

## Steel Slag Vertical Mill

The GRMSS steel slag vertical mill of CHAENG is a kind of special equipment for grinding industrial waste such as steel slag and water slag into powder. Integrating crushing, transporting, grinding and drying, the steel slag vertical mill is a kind of ideal equipment for grinding steel slag. The models of CHAENG's GRMS steel slag vertical mill are complete, include GRMSS33.31 GRMSS46.41 GRMSS53.41 and so on, which can meet the needs of the steel slag production line project with an annual output of 200,000-1,500,000 tons.

**【Output】** 200,000-1,500,000t/a

**【Specific surface area】** 450~500 m<sup>2</sup>/kg

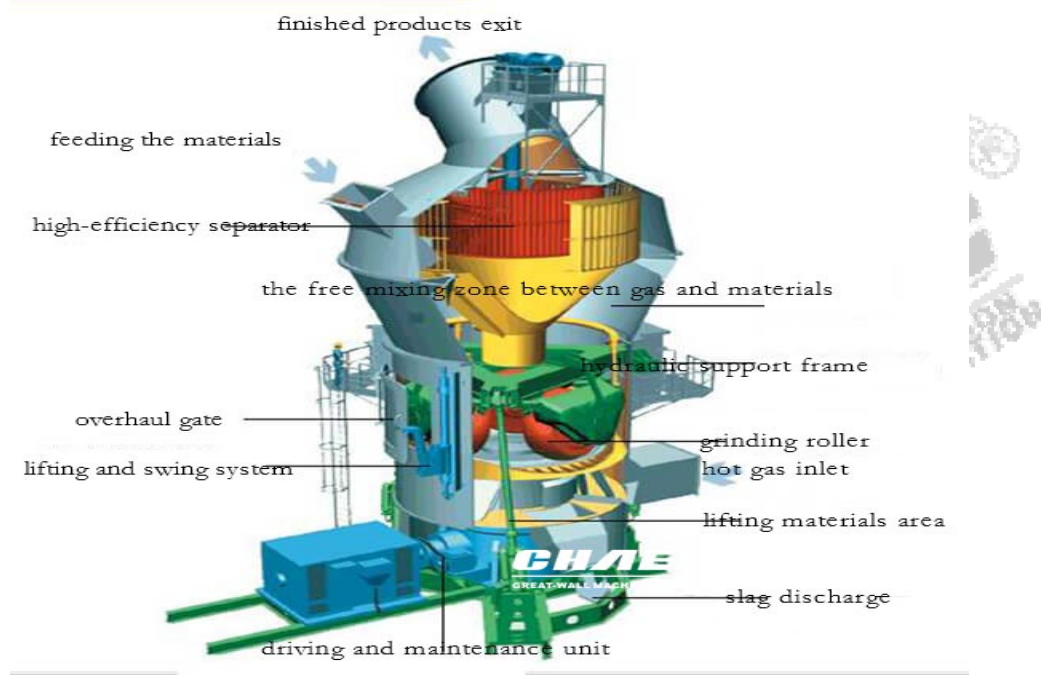
**【System power consumption】** ≤ 50 kWh/t

### Process Introduction

The materials fall to the central of grinding table through the blanking pipe, then the grinding table is rotating at the constant speed and disperses and spreads out the materials evenly with the aid of centrifugal force, which makes the grinding table become the material bed with a certain thickness. Then several grinding rollers on the grinding table grind and crush the materials at the same time. With the continuous centrifugal force, the materials constantly move toward the outer edge of the grinding table. When the materials which leave the grinding table meet the hot gas which enter into the mill through wind ring, the materials will also rise. Then the materials enter into the separator through the mill's middle shell, during this process, the materials and the hot gas have

sufficiently heat exchange with each other, and the water is quickly evaporated. The powder separator controls the size of the finished products, particles which are larger than the specified size will be separated and fall back into the grinding table, and particles that meet the fineness requirement will enter into the finished products warehouse through the powder separator.

According to the statistics of the association network, for the moment there are over 90,000,000 tons steel slag being produced in China every year. But in 2013, the use ratio of steel slag is less than 25%. Over the past five years, there are over 127,9000,000 tons wasted steel slag, and the number is still increasing, which brings serious challenges to the environmental management of steel companies.



## Parameters

| Items                                     | 600,000t/a slag grinding plant<br>Energy consumption | 450,000t/a slag grinding plant<br>Energy consumption | 300,000t/a slag grinding plant<br>Energy consumption |
|---|--|--|--|
| Output/unit (t/h)                         | 105  | 65   | 50   |
| Annual output ( × 10,000 tons)            | 60   | 45   | 30   |
| Total Power                               | 5400   | 3770   | 2860   |
| The power at 10KV                         | 4400   | 3140   | 2230   |
| Transformer specifications                | 1000KVA  | 630KVA   | 630KVA   |
| Power consumption /unit product (Kwh/ton) | 40   | 40~41  | 42   |
| Coal consumption /unit product (kg/ton)   | 18   | 18   | 18   |

## Advantages:

1. One set of system is enough, low operating costs

When the specific surface area of the products reaches  $4500\text{cm}^2/\text{g}$ , the average grinding capacity of the CHAENG' s steel slag vertical mill can reach 90t/h. But choosing ball mill, there are at least six sets of ball mill systems being required.

2. The power consumption of vertical mill system is 20% lower than ball mill

For many cement enterprises, the high energy consumption of ball mill system is such a big headache. But the new type of vertical mill is a kind of energy-saving and environment-friendly grinding equipment. Compared with ball mill system, vertical mill can save 30%-50% power. Also compared with traditional vertical mill, CHAENG' s steel slag vertical mill has large external circulation ratio, which can reduce the system power consumption by about 20%.

| System Solutions                        | ball mill  | roller press + ball mill               | Vertical roller mill                           |
|---|--|--|--|
| System Power Consumption, kWh/t         | 90   | 60                                     | 45   |
| Drying ability                          | bad (drying separately)                                  | general (drying with V-Separator)      | very good (drying inside the mill)             |
| Adaptability                            | bad  | good                                   | very good                                      |
| Main reason of affecting operation rate | need to pour out the steel balls and clear the iron slag | need to repair the worn roller surface | need to repair the worn press roller and liner |
| Scale                                   | difficult  | easy                                   | easy   |
| Application and practice                | 100,000 tons   | 300,000 tons                           | /  |

### 3. Low dust pollution

The ball mill requires several auxiliary equipment and conveyors due to the complicated system process, which will cause serious dust pollution. The steel slag vertical mill system

is fully enclosed integrating functions of conveying, grinding, drying and powder separating and CHAENG also installs dust collectors in the vibrating screen frame and the feeding frame, which really achieves the “low” emission of dust.

4. High iron separation rate, improving economic efficiency



Steel slag generally has an iron content ranging from 1% to 3%. CHAENG optimizes the

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iron separation process of the vertical mill grinding system, and adds several iron removers to the feeding system, which greatly increases the iron removal amount and improves the integrated economic and environmental benefits.

5. Advanced slag discharge belt, to reduce the wear of grinding roller

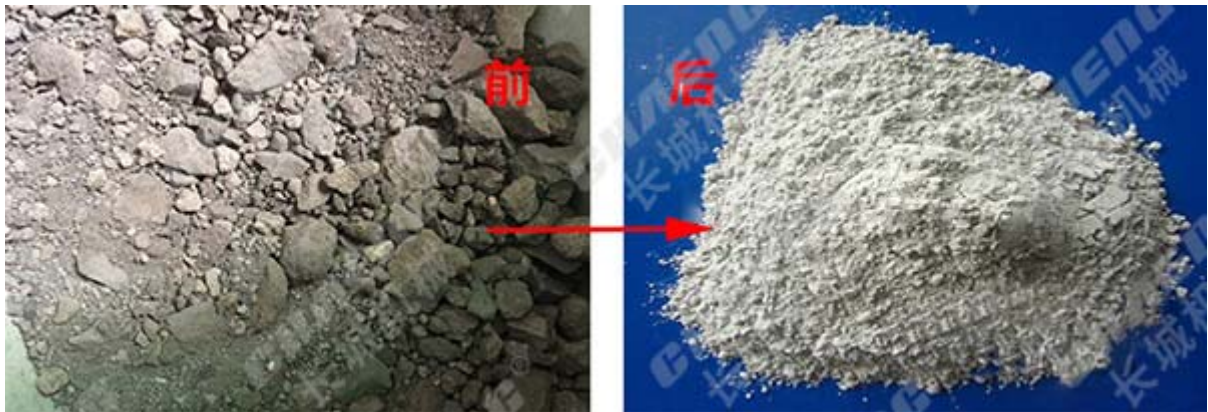
The slag discharge belt adopts the advanced flat belt and paving device, which enables the iron remover suspended on the belt to more effectively magnetically select the iron-containing material discharged from the mill to prevent it from being re-grinding, so as to reduce the wear of the grinding roller.



Iron remover of the belt conveyor

6. Finished fineness can be guaranteed at 480-500m<sup>2</sup>/kg

CHAENG steel slag vertical mill uses many external circulation and effectively removes iron in the external circulation, which can make the iron content in the tailings less than 2%. And the steel slag powder has high fineness that the finished specific surface area can reach 450~500 m<sup>2</sup>/kg or above, and has good activity, which is suitable as cement active mixture and concrete admixture.



Steel slag and steel slag powder

CHAENG steel slag vertical mill used in Xuzhou Steel's steel slag grinding plant with annual output of 300,000 tons

In 2010, Xuzhou Steel and CHAENG cooperated to build a steel slag grinding plant with production capacity of 45 tons per hour. The plant uses advanced vertical roller mill to grind the steel slag. The product steel slag powder is mixed into cement or concrete as a mixture, to significantly improve its strength, impermeability and frost resistance. The steel slag powder produced by the plant is sold well in cement plants and concrete mixing stations around Xuzhou, and will be widely used in key projects in the province.



### Service support

CHAENG has 60 years of experience in large-scale kilns and mills production, and aims to be an advanced comprehensive service provider of grinding system. In the development, we always adhere to the business philosophy of “Customer satisfaction is our eternal pursuit” and launch a series of measures to improve customer service. Providing customers with one-stop overall service solutions before, during and after sales, we truly let customers experience "Be at ease when making choice, free from worry when using equipment, feel comfortable when accepting services"

### EPC service

In order to ensure the smooth progress and completion of the entire project, CHAENG has launched a valuable service plan of “1 equipment with 8 services” . It provides full



guidance from the previous project, raw material testing to final production, making customers feel worry-free all the way



#### Technical Services

CHAENG has been cooperating with top domestic research institutes and industry experts for a long time and owns a professional technical team of more than 80 people. It has 1 domestic advanced powder test line of vertical mill and ball mill, more than 60 sets of testing equipment of various materials and concrete, and has rich analysis ability of various powder materials, which can provide scientific and professional industrial waste system solutions for customers.

#### Spare parts service

CHAENG has a large casting base in the north of Henan Province, and also one of the few large casting bases in the same industry in China. It has more than 500 domestic and foreign advanced equipment with strong processing capacity and perfect detection

methods. All main components of the equipment are self-sufficiency with the fast delivery. It can provide fast, high-quality spare parts custom services for a long time for the customers.