CYBAS-i General Dimensions

CYBAS-i Cone
High Performance Cone Crushers

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CYBAS-i Produced under licence from EarthTechnica Ltd, a Kawasaki Heavy Industries company.

Dimensions shown for reference purposes only. Space required for maintenance must be considered when installing equipment.

Optimised Chamber Configuration
Improved Crushing Performance
Optimised Component Design

Legendary Robustness and Reliability
Up to 50% More Installed Power and Capacity

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The CYBAS-i Cone Crusher

The CYBAS-i Cone crusher is a modern high performance hydraulically adjusted (hydrosset-type) cone crusher, an enhancement of the original legendary CYBAS Cone. It is the result of intensive research and development of the crushing chamber and mechanical design. This development was achieved by taking the experiences from a multitude of applications and combining this with the latest developments in materials and development of the crushing chamber and mechanical design. This development was achieved by taking the crusher, an enhancement of the original legendary CYBAS Cone. It is the result of intensive research and development.

Ease of operation and maintenance coupled to the aforementioned features positions the CYBAS-i as a state of the art, cost efficient, modern cone crusher with advanced performance.

### Product Size Distribution

Set Under (Percentage Product Passing Setting First Pass) is in the range of 85-92%

#### Influence of water and mud content

Presence of water and mud in the feed may lower throughput and increase liner wear.

### Capacity Calculating Method

Crusher performance (capacity, reduction etc.) varies greatly with the properties of feed material like compressive strength, hardness, feed size and moisture content.

In planning a plant, it is recommended that crushing parameters are determined at our test plant.

a. Size of sample needed for one test
   - Open circuit: 0.5 ton
   - Closed circuit: 1.0 ton
   - For abrasion test: 30-45mm material 0.03 ton

b. Basic selection of machine model

<table>
<thead>
<tr>
<th>Q</th>
<th>Estimated capacity (t/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q_0</td>
<td>Standard capacity (t/h)</td>
</tr>
</tbody>
</table>

(Value shown in capacity table)

<table>
<thead>
<tr>
<th>K_1</th>
<th>Correction factor (Material strength)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K_2</td>
<td>Correction factor (Moisture content)</td>
</tr>
</tbody>
</table>

### Table 1: Correction factor - hardness of stone

<table>
<thead>
<tr>
<th>Compressive strength (kg/cm²)</th>
<th>K_1</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 or less</td>
<td>1.2 - 1.3</td>
</tr>
<tr>
<td>500 - 1000</td>
<td>1.0 - 1.2</td>
</tr>
<tr>
<td>1000 - 1500</td>
<td>0.8 - 1.0</td>
</tr>
<tr>
<td>1500 - 2000</td>
<td>0.6 - 0.8</td>
</tr>
<tr>
<td>2000 - 2500</td>
<td>0.4 - 0.6</td>
</tr>
<tr>
<td>2500 - 3000</td>
<td>0.2 - 0.4</td>
</tr>
</tbody>
</table>

### Table 2: Correction factor - moisture content

<table>
<thead>
<tr>
<th>Moisture Content (%)</th>
<th>K_2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 - 0.2</td>
<td>1.0</td>
</tr>
<tr>
<td>0.2 - 0.4</td>
<td>1.2</td>
</tr>
<tr>
<td>0.4 - 0.6</td>
<td>1.4</td>
</tr>
<tr>
<td>0.6 - 0.8</td>
<td>1.6</td>
</tr>
<tr>
<td>0.8 - 1.0</td>
<td>1.8</td>
</tr>
</tbody>
</table>

### Table 3: Correction factor - feed size

<table>
<thead>
<tr>
<th>Particle Size (mm)</th>
<th>Passed (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>99.5</td>
</tr>
<tr>
<td>2</td>
<td>99.0</td>
</tr>
<tr>
<td>5</td>
<td>98.0</td>
</tr>
<tr>
<td>10</td>
<td>95.0</td>
</tr>
<tr>
<td>15</td>
<td>90.0</td>
</tr>
<tr>
<td>20</td>
<td>85.0</td>
</tr>
<tr>
<td>30</td>
<td>50.0</td>
</tr>
<tr>
<td>40</td>
<td>30.0</td>
</tr>
<tr>
<td>60</td>
<td>10.0</td>
</tr>
</tbody>
</table>

Q = Q_0 x K_1 x K_2 x δ/1.6
The CYBAS-i Cone crusher utilizes a specially configured curved crushing chamber design with a large, grooved, inlet opening. The curved crushing chamber is characterized by the almost vertical inlet centre line, with an optimally changing angle of inclination until it reaches a specific angle at the outlet. This design results in the choke point being located at the lower part of the crushing chamber. As a consequence, the density of the feed material gradually increases as it proceeds from the inlet towards the outlet. The following benefits are realized:

- **Inter-particle crushing within the crushing chamber as a result of the high density in the lower part results in a high quality product having a roundish cubic form, with high set under (as high as 92%).** Set under is defined as the percentage product passing equivalent in size to the setting).

- **The volumetrically optimised crushing chamber coupled with effective inter-particle crushing results in a remarkable improvement in capacity.** The CYBAS-i boasts a 70% increase in throughput compared with older type conventional crushers of the same size.

- **Having a grooved inlet, which is almost vertical, and is larger than that of conventional crushers, ensures that the CYBAS-i can nip and crush large lumps of material smoothly and simultaneously, with limited to zero slippage.**

- **The optimised curved crushing chamber and inlet groove configuration ensures that the entire surface area of the crushing liners wear uniformly from the inlet to the outlet, facilitating optimum liner utilization and consistent crusher performance.** The design ensures that the inlet will not become smaller with wear of the liners. This ensures that the large crushing ratio is maintained, the crusher throughput and performance is constant, and that the highest productivity is achieved during the full life of the liners.

**Operational and Performance Features:**

### High Performance Curved Crushing Chamber design

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CRUSHER SIZE</th>
<th>THROUGHPUT CAPACITY (th)</th>
<th>MOTOR OUTPUT (kW)</th>
<th>GAP SETTING (Closed Side Setting - CSS) (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KF5010Z</td>
<td>50 x 1000</td>
<td>150</td>
<td>102 120 128 143</td>
<td>165 178 188 202 210 232 253</td>
</tr>
<tr>
<td>KF1010Z</td>
<td>100 x 1000</td>
<td></td>
<td>130 140 144 152</td>
<td>134 149 157 165 178 189 202 210 232 253</td>
</tr>
<tr>
<td>KM1510Z</td>
<td>150 x 1000</td>
<td></td>
<td>105 117 130 144 152</td>
<td>134 149 157 165 178 189 202 210 232 253</td>
</tr>
<tr>
<td>KM2010Z</td>
<td>200 x 1000</td>
<td></td>
<td>75 88 101 114 128</td>
<td>105 117 130 144 152 134 149 157 165 178 189 202 210 232 253</td>
</tr>
<tr>
<td>KM3010Z</td>
<td>300 x 1000</td>
<td></td>
<td>45 58 71 84 97</td>
<td>105 117 130 144 152 134 149 157 165 178 189 202 210 232 253</td>
</tr>
<tr>
<td>KC5010Z</td>
<td>500 x 1000</td>
<td></td>
<td>25 38 51 64 77</td>
<td>105 117 130 144 152 134 149 157 165 178 189 202 210 232 253</td>
</tr>
</tbody>
</table>

**Note 1:** Capacities stated are indicative and based on a dry feed material of bulk density 1.6 t/m³; feed material with particles smaller than the setting removed; open circuit operations; adherence to maximum feed size and feed from preceding blasting or crushing (with workable liners); material fed into the crusher uniformly and continuously in quantity and particle size.

**Note 2:** For application specific capacities contact IMS Engineering since the crusher setup, specific feed material properties and particle size distribution affect the capacity of selected crushers.
Features and Benefits:

High Crushing Capacity

The CYBAS-i has up to a 50% increase in installed power over the previous CYBAS generation. The higher installed power, together with the volumetrically optimised crushing chamber design, supports the remarkable increase in crusher capacity.

Patented Insert Mantle and Concave Liners

More effective use of the installed power, which in turn leads to energy savings of up to 30%, is achieved through the use of patented high performance mantle and concave liners, with grooves produced through a special insert design – this facilitates compound crushing within the chamber. Compound crushing means not only compression crushing but also bending and shearing actions are introduced.

The liners have been proven to improve both the set under ratio and deliver a superior cubically shaped product that negates the need for any downstream shape correcting.

Wet System Crushing

The CYBAS-i Cone crusher can be configured as a Wet System crusher for processing sticky or high moisture feed materials. The system requires correctly configured water addition and a water addition device integrated into the design with the specifically configured and selected machine.

Easy Replacement of Crushing Liners

The use of a torch ring facilitates the quick and easy change of liners in the shortest time. The head nut for fixing the mantle is self-tightening and can be used repeatedly. Only the mantle requires the use of backing material.

Easy Internal Inspection

The inside of the crusher can be easily viewed through large inspection hatches provided in the bottom frame.

Easy Adjustment of Discharge Setting

The hydroset design enables easy and accurate adjustment of the crusher discharge settings during operation at the push of a button, which is done at the crusher control panel or remotely from a control centre.

Operating Parameters of the Crusher can be determined at a glance

The crusher is equipped with a shaft position sensor and system for reading and recording gap setting and crusher liner wear, minimising the necessity to determine these by physical measurement inside the crusher other than for calibration. Hydraulic pressure monitoring and load sensing enables quick, easy and reliable monitoring of whether the crusher is being underutilised, overloaded or used at optimum level. These signals enable the control system to ensure the machines works at optimum levels all the time.

Automatic Control System

In line with the trend of increased automation the CYBAS-i control system is offered in a range of flexible configurations to allow selection of the most suitable system for each application.

With the primary objective of maximising production by offering protection to the crusher and optimising its performance the control system is instrumental in ensuring

- Highest possible reduction
- Protection against feed variations
- Better product shape
- Consistent product quality
- Push button gap calibration
- Wear compensation
- Easy monitoring of operation
- Easy interfacing with plant supervisory control system

Whatever the needs the CYBAS-i control system can be configured in a specific mode of operation to suit your requirements.
Features and Benefits:

Drive System
Spiral bevel helical gears are used for the eccentric gear and drive shaft pinion, which provide excellent transfer of power with highest efficiency and lowest noise. In addition, all drive system bearings have high quality surface finishes and generous oil film facilitation which reduces friction and prevents heat build-up. As a result power loss due to friction in the machine is minimised.

Dust Sealing System
The most effective system for preventing the ingress of dust particles into the lubrication system from within the operating crusher is by means of an air seal system. The pressurised air is provided by high quality high-duty air blower. Air seal piping is installed and protected within the main body of the crusher.

Crusher Frame Wear Liners
All surfaces where material comes into contact with the main body within the crusher are lined with liner plates to ensure that the main body is kept free of wear.

Mechanical Features:

Hydraulic System
The main shaft of the CYBAS-i Cone Crusher is supported and controlled by a hydraulic system during operation. This type of crusher design is referred to as a hydroset design and boasts the following benefits,

- Simple and easy crusher operating gap setting and re-adjustment.
- Fully remote setting and automated control of the crusher main shaft.
- Tramp relief and overload protection upon introduction of uncrushable foreign material into the crushing chamber. The elimination of such material is facilitated by the main shaft lowering automatically and releasing the material and then continuing with normal operation.

Main Shaft Supporting Structure
The main shaft has upper and lower support. This arrangement supports the crushing of very competent and large feed material without having to manage high loads applied to the main crusher body compared to cantilever loading designs. The upper support is by a heavy-duty spherical bearing. Over and above the metallurgical benefits offered by the spherical bearing system, this design reduces critical loading of the main shaft and results in longer fatigue life and lower power consumption.