduced and grinding media such as steel rods, steel balls and cylpebs in a revolving drum shell. Mill using pebbles or lump ore as grinding media are called pebble mill, we are also available

Classification

1. Grouping by grinding media
 - Rod Mill
 - Ball Mill
2. Grouping by method of operation
 - Continuous operation (open or closed circuit)
 - Batch operation
3. Grouping by transporting media
 - Wet grinding
 - Air swept (Dry method)
4. Grouping by product discharge method
 - Over flow
 - Grate discharge
 - Peripheral
 - Valve discharge
5. Grouping by method of drive
 - Side drive
 - Center drive

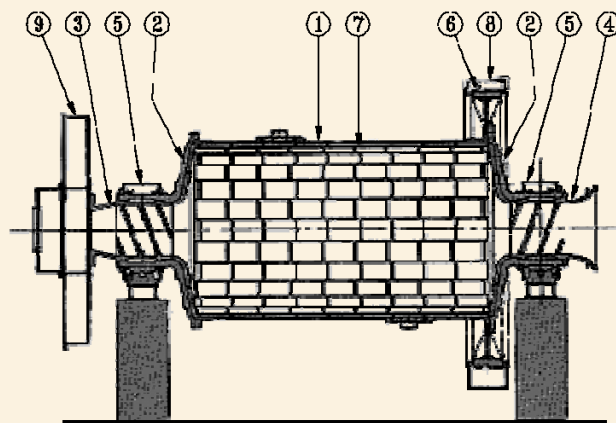
Ball mill

Classification of ball mill

Generally ball mill used to obtain fine particles and its can operated both under dry and wet system and roughly classified as follows.

(1) Over-flow type

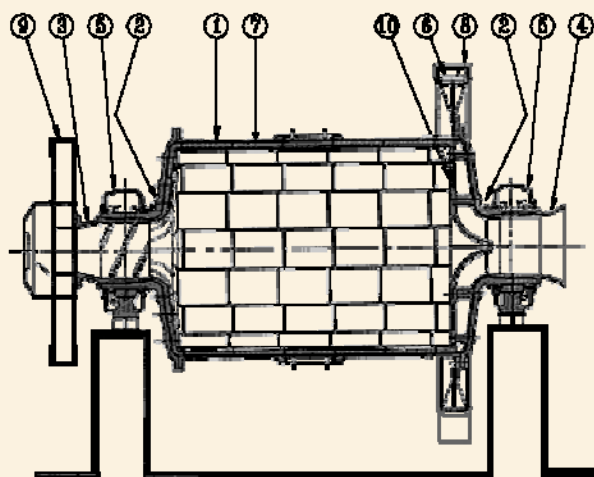
Over-flow type discharge side trunnion. This type is widely used for closed circuit grindingtogether with mechanical classifier or wet cyclone. This is also used regrinding and other special application under open circuit. Generally over flow type is suitable for fine grinding under -150 up to 200 mesh.



- 1. Shell
- 2. Trunnion
- 3. Feed Side Trunnion Liner
- 4. Discharge Side Trunnion Liner
- 5. Trunnion Bearing
- 6. Drum Gear
- 7. Liner
- 8. Gear Case
- 9. Scoop Feeder

(2) Grate discharge type ball mill

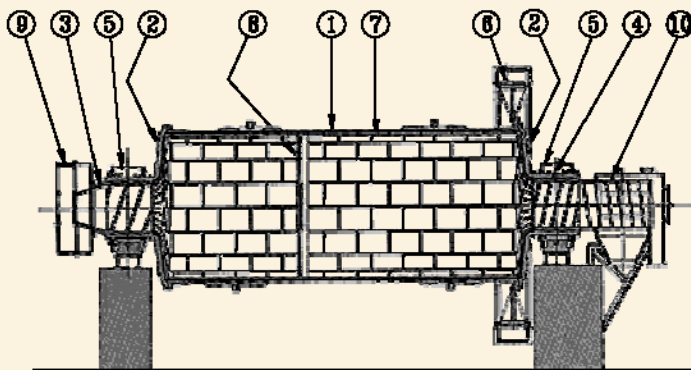
In grate discharge type ball mill, a grate is provided at the discharge end of shell. Compared with the over flow type, over grinding is minimized, and this suitable for grinding to 60 – 100 mesh level.



- 1. Shell
- 2. Trunnion
- 3. Feed Side Trunnion Liner
- 4. Discharge Side Trunnion Liner
- 5. Trunnion Bearing
- 6. Drum Gear
- 7. Liner
- 8. Gear Case
- 9. Chute
- 10. Screen Plate

(3) Compartment type Ball mill

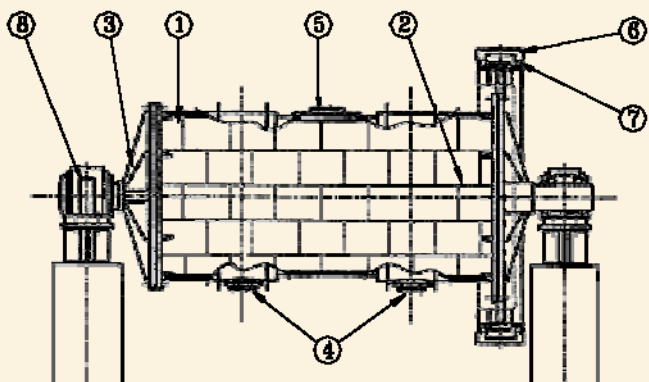
Compartment type has a long shell, inside of which is divided in 2 chambers by separate grate, and is suitable to obtain fine grains of 200 mesh level from coarse grains of 25 mm level.



1. Shell
2. Trunnion
3. Feed Side Trunnion Liner
4. Discharge Side Trunnion Liner
5. Trunnion Bearing
6. Drum Gear
7. Liner
8. Grate
9. Drum feeder
10. Trommel screen

(4) Batch type ball mill

Batch type ball mill is suitable to be adjustable product size of fine grains



1. Shell
2. Trunnion
3. Feed Side Trunnion Liner
4. Discharge Hole
5. Feed Hole (Man Hole)
6. Gear Case
7. Drum Gear
8. Trunnion Bearing

Grinding Capacity

Although the grinding capacity of ball mill varies with the operation system (wet, dry, open and closed circuit), size of feed material, size of products and quality of material, an example of over-flow type ball mill is shown in table below, together with major specification.

Capacity of over-flow type ball mill

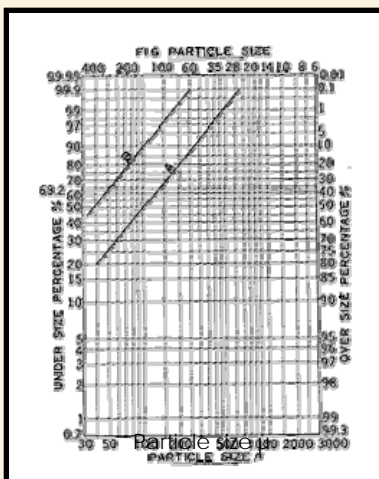
Model No.	ID x L mm	Ball charge qty. (Ton)	Shell PRM (R/M)	Power output (KW)	Motor output (KW)	Capacity (T/H)	
						A	B
2121	2100x2100	11.7	23.0	106	110	11.0	9.6
2424	2400x2400	17.6	21.4	167	190	18.0	15.8
2430	2400x3000	22.0	21.4	209	220	22.4	19.6
2727	2700x2700	25.4	20.1	250	260	27.5	24.1
2733	2700x3300	31.0	20.1	306	340	33.7	29.6
3030	3000x3000	35.0	18.8	350	370	39.5	34.6
3036	3000x3600	42.0	18.8	420	450	47.3	41.5
3236	3200x3600	48.0	18.8	484	510	55.5	48.7
3242	3200x4200	56.0	18.8	565	600	65.0	57.0
3442	3400x4200	63.5	17.5	655	700	75.5	66.0
3648	3600x4800	81.5	16.6	845	900	99.0	86.0
3848	3800x4800	91.5	16.2	960	1000	113.0	99.0
4051	4000x5100	108.0	15.8	1160	1200	139.0	122.0
4454	4400x5400	138.0	14.6	1480	1550	180.0	157.0
4857	4800x5700	174.0	13.7	1890	2000	234.0	204.0
5263	5200x6300	226.0	13.0	2480	2600	312.0	273.0
5670	5600x7000	294.0	12.1	3210	3300	409.0	358.0
6080	6000x8000	386.0	11.4	4160	4250	536.0	470.0
60100	6000x10000	482.0	11.4	5200	5300	670.0	587.0

Product size distribution

Average product size (classifier over-flow) under condition f A and B in above table. This varies according to the product quality and classifier performance

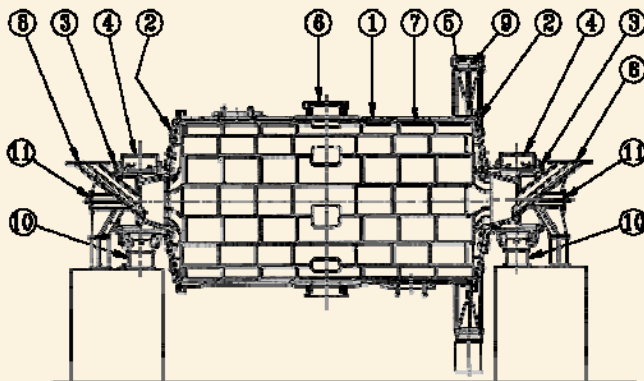
Note :

1. Ball charge quantity is 40 % of mill inside volume.
2. Ton is shown on metric ton
3. We manufacture other size mills at 100 mm unit for diameter and length.
4. Capacity shows when grinding ores with $W_i = 13$ KWH/ MT to
 - A: 80 % product passing size of - 65 mesh from 80% raw material passing size of - 10 mm.
 - B: 80 % product passing size of -200 mesh from 80% raw material passing size of - 0.8 mm.



Rod mill

Rod mills are used in wet and dry systems to obtain coarse particles. Sometimes, rod mills are used for primary grinding before ball mills. Rod mills are used in cases where over-grinding should be avoided. (Such as concrete aggregates and preparing feed for gravity concentration). Products are generally in a range of 4 – 100 mesh. Other uses of rod mills are in coarse grinding of feed to ball mills, preliminary grinding of cement raw material and cement clinkers and coke for sintering.



1. Shell
2. Trunnion
3. Trunnion Liner
4. Trunnion Bearing
5. Gear case
6. Outlet cover
7. Liner
8. Inlet chute
9. Gear
10. Sole Plate
11. Rod change hole

Classification of rod mill

1. Over-flow type (for wet mill)

Grinding capacity is low but very effective to obtain rather fine particles. Usually, -15 up to 30 mm size are feed and 80% products, of - 0.5 up to 1 mm are obtainable.



Over-flow Discharge Type (OFD type)

2. Peripheral discharge type

Center peripheral discharge type delivers coarse products and capacity is large. This type is normally used for grinding to -5 mm. When used in dry system, end peripheral discharge type is mainly employed.



Center peripheral discharge type (CPD type)



End peripheral Discharge Type (EPD type)

Grinding Capacity

Although the grinding capacity of ball mill varies with the operation system (wet, dry, open and closed circuit), size of fedd material, size of products and quality of material, an example of over-flow type ball mill is shown in table below, together with major specification.

Capacity of Rod mill

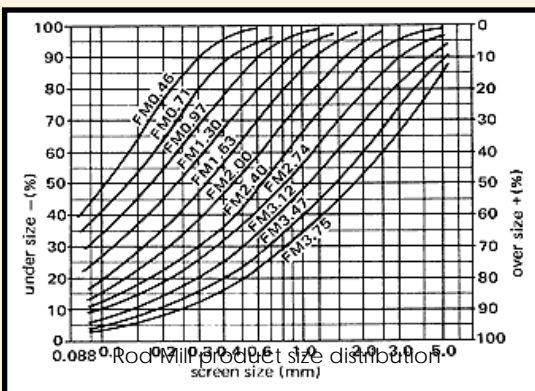
Model No.	ID x L (mm)	Rod charge qty. (Ton)	Shell PRM (R/M)	Power consumption (KW)	Motor output (KW)	Capacity (T/H)	
						A	B
1224	1200x2400	5.2	30.5	30	37	10.9	5.7
1230	1200x3000	6.5	30.5	38	45	13.6	7.2
1524	1500x2400	8.4	26.6	51	55	19.5	10.2
1533	1500x3300	11.5	26.6	70	75	26.8	14.1
1827	1800x2700	14.0	23.4	89	95	35.2	18.5
1836	1800x3600	18.6	23.4	118	130	46.8	24.6
2130	2100x3000	21.0	21.5	139	150	57.0	30.0
2136	2100x3600	25.2	21.5	167	190	68.5	36.0
2433	2400x3300	30.7	19.7	210	220	88.5	46.5
2442	2400x4200	39.0	19.7	266	300	111.0	58.0
2736	2700x3600	43.0	18.5	305	340	131.0	69.0
2745	2700x4500	53.5	18.5	381	400	165.0	86.0
3039	3000x3900	57.4	17.5	425	450	187.0	98.0
3048	3000x4800	70.5	17.5	523	550	231.0	120.0
3245	3200x4500	76.0	17.0	572	600	255.0	133.0
3251	3251x5100	86.2	17.0	650	700	290.0	150.0
3451	3400x5100	97.5	16.5	755	800	341.0	198.0
3654	3600x5400	116.0	15.5	890	950	407.0	212.0
3854	3800x5400	130.0	15.1	1015	1100	470.0	245.0
4054	4000x5400	145.0	14.7	1145	1200	535	278

Product size distribution

Product obtainable by rod mill show almost certain size distribution irrespective of the kind and size distribution of raw materials. Feed quantity of raw materials most effects the product size and water quantity supplied slightly effect in the case of wet grinding.

Note:

1. Rod charge quantity is 38 % of mill inside volume.
2. Ton is shown on metric ton
3. We manufacture other size mills at 100 mm unit for diameter and length.
4. Capacity shows when grinding ores with 80% passing size of -15 mm and $W_i = 15$ KWH/ MT by wet closed circuit system to
 - A: 80 % product passing size of - 2 mm by peripheral discharge type rod mill
 - B: 80 % product passing size of -0.8 mm by over-flow type rod mill.



Construction

Ball mills and rod mill are almost similar in its construction follows.

Shell and trunnions

Shell is a cylinder made of steel plate flanges welded on both ends. Trunnion cover is bolted to flanges. The cover is made of cast steel and combined with trunnion journals supporting shell on the bearings. Cast steel inside trunnion liners are inserted in the journal of trunnion cover, and the pulverized materials are fed and discharged through this inside trunnions.

Liners

High manganese cast steel or abrasion resisting special alloy steel liners are fitted by wedge bolts through special packings and washer. According to requirement, rubber liners can be used.

Trunnion bearings

Trunnion bearings are composed of cast iron bearing stands, cast steel spherical bearings and have self-aligning structure. White metal is used for sliding surface of liners. Automatic oil supply by bucket is the standard lubrication system, but forced circulation system may be adopted in some cases. In large mills, pressure pump is employed and in the case of electrical pump, interlock is provided between main motor and low pressure circulation pump in order to form lubricant film on the surface of bearings.

Gear and pinion

Gear is either built up by welding steel plate discs to carbon steel ring or made by cast steel, divided into two sections. Heat treated carbon or alloy steel is used for pinion which is keyed with shaft by shrinkage fit. Pinion and pinion shaft are of symmetrical type, thus enabling the use by turning round it when one side of teeth surfaces becomes worn out. However in small mills, pinion and pulley shaft are integrated and are not symmetrical. Gear and pinion are encased in enclosed case made of steel plate. Lubrication systems adopted are oil pinion type for medium mills and oil spray type (or oil pinion type) for large mills.

Feeder

One of the following feeders is used.

- Scoop feeder (wet or dry type)

This is employed when wet type ball mill and mechanical classifier are used jointly, and return coarse ores from the classifier are dipped up by two scoop and fed in the mill.



- Combination feeder (wet type)

This is sometimes employed under the combination of scoop and drum feeder.



- Drum feeder (wet or dry type)

- Screw feeder (dry type)

Motor and reducer

Electric motor

Totally enclosed induction motor is normally used, but synchronous motors may be used for large mills. Starting and stopping torques are needed to be above 170% and 200% respectively. According to requirement, starting compensation system can be designed by us.

Gear reducer

The mill is required toughness gear Reducer due to hard operating condition, so we provide it selected from high grade and most reliable maker's product

Screen

Vibrating Screen

KI type

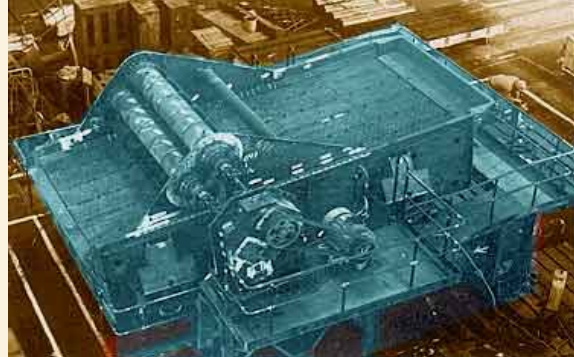


Construction

This screen is set at an included angle. Rotary movement is utilized to develop the necessary vibrating motion of the screen properly to move the material on the screen forward. Screen is V-belt drive.

KI type is generally used in dry or wet screening separations. It may be used for scalping coarse crushing in large quantity. Construction, especially the rotating parts in simple and wearing parts are few. This type is used for many purposes and it can be called a universal screen.

KH (KD) type



Construction and feature

Vibratory motion is long the plane inclined At 45° to the horizontal towards the discharge end.

This arrangement permits movement of materials forward on a horizontal screen. Required head between inlet and outlet of screen is minimized.

KH (KD) type is designed to reciprocate on a Straight line. It is particularly suitable for medium and fine size screening, washing and draining concrete aggregates, of float and sink in heavy media separation plant. Its horizontal construction can save head and space.

KI type

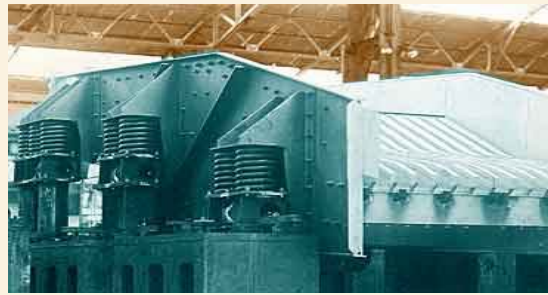
Model number	Screen Size (mm)		Motor (KW)	
	Width	Length	1 stage	2 stage
KI 1224 KI 1230	1200 1200	2400 3000	5.5 7.5	5.5 7.5
KI 1530 KI 1536 KI 1542	1500 1500 1500	3000 3600 4200	11 11 11	11 11 15
KI 1842 KI 1848	1800 1800	4200 4800	11 15	15 18.5
KI 2148 KI 2160	2100 2100	4800 6000	18.5 18.5	18.5 22
KI 2448 KI 2460	2400 2400	4800 6000	18.5 22	22 30
KI 2760 KI 2772	2700 2700	6000 7200	30 37	37 45
KI 3072	3000	7200	45	55

KH (KD) type

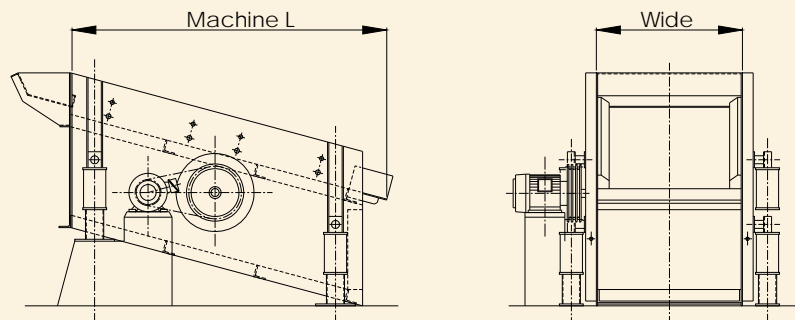
Model number	Screen Size (mm)		Motor (KW)	
	Width	Length	1 stage	2 stage
KI 1224 KI 1230	1200 1200	2400 3000	7.5 11	11 11
KI 1530 KI 1536 KI 1542	1500 1500 1500	3000 3600 4200	11 15 15	15 15 15
KI 1842 KI 1848	1800 1800	4200 4800	15 18.5	18.5 18.5
KI 2148 KI 2160	2100 2100	4800 6000	7.5x2 11x2	11x2 11x2
KI 2448 KI 2772	2400 2700	4800 7200	11x2 22x2	15x2 22x2
KI 3072	3000	7200	22x2	30x2

Vibrating Grizzly feeder

Vibrating grizzly feeder enables to take out large quality of large lumps and easily adjust the feed quantity by the Adoption Of variable speed motor angle is 5% - 10%, and grizzly bar is provided at the discharge side of trough. It can be used both as feeder and scalping screen, and is one of the most superior kinds of feeder to crusher.



Performance of vibrating grizzly feeder



Model Number	Machine Size (W x L) (mm)	Max. Feed Size (L x W x T) (mm)	Revolution (r/min)	Capacity (T/H)	Motor (kw)
HVF-0930	900 x 300	600 x 400 x 300	600 ~ 900	~ 150	7.5 kw VS Moptor
HVF-1236	1200 x 3600	800 x 530 x 400	600 ~ 900	100 ~ 300	11 kw VS Motor
HVF-1542	1500 x 4200	1000 x 800 x 600	600 ~ 900	400 ~ 600	30 kw VS Motor
HVF-1848	1800 x 4800	1200 x 950 x 800	600 ~ 900	500 ~ 700	37 kw VS Motor
HVF-2154	2100 x 5400	1500 x 1100 x 900	600 ~ 900	600 x 900	45 kw VS Motor

Remark: (1) Capacity shows the case when treating raw material with bulk density 1.6 T/m³
 (2) Please design so that load inside bin shall not be added directly to pan part and raw material stone shall not hit pan part directly.
 (3) Standard of grizzly opening is 50 - 100mm

Other Kurimoto products

We, SIKO also available to supply equipment for other kurimoto product on various capacity and we commit to Guarantee after sales service. These are such as:

1. **Crusher**
 - Jaw Crusher - Impact Crusher
 - Corn crusher - Roller Mill
2. **Mixer, kneader and Pug mill**
3. **Apron Feeder and others**

TO MEET EVERY REQUIREMENT OF YOUR DUST COLLECTOR SATISFACTORILY,
PLEASE ATTACHED THE FOLLOWING QUESTIONNAIRE, AFTER FILLING IT UP ANY
TIME YOU MAKE AN ORDER OR AN INQUIRY

1. Purpose of Installation
 - a. Kind of factory :
 - b. Description :
 -
 -

2. Material and properties
 - a. Name of material :
 - b. Specific gravity :
 - c. Hardness :
 - d. Viscosity :
 - e. Moisture :
 - f. Corrosive property :
 - g. Stick to surface :
 - h. Inlet temperature :
 - i. Work index (Wi) or HGI :

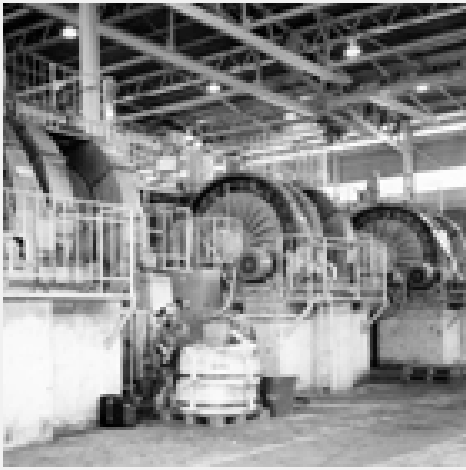
3. Capacity
 - a. Operation capacity :(T/H)
 - b. Design capacity :(T/H)

4. Size distribution (Mesh) (%)
 - a. Feed size :
 -
 -
 - b. Required product size :
 -
 -

5. Operations
 - a. Operations system : Wet / Dry / Closed circuit
 - b. Operation hours : Daily(Hr)
Year(Days)

6. Power supply
 - a. Voltage :(V)
 - b. Frequency :(Hz)

7. Other requirement
 - a. Linner material : High Manganese steel/rubber
 - b. Starting compensator : Yes / No
 - c. Description :
 -



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