

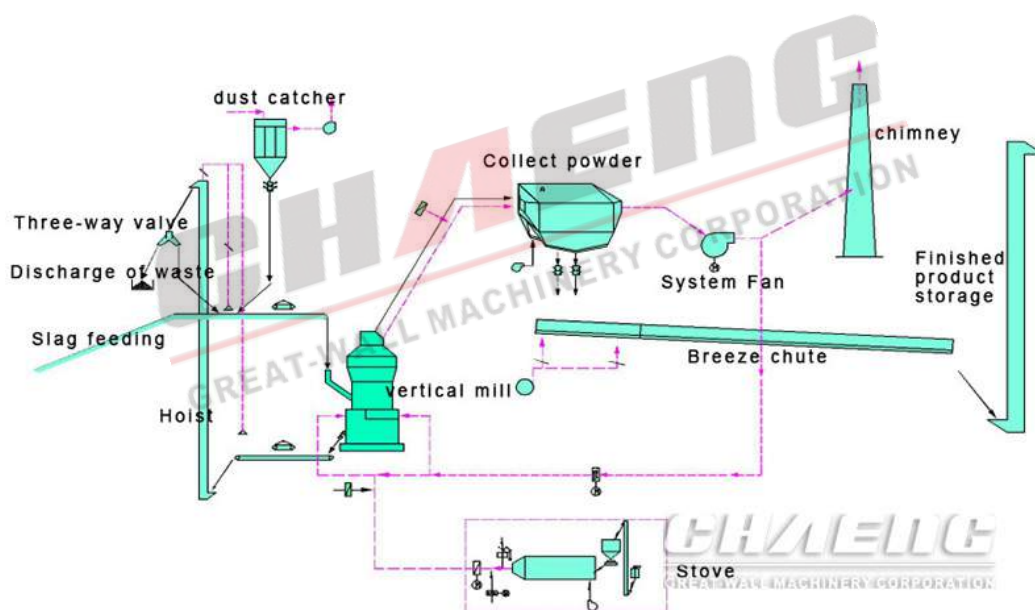
# Process Description

CHAENG can undertake EPC turnkey services for slag / steel slag / nickel slag / manganese slag powder production line with an annual output of 200,000-1,500,000 tons.

So far, CHAENG has established successfully more than 100 slag production lines in the world.

Over the past decade, it shows that the general trend of cement industry in Germany and Switzerland, which are strong power in world cement industry, is that the traditional portland cement is replaced by the type II cement which is added into large amounts of slag, fly ash, sintered shale, volcanic ash, limestone and relatively less clinker.

GGBFS is a kind of concrete admixture with superior performance. Adding GGBFS during cement production can increase the strength 28D of cement by 15% - 20%, to admix 42.5 grade cement, and during concrete production, slag powder can replace 10 ~ 50% of the cement, to mix C20 ~ C60 concrete, which has become an important measure to reduce the cost of cement in the international cement industry.



Piles of slag are taken and fed by the forklift truck, and conveyed by a belt conveyor. During the process of conveying, slag raw material will be iron-removing and screening through magnetic separator and vibrating screen, and then go to the weigher cabin, elevator and last to the vertical roller mill for grinding process. The ground granulated slag powder is drying by the hot air supplied by hot blast furnace, and with the help of hot air, the powder selecting is made in the separator. The qualified slag powder particles will be collected by bag dust collector, then conveyed to and stored in the silos by the air slide and elevator.



## Specifications

### Suggestions for the equipment selection

CHAENG already has more than 100 customers currently, and almost 80% of them built slag grinding plant with annual capacity of 1,000,000 tons, 600,000 tons, 300,000 tons. Below table has shown the three main equipment in aspects of model selection, energy consumption and so on.

Product Specifications	GRMS 53.41	GRMS 46.41	GRMS 33.31
Annual production (tons)	1,000,000	600,000	300,000
Designed production (t/h)	150	90	45
Raw materials input amount (t/h)	188	125	65
Actual output (t/h)	160	105	55
Final products fineness (m <sup>2</sup> /Kg)	500	500	500
Power consumption (KWh/t)	26.5	28.5	30
System power consumption (KWh/t)	35	37	42
Coal consumption (equivalent to standard coal) (kg)	17	18	18
Metal recovery of per ton slag (%)	0.2-0.3	0.2-0.3	0.2-0.3

### Slag grinding plant investment returns analysis

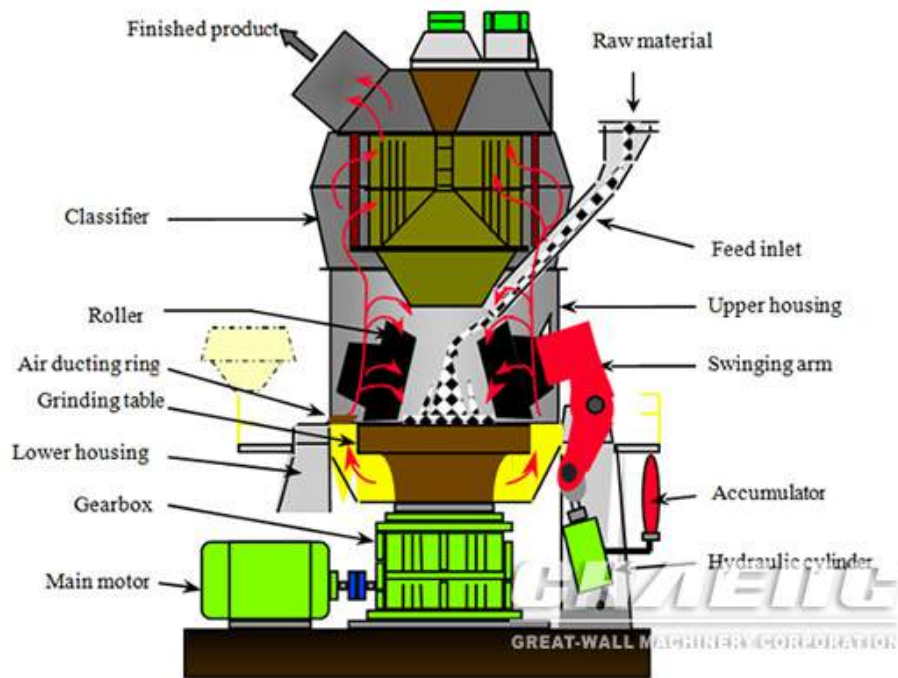
Take our 600,000 t/y GGBFS production line as an example, the total investment of this project is RMB 50 million. It was put into

production on April, 2011, and within 2 years, all the investments on equipment has returned and now is getting pure benefits. The investment details list as below:

Project	Indicator	Practical operation
Start date	Date of start running	April 2011
Investment calculations	Total investment	50 million
Cost calculation	Raw material cost	¥ 70T
	Production costs (including salaries, electricity, coal, and maintenance management fees, sales charges, and so on)	¥ 50
Profit calculation	Market sales prices	¥ 160T
	Tons of profits	¥ 40T
	Annual profit	40 * 600,000 = 24 million
Economic benefits	Within 2 years, all the investments returned (currently in a State of pure profit)	
Slag powder quality	Fineness	500 m <sup>2</sup>
	7d Activity index	About 100%
	Activity index	Pass GB S95

## Features

1. Introduce Germany loesche vertical Mill technology, and process system is simple.



2.High operating rate, energy saving

3.With easy operation system, saving labor cost



CHAENG slag vertical mill intelligent operating system, to monitor and adjust the hidden dangers of real-time production and operation

4.Replacement of parts is simple and convenient in later stage



## CUSTOMER STORIES

In November, 2015, chairman of Indonesia Growth Steel Group came to CHAENG and signed the EPC Turkey Project contract of 300,000 t/y nickel slag grinding plant.

In May 2016, the vertical mill, auxiliary machine, and accessories of 300,000 t/y nickel slag grinding plant ordered by Indonesia Growth Steel Group were sent to Indonesia;



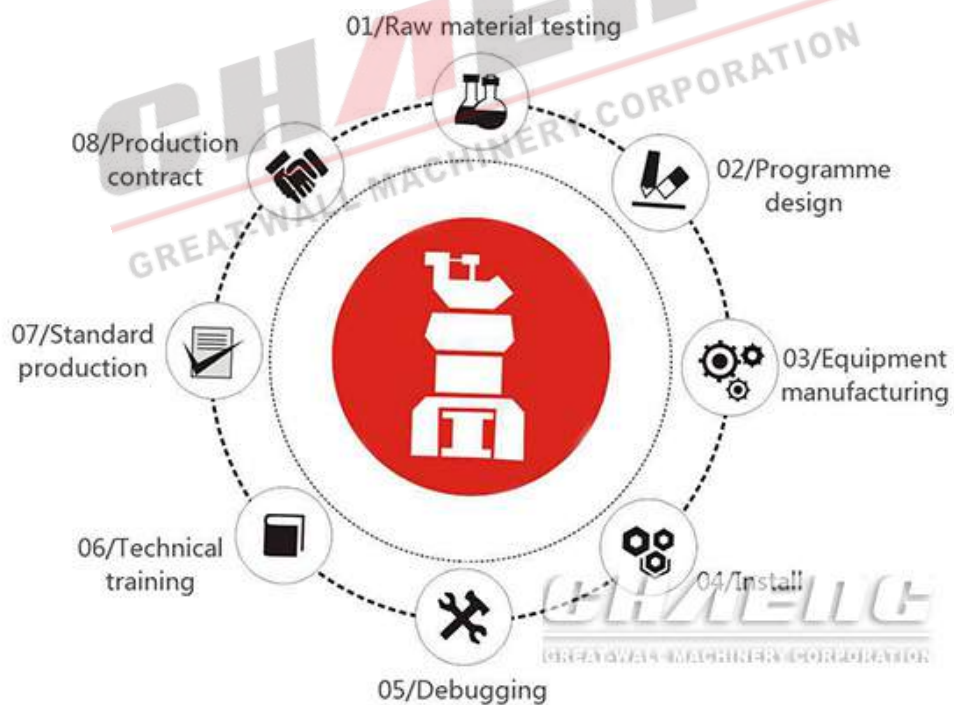
In September 2016, the project design, civil construction and equipment manufacturing of 300,000 t/y nickel slag grinding plant for Indonesian Growth Steel Group has been successfully completed, equipment installation and commissioning work were also near the end.

On November 3, 2016, 300,000 t/y nickel slag grinding plant EPC project of Indonesia was completed and put into production!



## Services

We are the first to develop "1 vertical mill, 8 service" one-stop integrated service solution. From setting up the project to starting production, CHAENG provides the all-round guidance for the whole course, to ensure the smooth progress of the project.



## About CHAENG

Founded in 1958 and located in Xinxiang, Henan province, CHAENG with 60-year experience in equipment manufacturing covers an area of 330,000 m<sup>2</sup> and its annual production value is 1 billion yuan. The company specializes in manufacturing tube mills, rotary kilns, vertical mills and large steel casting and can undertake the EPC projects of cement production lines, active lime production lines, blast furnace slag/ steel slag/ nickel slag grinding plants, and its products are sold to more than 50 countries and regions in

Southeast Asia, Central Asia, South Asia, North America, South America and Europe.

Our long-term strategic partners: Arcelor Mittal, Tata Group, Pohang Iron and Steel Company, Germany CCE, Japan Chiba , Shanghai Baosteel , Voestalpine and ASGT.

**CHALLENGE**  
GREAT-WALL MACHINERY CORPORATION