

PROJECT PROFILE ON
SINTERED BUSH

1. Product : Sintered Bush
2. Production capacity : Quantity - 90,000 nos.
Value - Rs.76.50 lakhs
3. Month & year of preparation : February 2011
4. Prepared by : Metallurgy Division
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INTRODUCTION

Sintering is the process in which the green compact metal powder is subjected to heat at a temperature below the melting point of the solid metal. It is one of the two operations of powder metallurgical technology through which an ordinary shape to a complicated one can be manufactured at reasonable cost. The other operation is compacting or pressing which consists of subjecting the suitably prepared powder mixture at normal or elevated temperature to considerable pressure. The resulting powder compact is known as briquette and is said to be the form known as green.

In this process metal powder at a required ratio is blended, then pressed to desired level at a high pressure with precision tools and finally bonded or fused at elevated temperature in a furnace under a protective atmosphere as a high quality finished part, with mechanical properties more or less equal to parts manufactured under conventional method.

This profile deals with the manufacturing of sintered bronze bush bearing which can be useful for any prospective entrepreneur.

MARKET POTENTIAL

Porous metal bearings were manufactured using Powder metallurgy techniques as early as 1909. But the growth rate of powder metallurgy has increased very rapidly from 1950s. Self lubricated bearings (bronze) are used in the industries of automobile, textile, agricultural and home appliances manufacturing and to a small extent in small motors of fractional HP capacities. As the application of sintered metal bushes is increasing in many areas, particularly in automobile sectors and home appliances such as washing machines, refrigerators, electric clocks manufacturing industry the demand is also steadily increasing for this item.

BASIS AND PRESUMPTIONS

1. The scheme is worked out on a single shift basis of 8 hours in a day for 25 working days in a month.
2. At 75% capacity utilization of installed capacity of plant and machinery to achieve the production target 90000 no. of bronze bushes per annum.
3. Interest rates and land prices are as per the prevailing market prices. Salary and utility charges are as per local rates.

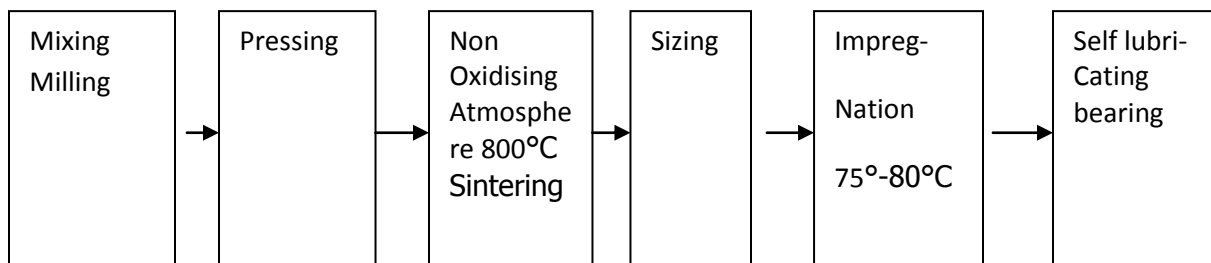
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IMPLEMENTATION SCHEDULE

Sl.No.	Activity	Period (in Months)									
		1	2	3	4	5	6	7	8	9	10
1.	Preparation of Project Report					X					
	SSI Registration(PRC)					X					
2.	Identification of site				X	X					
3.	Statutory clearance		X	X							
4.	Arranging finance			X	X						
5.	Building construction								X	X	X
6.	Arranging utilities						X	X			
7.	Selection and ordering for machine							X	X		
8.	Erection/installation of machine						X	X			
9.	Recruiting manpower									X	
10.	Procuring raw material/trial production									X	X
11.	Production								X		

TECHNICAL ASPECTS

Process of manufacture



The basic steps in the production of Porous self-lubricating metal bushes are

1. Blending and mixing of metal powder
2. Pressing-Die compaction(green briquettes)
3. Pre-sintering and sintering
4. Repressing
5. Sizing
6. Oil impregnation

The metal powder of copper, tin and graphite is mixed in a pre-determined ratio and blended in a ball mill by using organic lubricants by few percentage in weight for easing the moulding operation. The blended metal powder mix is compacted by subjecting to die compaction press briquetting. Before sintering the green briquettes at 800°C in a mesh belt conveyor of continuous furnace, pre sintering is carried out in the low

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temperature zone of the furnace at 440-450°C. The pre-sintering operation allows this powdered particles to liquidify and completely diffused into copper. The entire sintering operation is done in a furnace under a protective atmosphere creating a high quality finished product. Otherwise the bonding between particles will be affected by surface films such as oxides. For applications that require higher density or close dimensional tolerances, sintering is followed by a cold working operation known as coining or repressing.

In some cases re-sintering after repressing will increase mechanical properties. Despite increase in strength, re-sintering may result in large grain size and loss of dimension due to shrinkage and to rectify this, sizing is done. Special sizing process similar to powder process and sizing dies gives the final dimensions. Finally, oil impregnation is done to fill the porous in the sintered parts by dipping them into hot non-flaming petroleum oil for 10-15 minutes at 110°C, complete impregnation which is done primarily to improve anti-friction properties.

The final product, self lubricating bushes are checked as per IS 3980 and packed for dispatching.

Quality Control and Standards

As per IS 3980

Production Capacity

90,000 nos. of bronze bush for pumps of size O.D. 43 mm x I.D. 38 mm x height 40 mm.

Pollution Control

Sintering furnace should be provided with the fume outlet chimney of suitable height and the floor should be well ventilated and provided with exhaust fans.

Energy Conservation

Power factor should be monitored, at least once in a month it should be measured. If required additional capacitors can be installed to improve power factor. When any equipment is not in use it should be disconnected from the supply. Insulation should be provided wherever heat loss will occur.

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Financial Aspects**A. Fixed Capital****i) Land and building**

Working shed average of 2000
Sq.ft. @ Rs.10 per sq.ft. on rent

Amount(Rs.)

20000

ii) Machinery and Equipments

Sl.No.	Description	Qty.	Rate(in Rs.)	Amount (in Rs.)
1.	Sintering machine 8.2 kw with Other accessories	1	20,25,000	20,25,000
2.	Mechanical power Press 20 T Capacity	1	3,80,000	3,80,000
3.	Repressing power press 10 T	1	3,80,000	3,80,000
4.	Briquetting press 1 T cap	1	1,25,000	1,25,000
5.	Air Compressor with 3 HP Motor	1	20,000	20,000
6.	Ball mill 500 kg capacity	1	70,000	70,000
7.	Oil Quenching tank 4' x 2' x 2'	2	8,000	16,000
8.	M.S. Water Tank	1	10,000	10,000
9.	Mould and other tools	-	-	25,000
10.	Heater 1.5 KW	1	4,000	4,000
11.	Exhaust Fan	1	10,000	10,000
12.	Office equipment/furniture			1,00,000
13.	Pre-operative expenses			50,000
14.	Installation and Electrification			3,09,500
Total :				34,04,500
Say 340500				

B. Working Capital (per month)**i) Raw Materials**

Sl.No.	Description	Qty.	Rate(In Rs.)	Amount(in Rs.)
1.	Atomized tin powder(kg0 36	700		25,200
2.	Electrolytic grade	404	330	1,33,320
3.	Copper Powder(kgs)			
4.	Graphite powder	7.5	300	2,250
5.	High grade non gumming	12	80	960
Total				1,61,730

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Salaries and Wages

Sl.No.	Description	Qty.	Rate(In Rs.)	Amount(in Rs.)
1.	Work Manager	1	15000	15000
2.	Supervisor	1	12000	12000
3.	Skilled Workers	10	4500	45000
4.	Semi Skilled Workers	10	3750	37500
5.	Accountant	1	9000	9000
6.	Office Asstt.	1	3750	3750
7.	Watchman	1	3000	3000
	Total			1,25,250
	Perquisite @15%			18,787
Total:		1,44,037	Say 1,44,000	

i) Utilities (per month)

Sl.No.	Description	Qty.	Rate(In Rs.)	Amount(in Rs.)
1.	Fuel Combusted Hydro Carbon Gas cylinder	15	500	7500
2.	Power 1250 kw units @Rs.5 per unit			6250
3.	Water 10 kl @Rs.500 per kl			5000
	Total			18750

ii) Other contingent expenses

Sl.No.	Description	Qty.	Rate(In Rs.)	Amount(in Rs.)
1.	Advertisement and Publicity			5,000
2.	Consumables			10,000
3.	Insurance			15,000
4.	Postage,Stationery/Telephone			3,000
5.	Repairs & Maintenance			3,000
6.	Sales Expenses			2,000
7.	Taxes			5,000
8.	Transport			20,000
9.	Miscellaneous			5,000
10.	Rent			20,000
	Total :			63,000

Working capital per month(a+b+c+d)=387480 Say : 387000

Working capital For 3 months x387000 = Rs.1161000

C.Total Capital Investment

Fixed Capital	Rs. 3405000
Working Capital(for 3 months)	Rs. 1161000
Total	Rs. 4566000

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FINANCIAL ANALYSIS**1. Cost of Production(per annum)**

Sl.No.	Description	Qty.	Rate(In Rs.)	Amount(in Rs.)
1.	Depreciation on furnace,machinery & equipment			
	Mould & fixture,office equipment @ 20%			6,19,000
2.	Recurring Expenditure			46,44,000
3.	Interest on Capital Investment @ 15%			6, 84,900
	Total			59,47,900

2. Sales (per annum)

By sale of 90,000 nos. of bronze bush for	
Pumps of sizeD 43 mm x ID 38 mm x height 40 mm	
@Rs.85/ piece	Total
	76,50,000

3. Profit (per annum)

	Rs.
Sales	76.50,000
Cost of production	59,47,900
	Profit
	17,02,100

$$\text{Profit percentage} = \frac{\text{Profit} \times 100}{\text{Sale}} = \frac{1702100 \times 100}{5947900} = 28\%$$

$$\text{Rate of return} = \frac{\text{Profit} \times 100}{\text{Turnover}} = \frac{1702100 \times 100}{7650000} = 22\%$$

4. Break even point**i) Fixed cost (per annum)**

1. Depreciation	6,19,000
2. Insurance	1,80,000
3. Interest on investment	6,84,900
4. 40% of salary and wages	6,91,377
5. 40% of other expenses	2,06,400
And utilities excluding insurance & rent	
6. Rent	2,40,000
Total	26,21,677

Profit (per annum) Rs.17,02,100

$$\begin{aligned} \text{B.E.P.} &= \frac{\text{Fixed Cost} \times 100}{\text{Fixed cost/annum} + \text{profit per annum}} \\ &= \frac{26,21,677 \times 100}{26,21,677 + 1702100} = \frac{2621677 \times 100}{4323777} = 60\% \end{aligned}$$

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Addresses of Machinery and Equipment Suppliers

- 1.M/s. Benco Hydraulics Ltd.7/2,Nangambakkam High Road,Chennai-34
- 2.M/s. Heaters India ,252,SIDCO Industrial Estate,Ambattar, Chennai – 98
- 3.M/s. Industrial Pyrotech Engineer ,20,Bashym,1st Street,Chennai- 23
- 4.M/s. Murugappa Morzan Thermal ,28,Rajaji Rd.5th Floor,Chennai
- 5.M/s. Thermotherm Engineers,455,12th Cross,4th phase,Penya,Bangalore – 58
- 6.M/s. Ruia Resistance Wires Pvt.ltd. Hari Nivas,Riya house,Malviya Rd.
Vile Parle(E) Mumbai – 57

Addresses of Raw material Suppliers

- 1.M/s. Bhandari Metallurgical Corpn.Ltd.829,Mount Rd.Chennai
- 2.M/s. Bombay Metal Depot,Ahugraha,19 NH Road,Chennai – 34
- 3.M/s. Padmavathy Metal and Alloy Pvt.Ltd.447/2,
Puonthamall High Rd.Chennai – 106
