"Licensed by Kurimoto Japan"

CRUSHING and GRINDING, SCREENING EQUIPMENT
MADE IN INDONESIA
Licensed by Kurimoto Japan

CRUSHING and Grinding,
SCREENING EQUIPMENT
MADE IN INDONESIA
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
   - Overflow
   - 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 it 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 grinding together 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.

(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.
(3) **Compartment type Ball mill**

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

![Diagram of Compartment type Ball mill]

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.

![Diagram of Batch type ball mill]

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

<table>
<thead>
<tr>
<th>Model No.</th>
<th>D x L mm</th>
<th>Ball charge qty. (Ton)</th>
<th>Shell PRM (R/M)</th>
<th>Power output (KW)</th>
<th>Motor output (KW)</th>
<th>Capacity (T/H)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>2121</td>
<td>2100x2100</td>
<td>11.7</td>
<td>23.0</td>
<td>106</td>
<td>110</td>
<td>11.0</td>
</tr>
<tr>
<td>2424</td>
<td>2400x2400</td>
<td>17.6</td>
<td>21.4</td>
<td>167</td>
<td>190</td>
<td>18.0</td>
</tr>
<tr>
<td>2430</td>
<td>2400x3000</td>
<td>22.0</td>
<td>21.4</td>
<td>209</td>
<td>220</td>
<td>22.4</td>
</tr>
<tr>
<td>2727</td>
<td>2700x2700</td>
<td>25.4</td>
<td>20.1</td>
<td>250</td>
<td>260</td>
<td>27.5</td>
</tr>
<tr>
<td>2733</td>
<td>2700x3300</td>
<td>31.0</td>
<td>20.1</td>
<td>306</td>
<td>340</td>
<td>33.7</td>
</tr>
<tr>
<td>3030</td>
<td>3000x3000</td>
<td>35.0</td>
<td>18.8</td>
<td>350</td>
<td>370</td>
<td>39.5</td>
</tr>
<tr>
<td>3036</td>
<td>3000x3600</td>
<td>42.0</td>
<td>18.8</td>
<td>420</td>
<td>450</td>
<td>47.3</td>
</tr>
<tr>
<td>3236</td>
<td>3200x3600</td>
<td>48.0</td>
<td>18.8</td>
<td>484</td>
<td>510</td>
<td>55.5</td>
</tr>
<tr>
<td>3242</td>
<td>3200x4200</td>
<td>56.0</td>
<td>18.8</td>
<td>565</td>
<td>600</td>
<td>65.0</td>
</tr>
<tr>
<td>3442</td>
<td>3400x4200</td>
<td>63.5</td>
<td>17.5</td>
<td>655</td>
<td>700</td>
<td>75.5</td>
</tr>
<tr>
<td>3648</td>
<td>3600x4800</td>
<td>81.5</td>
<td>16.6</td>
<td>845</td>
<td>900</td>
<td>99.0</td>
</tr>
<tr>
<td>3848</td>
<td>3800x4800</td>
<td>91.5</td>
<td>16.2</td>
<td>960</td>
<td>1000</td>
<td>113.0</td>
</tr>
<tr>
<td>4051</td>
<td>4000x5100</td>
<td>108.0</td>
<td>15.8</td>
<td>1160</td>
<td>1200</td>
<td>139.0</td>
</tr>
<tr>
<td>4454</td>
<td>4400x5400</td>
<td>130.0</td>
<td>14.6</td>
<td>1480</td>
<td>1550</td>
<td>160.0</td>
</tr>
<tr>
<td>4857</td>
<td>4800x5700</td>
<td>174.0</td>
<td>13.7</td>
<td>1890</td>
<td>2000</td>
<td>234.0</td>
</tr>
<tr>
<td>5263</td>
<td>5200x6300</td>
<td>226.0</td>
<td>13.0</td>
<td>2480</td>
<td>2600</td>
<td>312.0</td>
</tr>
<tr>
<td>5670</td>
<td>5600x7000</td>
<td>294.0</td>
<td>12.1</td>
<td>3210</td>
<td>3300</td>
<td>409.0</td>
</tr>
<tr>
<td>6080</td>
<td>6000x8000</td>
<td>386.0</td>
<td>11.4</td>
<td>4160</td>
<td>4250</td>
<td>536.0</td>
</tr>
<tr>
<td>60100</td>
<td>6000x10000</td>
<td>482.0</td>
<td>11.4</td>
<td>5200</td>
<td>5300</td>
<td>670.0</td>
</tr>
</tbody>
</table>

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 Wi=13 KWH/MTon.
   - 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.

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.
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 overgrinding 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.

![Diagram of Rod Mill Components]

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 fed 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 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 Rod mill

<table>
<thead>
<tr>
<th>Model No.</th>
<th>ID x L (mm)</th>
<th>Rod charge qty. (Ton)</th>
<th>Shell PRM (R/M)</th>
<th>Power consumption (KW)</th>
<th>Motor output (KW)</th>
<th>Capacity (TH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1224</td>
<td>1200x2400</td>
<td>5.2</td>
<td>30.5</td>
<td>30</td>
<td>37</td>
<td>10.9</td>
</tr>
<tr>
<td>1230</td>
<td>1200x3000</td>
<td>6.5</td>
<td>30.5</td>
<td>38</td>
<td>45</td>
<td>13.6</td>
</tr>
<tr>
<td>1524</td>
<td>1500x2400</td>
<td>8.4</td>
<td>26.6</td>
<td>51</td>
<td>55</td>
<td>19.5</td>
</tr>
<tr>
<td>1533</td>
<td>1500x3300</td>
<td>11.5</td>
<td>26.6</td>
<td>70</td>
<td>75</td>
<td>28.8</td>
</tr>
<tr>
<td>1627</td>
<td>1800x2700</td>
<td>14.0</td>
<td>23.4</td>
<td>85</td>
<td>95</td>
<td>35.2</td>
</tr>
<tr>
<td>1636</td>
<td>1800x3600</td>
<td>16.6</td>
<td>23.4</td>
<td>118</td>
<td>130</td>
<td>46.6</td>
</tr>
<tr>
<td>2130</td>
<td>2100x3000</td>
<td>21.0</td>
<td>21.5</td>
<td>139</td>
<td>150</td>
<td>57.0</td>
</tr>
<tr>
<td>2135</td>
<td>2100x3600</td>
<td>25.2</td>
<td>21.5</td>
<td>167</td>
<td>190</td>
<td>68.5</td>
</tr>
<tr>
<td>2433</td>
<td>2400x3300</td>
<td>30.7</td>
<td>19.7</td>
<td>210</td>
<td>220</td>
<td>88.5</td>
</tr>
<tr>
<td>2442</td>
<td>2400x4200</td>
<td>39.0</td>
<td>19.7</td>
<td>266</td>
<td>300</td>
<td>111.0</td>
</tr>
<tr>
<td>2736</td>
<td>2700x3600</td>
<td>43.0</td>
<td>18.5</td>
<td>305</td>
<td>340</td>
<td>131.0</td>
</tr>
<tr>
<td>2745</td>
<td>2700x4500</td>
<td>53.5</td>
<td>18.5</td>
<td>381</td>
<td>400</td>
<td>166.0</td>
</tr>
<tr>
<td>3039</td>
<td>3000x3900</td>
<td>57.4</td>
<td>17.5</td>
<td>425</td>
<td>450</td>
<td>187.0</td>
</tr>
<tr>
<td>3048</td>
<td>3000x4800</td>
<td>70.5</td>
<td>17.5</td>
<td>523</td>
<td>550</td>
<td>231.0</td>
</tr>
<tr>
<td>3245</td>
<td>3200x4500</td>
<td>76.0</td>
<td>17.0</td>
<td>572</td>
<td>600</td>
<td>255.0</td>
</tr>
<tr>
<td>3251</td>
<td>3251x5100</td>
<td>86.2</td>
<td>17.0</td>
<td>650</td>
<td>700</td>
<td>290.0</td>
</tr>
<tr>
<td>3451</td>
<td>3400x5100</td>
<td>97.5</td>
<td>16.5</td>
<td>755</td>
<td>800</td>
<td>341.0</td>
</tr>
<tr>
<td>3654</td>
<td>3800x5400</td>
<td>116.0</td>
<td>15.5</td>
<td>890</td>
<td>950</td>
<td>407.0</td>
</tr>
<tr>
<td>3854</td>
<td>3800x5400</td>
<td>130.0</td>
<td>15.1</td>
<td>1015</td>
<td>1100</td>
<td>470.0</td>
</tr>
<tr>
<td>4054</td>
<td>4000x5400</td>
<td>145.0</td>
<td>14.7</td>
<td>1145</td>
<td>1200</td>
<td>535</td>
</tr>
</tbody>
</table>

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 Wi= 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.

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.
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

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.

<table>
<thead>
<tr>
<th>Model number</th>
<th>Screen Size (mm)</th>
<th>Motor (KW)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Width</td>
<td>Length</td>
</tr>
<tr>
<td>KI 1224</td>
<td>1200</td>
<td>2400</td>
</tr>
<tr>
<td>KI 1230</td>
<td>1200</td>
<td>3000</td>
</tr>
<tr>
<td>KI 1530</td>
<td>1500</td>
<td>3000</td>
</tr>
<tr>
<td>KI 1536</td>
<td>1500</td>
<td>3600</td>
</tr>
<tr>
<td>KI 1542</td>
<td>1500</td>
<td>4200</td>
</tr>
<tr>
<td>KI 1842</td>
<td>1800</td>
<td>4200</td>
</tr>
<tr>
<td>KI 1848</td>
<td>1800</td>
<td>4800</td>
</tr>
<tr>
<td>KI 2148</td>
<td>2100</td>
<td>4800</td>
</tr>
<tr>
<td>KI 2160</td>
<td>2100</td>
<td>6000</td>
</tr>
<tr>
<td>KI 2448</td>
<td>2400</td>
<td>4800</td>
</tr>
<tr>
<td>KI 2460</td>
<td>2400</td>
<td>6000</td>
</tr>
<tr>
<td>KI 2760</td>
<td>2700</td>
<td>6000</td>
</tr>
<tr>
<td>KI 2772</td>
<td>2700</td>
<td>7200</td>
</tr>
<tr>
<td>KI 3072</td>
<td>3000</td>
<td>7200</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Model number</th>
<th>Screen Size (mm)</th>
<th>Motor (KW)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Width</td>
<td>Length</td>
</tr>
<tr>
<td>KI 1224</td>
<td>1200</td>
<td>2400</td>
</tr>
<tr>
<td>KI 1230</td>
<td>1200</td>
<td>3000</td>
</tr>
<tr>
<td>KI 1530</td>
<td>1500</td>
<td>3000</td>
</tr>
<tr>
<td>KI 1536</td>
<td>1500</td>
<td>3600</td>
</tr>
<tr>
<td>KI 1542</td>
<td>1500</td>
<td>4200</td>
</tr>
<tr>
<td>KI 1842</td>
<td>1800</td>
<td>4200</td>
</tr>
<tr>
<td>KI 1848</td>
<td>1800</td>
<td>4800</td>
</tr>
<tr>
<td>KI 2148</td>
<td>2100</td>
<td>4800</td>
</tr>
<tr>
<td>KI 2160</td>
<td>2100</td>
<td>6000</td>
</tr>
<tr>
<td>KI 2448</td>
<td>2400</td>
<td>4800</td>
</tr>
<tr>
<td>KI 2460</td>
<td>2400</td>
<td>6000</td>
</tr>
<tr>
<td>KI 2760</td>
<td>2700</td>
<td>6000</td>
</tr>
<tr>
<td>KI 2772</td>
<td>2700</td>
<td>7200</td>
</tr>
<tr>
<td>KI 3072</td>
<td>3000</td>
<td>7200</td>
</tr>
</tbody>
</table>

siko engineering
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

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

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
   - Com crusher
   - Roller Mill

2. **Mixer, kneader and Pug mill**

3. **Apron Feeder and others**

siko engineering
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: ......................
       ..............................................................................................................

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.

Siko Engineering
Head Office:
Gedung Mandiri Lantai 4.
Jl. Tanjung Karang No. 3-4A
Jakarta Pusat – 10230
Phone. +6221-3162540
Fax. +6221-3162542
Email: corp@siko.co.id
Website: www.siko.co.id

Project Office:
Jl. Kendal No. 7, Blora
Jakarta Pusat – 10310
Phone. +6221-3907655/56/57