

## **GRINDING MEDIA**

**Product Code (ASICC) : 71301**

**Quality & Standards : IS: 6079 - 1989**

**Production Capacity : 360 MT per year**

**Month & Year of Preparation : March,2012**

**Prepared By : MSME- Development Institute,  
(*Metallurgy Division*)  
C.G.O. Complex, Block“C”, Seminary Hills, Nagpur – 6.**

## 1. INTRODUCTION:

Grinding Media are cast steel balls, diameter generally from 15mm to 100mm, with the help of which ores, minerals, valuable stones and other similar hard materials are converted into powder form in ball mills. Material to be powdered is fed into the ball mill where it comes in between continuously rotating grinding balls which converts the material into desired size powder. Grinding balls are used in benefaction of Iron, Copper, Zinc & Aluminum ores, in cement plants, in refractory manufacturing units and in other various industries where hard materials are required to be converted into powder form.

## 2. MARKET POTENTIAL:

Grinding balls are mainly required by the core-sector industries & being consumable item, it has a very good demand wherever it is required. Generally these are produced by steel foundries & presently there are considerable number of steel foundries in our country.

So far as Vidarbha region is concerned, there is no unit manufacturing this product. On the other hand, there are no. of cement plants in this region and refractory manufacturing units are also there to support it. Raw material is also available in abundance in this region. This gives an ample scope for setting up of grinding media plant in this region.

## 3. BASIS AND PRESUMPTION:

The project profile is drawn on the basis of following presumptions.

Working hours per shift	: 8 Hours.
No. of shift per day	: 1 shift
Working days	: 300 days
Total number of working hours	: 2400
Working efficiency	: 75%
Time period for achieving maximum capacity Utilization.	: 3 <sup>rd</sup> year from the date on which production is started
Labour charges	: As per minimum Wages Act of State Govt.
Rate of bank interest	: 14%
Operative period of the project	: 10 years.

**4. IMPLEMENTATION SCHEDULE:**

1.	Scheme preparation and approval	-	3 months
2.	Selection of site	-	1 month
3.	Sanction of loan	-	2 months
4.	SSI Provisional registration	-	1 day
5.	Machinery procurement, erection & commissioning	-	2 months
6.	Power connection	-	1 month
7.	Trial run	-	2 months
9.	Commencement of production	-	5 months onwards

**5. TECHNICAL ASPECTS:**

**a. PRODUCTION DETAILS AND PROCESS OF MANUFACTURING:**

The process of manufacturing of grinding balls consists of namely Pattern Making, Moulding, Melting, Fettling and Inspection. It is presumed that the patterns will be supplied by the customers or they will be obtained from outside pattern makers as per the requirement. The moulding sand is prepared by adding suitable proportion of various ingredients and the moulds are prepared with the help of patterns.

There are two grades of cast steel grinding media. Grade-1 for sizes 60mm & above and Grade-2 for sizes below 60mm..A typical chemical composition for both the grades is as follows:

<b><u>Element</u></b>	<b><u>Grade-1</u></b>	<b><u>Grade-2</u></b>
Carbon, %	1.25-1.50	1.60-1.90
Manganese, %	1.0 max.	1.0 max.
Chromium, %	1.50-2.00	1.50-2.00
Sulphur, %	0.06 max.	0.06 max.
Phosphorous, %	0.06 max.	0.06 max.

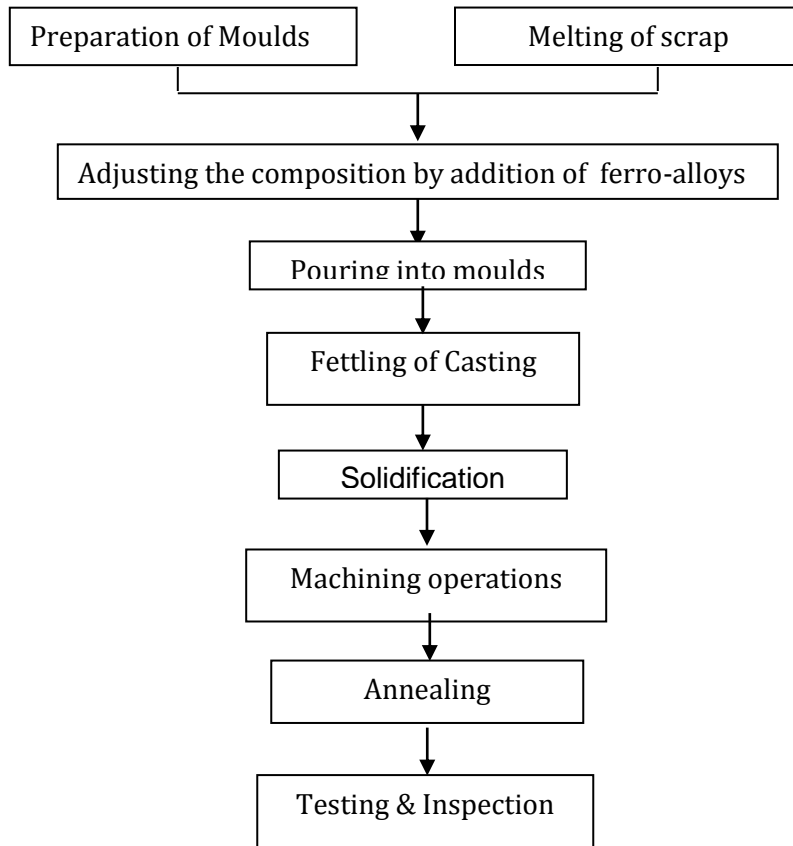
The M.S. scrap is melted in the Induction Furnace at a temperature of about 1600°C. & alloying elements are added as per the required chemical composition. The molten metal is then taken into laddles and poured into the moulds. After the castings are solidified, they are knocked out from the moulding boxes, runner, risers are cut off with gas cutting set & castings are cleaned by hand grinder. After that castings are annealed in the annealing furnace & inspected.

**b. QUALITY CONTROL & STANDARDS:**

Grinding Balls are Low Alloy Cast Hyper Steel conforming to IS:6079-1989. The castings are usually inspected for the casting defects & examined for Hardness, Chemical composition and Microstructure etc. Microstructure shall be free from continuous carbide network. Hardness of the grinding media shall not be less than 375 HB.

Similarly, quality control of molding sand with respect to sand grain size & fusion point, moisture permeability and green compression strength is equally important. A proper surface in the sand mould must be ensured for soundness & good surface finish of the casting.

**6. PROCESS FLOW Graphic representation:**



**7. PRODUCTION CAPACITY :**

QUANTITY : 360 MT .  
VALUE : 1,44,00,000/-

**8. MOTIVE POWER REQUIREMENT : 7000 KWH per month approximately**

**9. POLLUTION CONTROL:**

The unit should usually follow the pollution control measures meant for steel melting and sand handling sections by providing exhaust fans, proper ventilation etc.

**10. ENERGY CONSERVATION:**

Energy conserving measures like gradual heating of the scrap in crucible provided in the induction furnace & using insulating bricks touching inside face of the outer shell of the heat treatment furnace should be taken to save considerable amount of energy.

## 11. Financial Aspects

### A. Fixed Capital

i) Land & Building, 1000 Sq. Meters (rented) per month:

12000

### ii) Machinery & Equipments:

S.No.	Description of Machines	Quantity	Price (Rs)
1	Induction furnace (200 Kg capacity) with control panel & accessories	1	2100000
2	Sand Muller & Mixer, 150 Kg. batch cap. with 2 HP Motor & Starter	1	35000
3	Vibrating & Sieving Machine, with 1.5 HP motor	1	20000
4	Welding Transformer, 300Amp (Oil cooled)	1	15000
5	Pedestal Grinder Double Ended 8" wheel	1	9000
6	Portable Shaft Grinder 150mm, 1HP	1	7500
7	Annealing furnace, size 4' x 4' x 4' with pyrometers, burners, blowers .	1	8000
8	150 KVA Transformer with standard accessories.	1	100000
9	Hardness Testing Machine, Rockwell/Brinell type	1	50000
10	Cast Iron/Plate Fabricated Mould boxes	L.S.	25000
11	Platform type weighing machine 500 Kg. Cap	1	10000
12	Laddles	6	10000
13	Gas Cutting Set	1	8000
14	Carbon-Sulphur Analysis Apparatus complete	1	50000
15	Sand Testing Equipments	L.S.	20000
16	Material handling Trolleys	3	12000
		<b>Total</b>	<b>2479500</b>
17	Electrification & installation @ 10% of above cost		247950
18	Office equipments like Computer, furniture, fan,etc.	L.S.	50000
19	Pre-operative expenses		30000
		<b>Total</b>	<b>2807450</b>

## 12. Working capital (Per month):

### A: Staff & Labour:

S.No.	Description	Nos.	Salary	Total
1	Metallurgist	1	6000	6000
2	Supervisor	2	5000	10000
3	Melter	1	5000	5000
4	Accountant/Clerk	1	4000	4000
5	Laboratory Technician	1	4000	4000
6	Skilled Worker	4	3000	12000
7	Semi-Skilled Worker	2	2500	5000
8	Unskilled worker	8	2200	17200
9	Peon	1	2000	2000
10	Watchman	1	2000	2000
			<b>Total</b>	<b>67200</b>
	Add perquisite @15% of salary			10080
			<b>Total</b>	<b>77280</b>

**B. Raw Material (Per month)**

S.No.	Particulars	Qty.	Rate(Rs.)	Value
1	Steel Scrap, MT	30	25000	750000
2	Petroleum Coke,Kg	250	22	5500
3	Ferro Alloys i.e. Fe-Silicon, Fe-Mn, Fe-Cr, Fe-Ni etc.	L.S.	*****	25000
4	Bentonite, Dextrine, Core oil, Graphite	L.S.	*****	10000
5	Welding rods, cutting gaugesl	L.S.	*****	7000
6	Sand, Kg	2000	4	8000
			<b>Total</b>	<b>805500</b>

**C. Utilities (Per month)**

1	Electricity	35000
2	Water	5000
	<b>Total</b>	<b>40000</b>

**D. Other Contingent Expenses (Per month)**

1	Rent	12000
2	Postage & Stationery	3000
3	Telephone	1500
4	Insurance	7000
5	Repairs & maintenance	5000
6	Consumable Stores	5000
7	Misc. Expenses	5000
8	Transport allowances	5000
	<b>Total</b>	<b>43500</b>

**13. Total Working Capital (Per month)****966280****14. Total Capital Investment**

i)	Fixed Capital	2807450
ii)	Working Capital	2898840
	<b>Total</b>	<b>5706290</b>

**15. Financial Analysis****a. Cost of Production (Per Year)**

i)	Total recurring cost	11595360
ii)	Depn. on machinery & equipment @ 10%	37150
iii)	Depn. on furnaces @ 20%	421600
iv)	Depn. On office equipments @ 20%	10000
v)	Interest on Total capital investment @12%	684755
	<b>Total</b>	<b>12748865</b>

**b. Turnover (Per Annum)**

By sale of 360 MTs of  
Grinding Balls @ Rs. 40000 per MT = **14400000**

**c. Net Profit per year**

Turnover per year - Cost of production **1651135**

**d. Net Profit Ratio**

(Net profit per year/ Turnover per year) X 100 = **11.47 %**

**e. Rate of Return**

(Net profit per year/ Total investment) X 100 = **28.94 %**

**f. Break-even Point(B.E.P.)****Fixed Cost**

i) Rent	144000
ii) Depn. on machinery & equipment @ 10%	37150
iii) Depn. on furnaces @ 20%	421600
iv) Depn. On office equipments @ 20%	10000
v) Interest on Total capital investment @12%	684755
vi) Insurance	84000
vii) 40% of salary & wages	370944
viii) 40% of other contingent expenses excluding rent & insurance	117600
<b>Total</b>	<b>1870049</b>

**Break- Even Point (B.E.P.)**

[Fixed Cost/ (Fixed cost + Profit)] X 100 = **53.11 %**

**NAMES & ADDRESSES OF MACHINERY AND RAW MATERIAL SUPPLIERS :**

1. M/s. Hannu Metallurgical,  
B-22,Girikunj Indsutrial Estate, Chakala, Mahakali Caves Road,  
Andheri (East), Mumbai – 93 Ph.no. (022)-26875545.
2. M/s. Mahavir Engineering Corpn.,  
1, Ambica Estate, B/h. Agarwal I.E.,  
off S.V. Road, Jogeshwari West,  
Mumbai – 102. Ph.no. (022)-56992785
3. M/s. Divecha Electrtricals,  
Balaji Indl. Complex,  
Gala No. ½, Navaghar , Bhayandar (E), Distt. Thane.
4. M/s. Nisha Engrs. & Consultants  
Nisha Enclave, Plot No. 95,  
Sector 23, Cidco Indl. Area,Turbhe, Distt. Thane.Ph.no. (022)-27684697
5. M/s. Combustion Equipments & Instruments,  
Jer Mahal, Dhobi Talaw, 1<sup>st</sup> Floor,Mumbai –2. Ph.no. (022)-27690171/27600842.
6. M/s. AIMIL Ltd.,  
Malhotra House, Opp. G.P.O.,  
Walchand Hirachand Marg,Mumbai – 1. Ph.no. (022)- 22642435
7. M/s. Electroil Super Thermal Engineers,  
151, Small Factory Area, Lakadganj,Nagpur – 8. Ph.no. (0712)-2286284
8. M/s. G.R.C.  
1, Taratala Road,  
Kolkata-700024.
9. M/s. Standard Electricals  
282, B.B. Chatterjee Road,  
Kolkata-700042. Ph no. (033)- 24422063
10. M/s. Associated Engineers  
32, G.C. Avenue,  
Kolkata-13. Ph. No. (033)-40066117, 22126477, 24731518
11. M/s. Machine Tools Impex  
75, S.C. Avenue,  
Kolkata-700013. Ph no. (033)- 22377569, 65481114
12. M/s. Rana Udyog (P) Ltd.  
NH-6, Vill.: Sulati, Dhulgarh,  
Howrah -711303. Ph.no. (033)- 26617891

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