BRONZE BUSHES

1. INTRODUCTION:

Bronze is an alloy consisting primarily of copper, commonly with about 12% tin and often with the addition of other metals (such as aluminum, manganese, nickel or zinc) and sometimes non-metals such as arsenic, phosphorus or silicon. These metal and nonmetal additions produce a range of alloys that may be harder than copper alone, or have other useful properties, such as stiffness, ductility, or machinability. A common plain bearing design utilizes a hardened and polished steel shaft and a softer bronze bushing. The bushing is replaced whenever it has worn too much.

Since most rotating parts like shafts are made of steel, bushes or plain bearing is made of alloys viz brass and bronze which have excellent wear properties are used. Various grades of Bronze alloys that are known for robustness, heat resistance and anti-corrosive property are used for plain bearings also called Bushes.

2. PRODUCT & ITS APPLICATION:

There are several types of bush bearings viz brass, bronze, self-lubricated oil, graphite etc. lubricant impregnated bearings and bi-metal and Babbitt bearings.

Bronze bushing are made from Phosphor Bronze, Aluminum Bronze, etc. widely used alloys and it finds application in almost all types of equipments from domestic appliances viz kitchen appliances, dish and cloth washing machines to automobiles, Earth movers to defense to space etc. Thrust Bush and plain radial types are two prominent designs of bronze bearings. To ensure quality, specific compositions are chosen for bush bearings that can be either procured from local foundries or the unit can have its own foundry.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Preferably Mechanical / Metallurgical engineering background with ITI, diploma or degree and experience.

4. INDUSTRY OUTLOOK/TREND

The bronze bushes and other component and castings market of world is valued at Rs 630 Billion in 2016 and is projected to reach Rs 700 Billion by 2022, at a CAGR of 2.8% between 2017 and 2022. The ecosystem of the bronze market includes bronze alloy fabricators and service centers. The types of market of bronze by Type: Aluminum Bronze, Phosphor Bronze, Silicon Bronze, Leaded Tin Bronze, Other special compositions and Bronze Market, by end users Industrial machinery and equipments, Marine engines and equipments, Infrastructure & Construction machinery, Automotive and stationary engines, Electrical & Electronics equipments, Aerospace & Defense, etc.

Bushes production and supply has been essentially domain of small medium sector. At present, there are more than 100 manufacturers specializing in brass bronze bushes offering products in select sectors of industrial machines, Auto sector, off road and earth moving machines, white goods, computer peripherals, marine applications etc. The unit clusters are mainly located in North Indian centers like Punjab, Haryana, Delhi and West UP, in Maharashtra around Pune and Bombay and Southern India near Bangalore, Chennai and Hyderabad, in Gujarat around Rajkot and Surendranagar.

Although new products have emerged to replace the brass and bronze viz graphite and PTFE lined bearings to a great extent, the ease of production for replacement, and compatibility of brass and bronze is not replaceable except in special applications.

5. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

Starting from automobiles, tractors, earth-movers, trailers, compressors and submersible pumps to even the home appliances and industrial machines of all types need bush bearings. Various designs are popular viz grooved, flanged bush housing etc. of various sizes and shapes.

Bronze, brass, aluminum bronze bush, etc. are wearable parts requiring frequent replacement requirements; therefore there is huge demand potential for these products. Entrepreneur can start with trade channels or OEM consumers to select the products and meet their requirements.

The entrepreneur can focus on specific product range that has good market demand in the region in which it is located.

6. RAW MATERIAL REQUIREMENTS:

Main raw materials are scrap or ingots of copper, brass, tin, zinc, etc. Other materials are rods and bars of the readily available brass and bronze of desired compositions.

7. MANUFACTURING PROCESS:

Bronze Bushes are produced by machining from the rods and castings. The process involves cutting from rods to desired size and then machining on lathe. Grooves and other machining can also be done on lathe and milling machine.

For self-lubricating bush production bushes may be coated with FEP, PFA, PTFE (Teflon) and other metals like lead tin alloys that provide better wear properties. The coating process can be done by simple spray attachments and torch heating /curing processes on lathe. These coatings may be baked in small oven to get desired uniformity.

8. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 6 employees initially and increase to 13 or more depending on business volume.

Sr. No	Type of Employees	Monthly Salary	No of Employees				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Skilled Operators	15000	3	3	6	6	6
2	Semi-Skilled/ Helpers	7000	6	9	9	12	12
3	Supervisor/ Manager	20000	0	0	1	1	1
4	Accounts/ Marketing	15000	0	0	1	1	1
5	Other Staff	6000	0	0	0	0	0
	TOTAL		9	12	17	20	20

9. IMPLEMENTATION SCHEDULE:

The unit can be implemented within 6 months from the serious initiation of project work.

Sr. No	Activities	Time Required in Months
1	Acquisition of Premises	2
2	Construction (if Applicable)	2
3	Procurement and Installation of Plant and Machinery	2
4	Arrangement of Finance	2
5	Manpower Recruitment and start up	2
	Total Time Required (Some Activities run concurrently)	6

10. COST OF PROJECT:

The unit will require total project cost of Rs 77.90 lakhs as shown below:

Sr. No	Particulars	In Lakhs
1	Land	15.00
2	Building	25.00
3	Plant and Machinery	19.35
4	Fixtures and Electrical Installation	0.70
5	Other Assets/ Preliminary and Preoperative Expenses	0.25
6	Margin for working Capital	17.60
	TOTAL PROJECT COST	**77.90**

11. MEANS OF FINANCE:

The project will require promoter to invest about Rs 9.74 lakhs and seek bank loans of Rs 4.64 lakhs based on 70% loan on fixed assets.

Sr. No	Particulars	In Lakhs
1	Promoters Contribution	32.68
2	Loan Finance	45.23
	TOTAL :	**77.90**

12. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr. No	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	11.67	40	4.67	7.00
2	Receivables	13.60	50	6.80	6.80
3	Overheads	1.47	100	1.47	0.00
4	Creditors	11.67	40	4.67	7.00
	TOTAL	38.41		17.60	20.81

13. LIST OF MACHINERY REQUIRED:

The layout of unit suitable for different activities are planned to ensure smooth material and product flow.

Sr. No	Particulars	UOM	Quantity	Rate	Total Value
	Main Machines/ Equipment				
1	Oil Fired Melting Furnace complete with burners, blowers	Nos	1	800000	800000
2	Sand Mixer Sieves etc. for Molds	Nos	1	50000	50000
3	Mold Machine	Nos	2	80000	160000
4	Band saw machine	Nos	1	60000	60000
5	CNC Lathe Machine	Nos	1	250000	250000
6	Lathe Machine Medium duty	Nos	3	85000	255000
7	Drilling Machine	Nos	2	25000	50000
8	Slotting machine	Nos	2	20000	40000
9	Milling Machine	Nos	1	250000	250000
	subtotal :				1915000
	Tools and Ancillaries				
1	Bench and Belt Grinders	LS	1	10000	10000
2	Gauges and Tools		1	10000	10000
	subtotal :				20000
	Fixtures and Elect Installation				
	Storage racks	LS	1	5000	5000
	Other Furniture	LS	1	10000	10000
	Telephones/ Computer	LS	1	25000	25000
	Electrical Installation	LS	1	30000	30000
	subtotal :				70000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	25000	25000
	TOTAL PLANT MACHINERY COST				2030000

All the machines and equipment are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines and tooling to have modern and flexible designs. It may be worthwhile to look at reconditioned imported machines, dies and tooling. Some of the machinery and dies and tooling suppliers are listed here below:

1. Balaji Engineers

No. 122, Vishala Industrial Estate, Near Odhav Ring Road Chokdi Near Kathwada G. I. D. C., Odhav, Odhav Industrial Estate, Ahmedabad -382415, Gujarat, India

2. Eddy Melt

C 70, M. I. D. C., Hingna Industrial Estate, Nagpur - 440025
Maharashtra, India

3. Electrotherm India Ltd.,
Survey No. 72, Village Palodia, Taluka Kalol Via Thaltej
Ahmedabad- 382115, Gujarat, India

4. Micro Engineering Works;
No. 6/140, Gandhi Nagar, Nallampalayam Road Nanjai Gounden, Pudur, G. N. Mills Post, Coimbatore - 641029, Tamil Nadu, India

5. Gautam Industries
Plot No. 267, Near Upvan Lake, Upvan
Thane - 400606
Maharashtra, India

Other well-known machine manufacturers can be searched from directories/ internet. Some are listed here below:

- ACME TOOLINGS, D-67, Phase 1, IDA Jeedimetla, Hyderabad – 500055,
- Ace Manufacturing Systems Ltd.,
- Batliboi Ltd. Mumbai,
- Bharat Fritz Werner Ltd.,
- HMT Machine Tools Ltd.,
- Advani Oerlikon Ltd, Bombay,
- Lakshmi Machine Works Ltd.,
- Lokesh Machines Ltd.,

- Praga Tools Ltd.,
- Toolcraft Systems Pvt. Ltd.

13. PROFITABILITY CALCULATIONS:

Sr. No	Particulars	UOM	Year Wise estimates				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Capacity Utilization	%	40	50	60	70	80
2	Sales	Rs Lakhs	163.20	204.00	244.80	285.60	326.40
3	Raw Materials &Other Direct Inputs	Rs Lakhs	140.06	175.07	210.08	245.10	280.11
4	Gross Margin	Rs Lakhs	23.14	28.93	34.72	40.50	46.29
5	Overheads Except Interest	Rs Lakhs	11.26	11.26	11.26	11.26	11.26
6	Interest	Rs Lakhs	6.33	6.33	6.33	6.33	6.33
7	Depreciation	Rs Lakhs	5.44	5.44	5.44	5.44	5.44
8	Net Profit Before Tax	Rs Lakhs	0.12	5.90	11.69	17.47	23.26

The basis of profitability calculation:

The Unit will have capacity of 120 MT of bronze bushes and other products per year of assorted types/ designs. The sales prices bronze bushes of various types range from Rs 300 to 400 per Kg or more depending on type, metal composition, and volumes. The raw material cost of CI scrap is ranges from 250 to 350 per Kg depending on grades. The material requirements are considered with wastage/ scrap/burnouts etc of 4 % of finished products as most of generated scrap is reused. The unusable scrap is sold at @ Rs 80 to 200 per Kg. and the income of same is added. Energy Costs are considered at Rs 7 per Kwh and fuel cost is considered at Rs. 65 per liter. The depreciation of plant is taken at 10 % and Interest costs are taken at 14 -15 % depending on type of industry.

14. BREAK EVEN ANALYSIS

The project is can reach break-even capacity at 39.80 % of the installed capacity as depicted here below:

Sr No	Particulars	UOM	Value
1	Sales at Full Capacity	Rs Lakhs	408.00
2	Variable Costs	Rs Lakhs	350.14
3	Fixed Cost incl. Interest	Rs Lakhs	23.03
4	Break Even Capacity	% of Inst Capacity	39.80

16. STATUTORY/ GOVERNMENT APPROVALS

The unit will require state industry unit registration with District Industry center. No other procedures are involved. For export, IEC Code and local authority clearances. The industry registration and approval for factory plan, safety etc. are required as per factory inspectorate and labor laws. Other registration are as per Labor laws are ESI, PF etc. Before starting the unit will also need GST registration for procurement of materials as also for sale of goods. As such there is no pollution control registration requirement, however the unit will have to ensure safe environment through installation of chimney etc. as per rules. Solid waste disposal shall have to meet the required norms.

17. BACKWARD AND FORWARD INTEGRATION

The machines and equipment offer scope for diversification into producing other consumer and industrial parts/ components and parts for heavy machinery of construction, earth moving, mining marine applications etc. The unit can the spare capacities of furnace and machining capabilities. As such there is not much scope for organic backward or forward integration.

18. TRAINING CENTERS/COURSES

There are no specific training centers for production technology. However foundry technology can be obtained by joining as apprentice in foundry units. The Prototype Development Centers can provide some assistance and for foundry technology, casting, machining, dies and Tools development, courses run by centers of excellence viz Indo German Tool Room at Ahmedabad, Rajkot, Chennai, etc shall be helpful.

The most important scope of learning is in new product design and development by study of the new product designs, product range, features and specifications of leading Brands / competitors across the world by scanning the Internet and downloading data from websites of Viz. North American, Europe, China etc markets.

Udyamimitra portal (link: www.udyamimitra.in) can also be accessed for hand-holding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.
Entrepreneurship program helps to run business successfully is also available from Institutes like Entrepreneurship Development Institute of India (EDII) and its affiliates all over India.

Disclaimer:

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.

Source:- Udyami Mitra/Sidbi