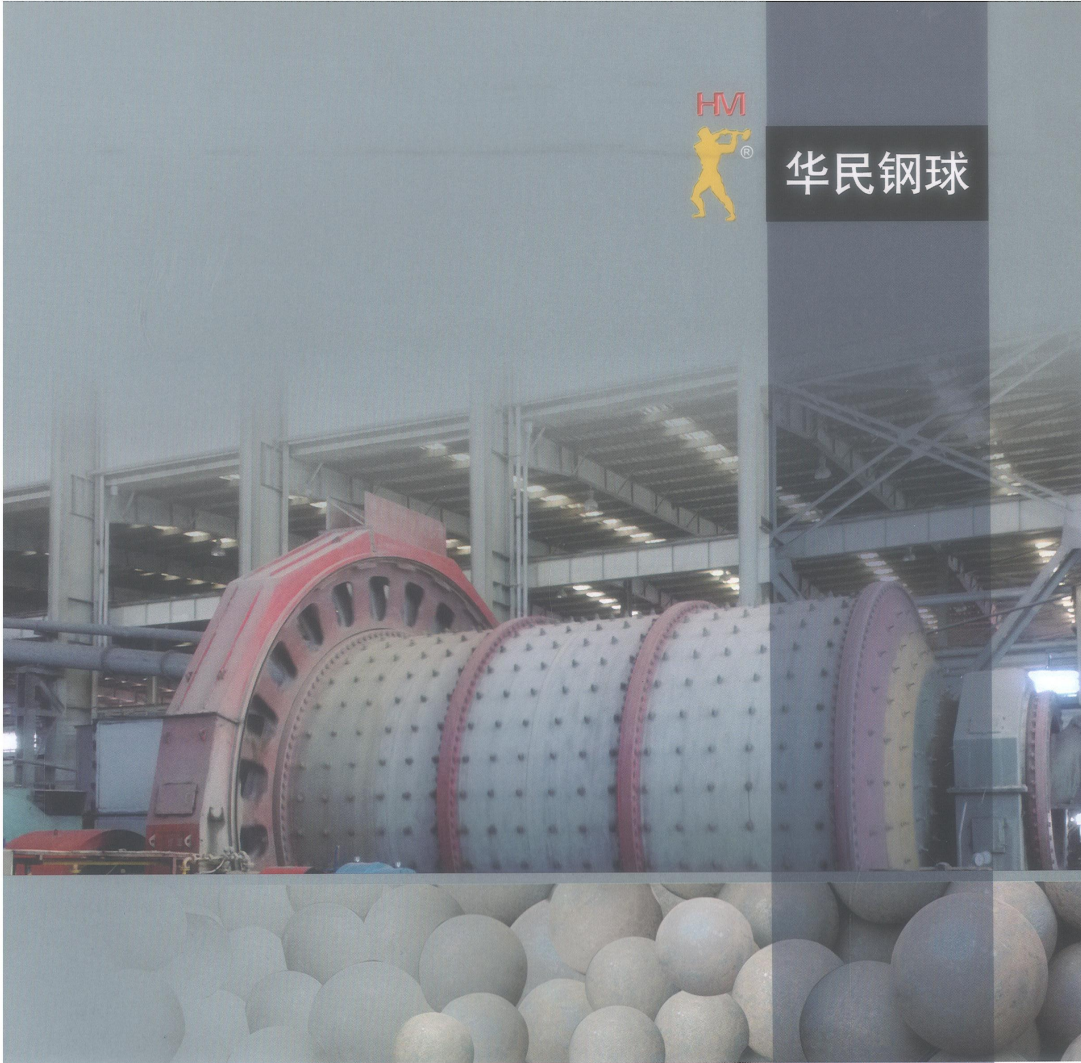




华民钢球



China Shandong  
Huamin Steel Ball Joint-Stock Co.,Ltd.

Huamin  
Steel Ball





## Enterprise Brief Introduction

- ★ The company was established in 1986, had set up Joint-Venture company with Korea Hyundai Co., Ltd. for 10 years since 1993.
- ★ From the year 1994 of getting the licence for export and import, our products had been exported to more than 40 countries.
- ★ Main products: forged steel grinding ball, grinding steel rod, various high chrome cast iron ball, cast cylpebs, patented rotary roll forged steel balls production equipment, full-automatic grinding steel rod production equipment.
- ★ Our company owns 15 invention patents, 11 utility model patents.
- ★ Become the professional manufacturer and exporter in grinding ball of new material, new technology, new equipment.
- ★ Huamin trademark gets provincial famous trademark, 30 countries trademark right protection in Madrid Organization.
- ★ Our company gets High and New Technology Enterprise, Enterprise Technical Center, State level defends the contract heavy credit enterprise, is awarded the first place in "comprehensive strength in China's forging steel ball industry" in the industry synthetical comparison and appraisal held by Confederation of Chinese Metalforming Industry.
- ★ Becoming one of the drafting units of national standard of "forged balls for electric power and industrial standard of grinding steel rods.
- ★ The first company to make rotary roll forged steel ball automatic production equipment and fully automatic grinding steel rod production equipment in China.
- ★ Products quality inspection and test trustworthy company certified by SGS internationally.
- ★ The first company to establish the R&D center through the cooperation of Sino-Australia Mining And Grinding Balls Center.
- ★ The company which has passed the ISO9001 international quality system certification, the ISO14001 environmental system certification and clean production certification, the 18001 Occupational health and safety management system certification
- ★ The membership company of CCPIT, China Metalforming Confederation, China Mining Association.
- ★ The company could make a variety of wear resistant material series products 300,000 tons annual scale.



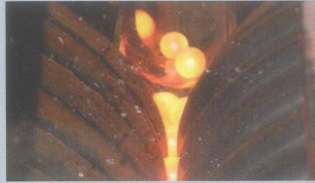


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## Forged Steel Ball



Continuous Electrical Heating



Rotary Roll Forged Process



Isothermy Process



Automatic production line for rolling ball



New materials of HM series special forging steel ball

### Huamin Series New Material Forged Grinding Steel Ball

As one of the Chinese largest export enterprises and manufacturer of grinding steel balls, our annual production capacity of various steel balls is 300,000 tons. The steel balls are exported to Australia, Canada, the United States, Chile, South Africa and other major mining companies, which have won high praise by customers.

We can provide customers forged steel balls with different materials, high hardness and ranging from  $\Phi$  20mm to  $\Phi$  200mm.



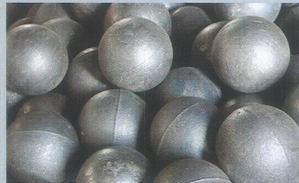
$\Phi$  120-  $\Phi$  200mm large diameter forged balls for SAG mill Application

**New material  
New technology  
New product  
New standard**





## Cast Iron Ball



Grinding Steel Ball



Barrel shipment



Bag shipment

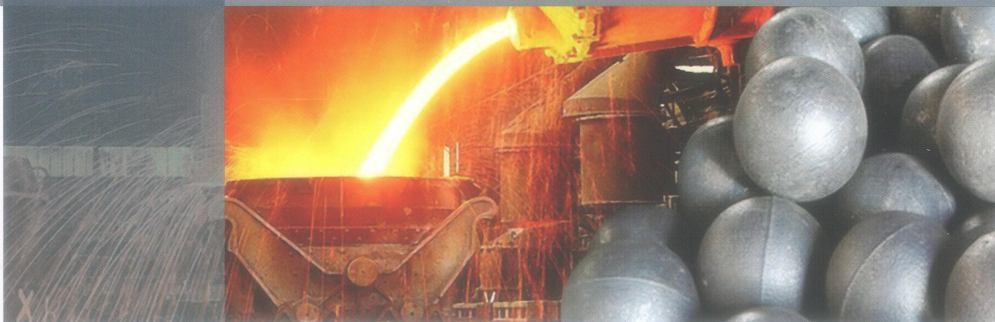
## ALLOYED CASTING IRON BALLS

### MECHANICAL PROPERTIES

NAME	BRAND	HRC SURFACE HARDNESS		ENDURANCE IMPACT TEST (TIMES)
		QUENCHED	UNQUENCHED	
HIGH CHROME CASING IRON BALL	ZQCr26	≥58	≥49	≥8000
HIGH CHROME CASING IRON BALL	ZQCr20	≥58	≥49	≥8000
HIGH CHROME CASING IRON BALL	ZQCr15	≥58	≥49	≥8000
HIGH CHROME CASING IRON BALL	ZQCr12	≥58	≥49	≥8000
MIDDLE CHROME CASING IRON BALL	ZQCr8	-	≥48	≥8000
LOW CHROME CASING IRON BALL	ZQCr2	-	≥45	≥8000
BAINITE DUCTILE CASING IRON BALL	ZQCI3	≥50	-	≥8000

### SIZES OF CASTING BALLS

ITEMS	SIZES														
	Φ10	Φ15	Φ20	Φ25	Φ30	Φ40	Φ50	Φ60	Φ70	Φ80	Φ90	Φ100	Φ110	Φ120	Φ130
TOLERANCE	+1.0				+2.0			+2.5			+3.0				
	-1.0				-1.0			-1.0			-1.5				
DIFFERENCE BETWEEN MAX DIAM AND MIN DIAM	≤ 1.0				≤ 2.0			≤ 3.0			≤ 4.0				





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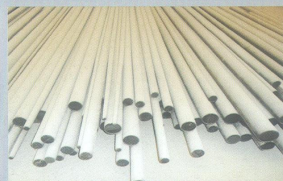
## Steel Grinding Rod



Steel grinding rod



Loading of grinding rods

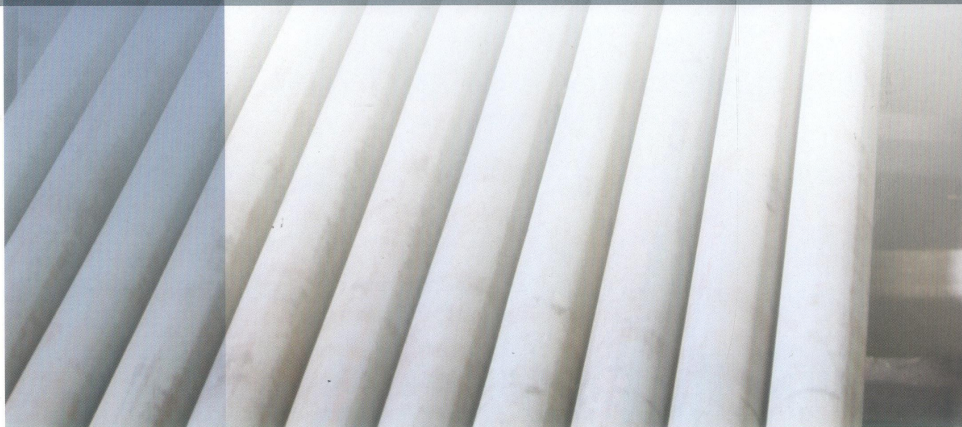


Unloading view after using in rod mill

One of the largest producer and exporter  
for steel grinding rods in China.

Diameter( $\Phi$ mm)	30-50	60-70	75-90	100-120	130
Length(m)	2.95	3.5	4.3	Agreement	Agreement

We can make the grinding rod according to the effective length  
of the rod mill customers owned







## Proprietary Equipment



Rotary rolling grinding ball automatic production line, originated by Huamin.  
Equipment Patent Number: ZL200610043960.1



Intelligent rolling forged steel ball complete equipment



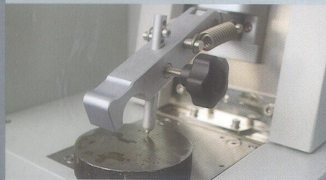
SAG mill steel ball automatic equipment



Steel grinding rod patented automated production equipment  
Equipment Patent Number: 200810238243.3



## Inspection And Testing



The inner quality of sampling test



Chemical elements analysis



Hardness Test

## Grinding Ball Inspection Process And Equipment

The material chemical analysis-Surface quality inspection-Size-Surface hardness test-Core and volumetric hardness test-Impact Value test-Metallographic test-Dropping test



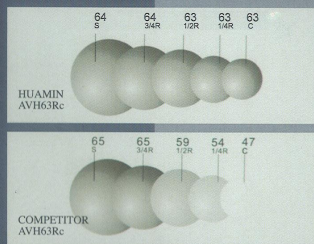
Sectional view for measuring points in a steel ball

The average volumetric hardness of steel balls is measured in the way below:

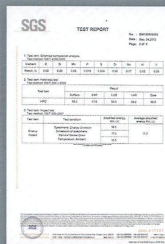
To determine the hardness values at 5 points of each sample. One of these points is on the surface and other 4 are placed respectively on 3/4R, 1/2R, 1/4R and the center on the same section of the sample. Then the average volumetric hardness of balls can be calculated from the following formula:

$$\begin{aligned} A.V.H. = & 0.289 \times \text{surface hardness} \\ & + 0.437 \times \text{hardness at } 3/4R \\ & + 0.203 \times \text{hardness at } 1/2R \\ & + 0.063 \times \text{hardness at } 1/4R \\ & + 0.008 \times \text{center hardness} \end{aligned}$$

It has been proved that when the value is higher than 544VHN (500BHN), it is proper to use RCHN method to measure the hardness of grinding media.



The conclusions are obvious. High quality such as HUAMIN offer always saves money in the long run.



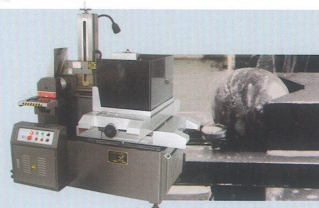
SGS Test Report



Impact value testing machine



Hardness testing equipment



Wire Cutting Machine



Dropping test machine