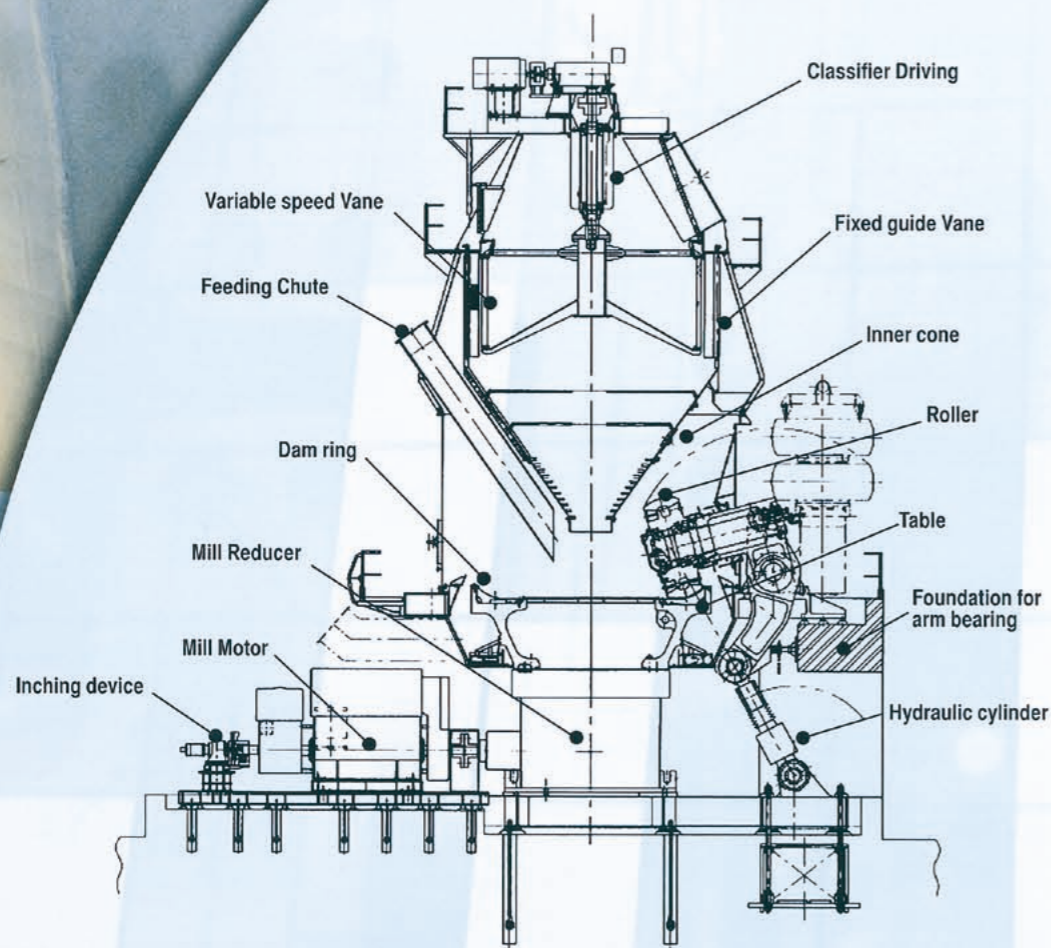


# KAWASAKI'S CK MILL

## General assembly drawing of CK MILL



## Features of KAWASAKI'S CK MILL

### Low power consumption mill motor

Due to the *tire-shaped roller*, high efficiency grinding can be achieved by a combination of "compressive grinding," effective for coarse grinding, and "frictional grinding," effective for fine grinding.

This grinding mechanism ensures low grinding power consumption together with stable operation for long term due to the function of an overhanging dam. (Fig.1 and Table 1)

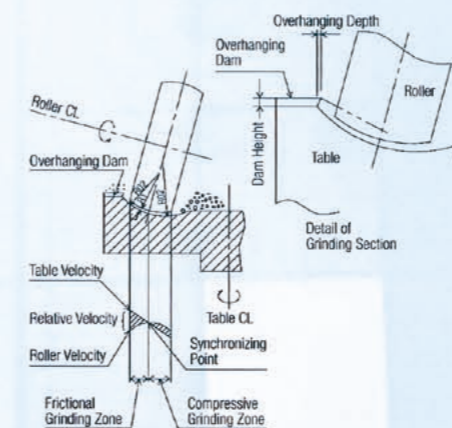


Fig. 1 Grinding mechanism

### Low power consumption fan motor

Due to the classification mechanism combined with an inner cone, a greatly reduced classification gas flow induced by the mill fan can be achieved without a reduction in product quality. Furthermore, fan pressure can be reduced, due to less pressure loss, compared to other conventional roller mills, because less material circulates inside the mill as a result of the higher grinding pressure and the excellent classifying mechanism.

### High quality, stable product

Due to its excellent grinding mechanism, the CK Roller Mill produces high quality slag powder and cement very similar to the product produced by a tube mill. The rollers are optimally configured for fine grinding and the original classification mechanism allows free adjustment of particle size distribution for products.

### Low vibration

The excellent fine-grinding mechanism eliminates vibration problems and assures a longer service life for the mechanical parts.

### Vertical-type material feeding chute

For wet and sticky materials, such as wet slag, the center chute system has been adopted, and offers the following advantages;

- No sticking of feeding material inside the chute.
- Stable and even material distribution to each roller.

### Long service life

The roller tires and the table liners of normal steel casting are configured to be minimally affected by abrasion, and the excellent abrasion resistance of the hard-faced material on both parts prolongs their service life. The combination of these features with the classification mechanism, which adjusts particle size distribution for products in a wide range, maintains a very stable grinding performance of the CK Mill over a long term. These hard-faced materials can be re-welded inside the mill after wearing, without any risk of cracking the body metal during either re-welding or mill operation.

### Arm bearing foundation

One of Kawasaki's latest technologies includes the steel base frames for arm bearings being installed on a concrete foundation. In conventional design, the arm bearings are supported on a steel structure. Our latest design changes this steel structure to a rigid reinforced concrete (RC) foundation and offers these technical benefits;

Reinforced concrete (RC) offers:

- Reduction of vibration at the arm bearing.
- Reduction of manufacturing costs over using a steel structure.
- Easy maintenance and easy access to hydraulic cylinder parts.

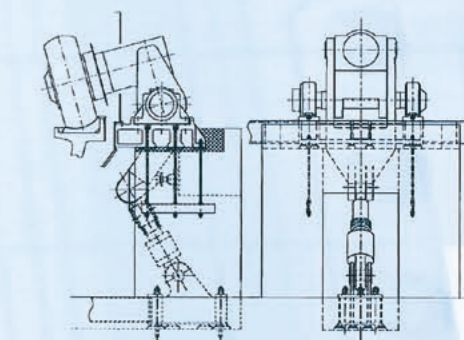


Fig. 3 Arm bearing foundation

Table 1: One example of slag grinding performance in a China project

Feed ratio	%	Slag 100%	
Moisture of feed material	%	9.3	
Capacity (D. B.)	t/h	85.6	> 80 (Guarantee)
Fineness (Blaine)	cm <sup>2</sup> /g	4,300	4,300
Classifier rotor speed	rpm	101	
Dam height	mm	62	
Material bed thickness	mm	42	
Vibration	mm/s	0.9-1.3	
Hydraulic pressure	MPa	10.5	
Power consumption			
Mill	kWh/t	27.3	
Classifier	kWh/t	1.3	
Total	kWh/t	28.6	< 30.5 (Guarantee)
Fan	kWh/t	4.5	Not included in Guarantee
Water spray		no spray	



Fig. 2 Hard-faced roller tire and table liner



## Introduction

Kawasaki Heavy Industries, Ltd. (Kawasaki) has delivered a number of CK Mills to customers worldwide since 1984. In 2007 Kawasaki launched a manufacturing workshop in Wuhu, China to manufacture major equipment for cement plant, especially large size VRM for slag, cement, raw meal and coal grinding. Kawasaki has successively upgraded its VRM technology to satisfy customer's requirement for shorter

delivery period (achieving as short as six months delivery for some mill units), rigid structure for longer lifetime, concrete pedestal to avoid vibration and attain stable operation, easier maintenance, lower installation costs, higher efficiency and competitive prices. These second-generation CK Mills came onto the market in 2008 and 97 units have been supplied or booked as of end of 2014. The second-generation CK Mill

is being manufactured with Kawasaki Technology and engineering expertise, strict quality and schedule, and safety control conducted by Kawasaki Japanese expatriates. Kawasaki has more than 30 years of successfully supplying CK Mills and continues to gain popularity and recognition in this field.