

Manufacturing of S.G. Iron Castings

PRODUCT CODE	: 33115000
QUALITY AND STANDARDS	: 1. BIS 1865:1974 2. BIS 5789:1970 S.G. Iron Castings for low temperature applications 3. BIS 5788:1970 S.G. Iron Castings for use at elevated temperature applications.
PRODUCTION CAPACITY	: Quantity : 300 MT (per annum) Value : Rs. 85,50,000
MONTH AND YEAR OF PREPARATION	: September, 2002
PREPARED BY	: Branch Small Industries Service Institute Industrial Estate, Jammu-180 010.

INTRODUCTION

The present project profile envisages the production of S.G. Iron Castings of various shapes and sizes having weight between 50 gm. to 12 kg. in Medium frequency induction furnace. S.G. Iron Castings are extensively used because of their high strength, ductility, shock as well as wear resistance properties and easy machinability.

MARKET POTENTIAL

S.G. Iron possesses greater tensile strength, machinability than ordinary cast iron and also has a considerable measure of ductility, resistance to impact comparable to that of steel and low cost involved that justifies it as the metal of future. Due to economic reforms based upon principle of liberalization, globalization, privatization and changes at international economy including the emergence of WTO global and domestic

challenges, the demand for components of S.G. Iron particularly in automobile sector is likely to increase manifold not only for domestic consumption but also for export purpose. Since small-scale sector accounts for 40% of gross value of output in the manufacturing sector and 35% of total exports from the country, this industry has great scope.

BASIS AND PRESUMPTIONS

1. All machinery and equipments are indigenously available.
2. Prices of machinery and equipment as included in the profile are of particular make and will change with the make and model of actual machine procured.
3. Prices of Raw Material, and others are those ruling at the time of preparation of this project profile.
4. Break-even Point has been calculated on full capacity utilization basis.

5. 5% irrecoverable melting loss has been considered. Rejection of runners and risers will be recycled.
6. Pay back period of 3 years had been considered after 1½ years of moratorium period.
7. The scheme is based on single shift of 8 hours at 75% efficiency assuming 300 working days in a year.
8. It is presumed that capacity utilization will be 60% in the 1st year, 70% in the second year and 80% in the subsequent years.
9. The rate taken in respect of salaries and wages for skilled workers and others are the prevailing rates in the State.
10. The interest rate for fixed and working capital has been assumed @18% on an average whether financed by Bankers or by Financial Institutions.
11. Margin money required is minimum 30% of the projected investment.
12. The rental value of the work shed and other built up/covered area has been taken on the basis of that prevailing in the area.

IMPLEMENTATION SCHEDULE

Sl.No.	Activity	Period (in Weeks)
i.	Selection of Site	01-02 weeks
ii.	Preparation of Project Report	06-08 weeks
iii.	Provisional Registration	00-01 week
iv.	Financial Arrangements	12-16 weeks
v.	Procurement of Machinery	12-16 weeks
vi.	Installation and Electrification	08-12 weeks

The above-mentioned schedule may be considered as guideline only. It can best be implemented in a period of 12

to 15 months by performing some common activities simultaneously with proper and systematic planning.

TECHNICAL ASPECTS

Process of Manufacture

S.G Iron is a high carbon ferrous material with graphite in the spheroidal form achieved with a small amount of magnesium and therefore the name derived. To make S.G. Iron, mild steel scrap, Fe-Si, Coke etc. is melted in induction furnace. Once the melt is ready, it is inoculated with small addition of Magnesium or Chromium available in Ferro blends. The metal is then poured into moulds, cooled and fettled. The total carbon remains as spheroid in as-cast condition but if required, it may further be annealed to achieve the desired properties.

Quality Control and Standards

- a. As per BIS: 1865-1974.
- b. BIS: 5789-1970 S.G. Iron Castings for low temperature applications.
- c. BIS: 5788-1970 S.G. Iron Castings for elevated temperature applications.

Production Capacity

300 MT per annum.

Motive Power

350 KW.

Pollution Control

Foundry industry produces heat, gases, dust, noise and a large quantity of wastes such as irreclaimable sands, ashes and slags. These individual elements have considerable effect on environmental degradation and cause conditions unsuitable for human health.

So it requires getting NOC from the State Pollution Control Board.

In order to minimize the level of above pollution, the Government provides information on related acts from time to time. The pollution can also be reduced by installing number of low cost-equipments meant for foundry.

Energy Conservation

It can effectively be achieved by :

- (a) Energy audit
- (b) Better combustion system
- (c) Use of lubricant and proper maintenance of the machines.

FINANCIAL ASPECTS

A. Fixed Capital

(i) Land and Building		(Rs.)
i. Land 1500 sq. mtrs. @ Rs. 100/ Sq. mtr.	1,50,000	
ii. Building		
Office / Laboratory 300 sq. mtr. @ Rs. 400/ sq. mtr.	1,20,000	
Factory shop floor 1000 sq. mtrs. @ Rs. 250/ sq. mtr.	2,50,000	
Total	5,20,000	

(ii) Machinery and Equipment

Sl. No.	Description	Quantity (No.)	Amount (In Rs.)
1.	200 KG medium frequency Induction melting Furnace with interchangeable crucibles, with Input voltage adjust transformer and solid state Inverter power pack output 325-375 KW and two way change over switch with hydraulic power pack arrangement for lifting of crucible	1	9,00,000
2.	One overhead tank, one underground Water tank pipelines with cooling towers	1	1,00,000
3.	Water Softening Plant	1	50,000

4.	Plate Type Heat Exchanger	01	50,000
5.	Immersion Pyrometer	1	25,000
6.	Air Compressor (7.5 HP)	1	75,000
7.	EOT Crane (1.5 Ton Capacity)	1	50,000
8.	Grinders (flexible shaft)	2	1,00,000
9.	Grinders (swing frame type)	2	1,00,000
10.	Platform Weighing Scale	1	50,000
11.	Transformer, cables and cost of Power connection	1	1,00,000
12.	D.G. set (60 KVA)	1	25,000
13.	Hand operated Moulding machine with squeezing arm, plunger and pressure plate	1	50,000
14.	Sand Mixer, 250 kg batch with 7.5 HP motor and accessories	1	50,000
15.	Heat Treatment Furnace (2.5 mtr.×1.5 mtr.×1.5 mtr.)	1	50,000
16.	Core and mould drying oven, Oil fired provided with Blower, Burner etc.	1	50,000
17.	Fettling and Cutting Tools (Mechanised)	LS	25,000
18.	Chemical laboratory equipment for routine testing (UTM, C-S apparatus, Ultrasonic Magnetic Detector etc.)	LS	1,50,000
19.	Sieving Machine with sieves and 15 HP motor	1	40,000
20.	Material Handling Equipment	LS	10,000
	Total		20,50,000
21.	Electrification and installation charge @ 10% of the cost of machinery and equipment		2,05,000
22.	Cost of Moulds and Foundry Tools	LS	50,000
23.	Patterns	LS	25,000
24.	Cost of Office Equipment	LS	1,50,000
25.	Pre-operative Expenses	LS	25,000
	Grand Total		25,05,000

B. Working Capital (per month)**(i) Personnel**

Sl. No.	Designation	Qty. No.	Salary (In Rs.)	Amount (In Rs.)
1.	Metallurgist	01	7,000	7,000
2.	Melter	01	3,500	3,500
3.	Foreman	01	3,500	3,500
4.	Chemist	01	3,000	3,000
5.	Clerk/Typist	01	2,500	2,500
6.	Store-Keeper	01	2,000	2,000
7.	Furnace Operator	02	3,500	7,000
8.	Skilled Workers	04	3,500	14,000
9.	Unskilled Workers	02	1,500	3,000
10.	Peon	01	1,500	1,500
11.	Chowkidar	01	1,000	1,000
			Total	48,000
			<i>Perquisites @ 15%</i>	7,200
			G. Total	55,200
			Say	55,000

(ii) Raw Materials (Indigenous) (Rs.)

1.	Mild Steel scrap 20 MT @ Rate Rs. 10,000 per MT		2,00,000	
2.	Ferro Alloys (Fe-Si, Fe-Mg etc.) 0.5MT @ Rs. 40,000 per MT		20,000	
4.	Refractory such as hot top and crucible linings and Ramming Mass (Mgo) etc.	LS	10,000	
5.	Moulding sand, binder and other materials	LS	5,000	
6.	Packaging materials	LS	2,000	
			Total	2,37,000

(iii) Utilities (Rs.)

1.	Power 50,000 Unit @ Rs. 2.5 per unit	1,25,000	
2.	Water Charges (Lump sum)	5,000	
3.	Furnace Oil (1000 litres @ Rs. 10/Litre)	10,000	
4.	Diesel (1000 litres @ Rs. 15/Litre)	15,000	
		Total	1,55,000

(iv) Other Contingent Expenses (Rs.)

1.	Postage	1,000	
2.	Telephone	5,000	
3.	Consumable stores like chemicals, oil for hydraulic power pack grinding wheel etc.	5,000	
4.	Repair and maintenance	2,500	
5.	Advertisement and publicity	2,500	
6.	Insurance	2,000	
7.	Miscellaneous	2,000	
		Total	20,000

(v) Total Recurring Expenses (Rs.)

Salary and Wages	55,000
Raw Materials	2,37,000
Utilities	1,55,000
Other Contingent Expenses	20,000
Total	4,67,000

(vi) Total Working Capital (for 3 months)

$$4,67,000 \times 3 = \text{Rs. } 14,01,000$$

C. Total Capital Investment

(i) Land and Building	Rs. 5,20,000
(ii) Machinery and Equipment	Rs. 25,05,000
(iii) Working Capital (for 3 months)	Rs. 14,01,000
Total	Rs. 44,26,000

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

a.	Total recurring expenditure	56,04,000
b.	Depreciation on Building @ 5 %	18,500
c.	Depreciation on machinery and equipment @ 10%	1,05,000
d.	Depreciation on Furnaces @ 30 %	3,00,000
e.	Depreciation on Moulds and Tools, Patterns @ 30 %	22,500
f.	Depreciation on office equipment @ 20%	30,000
g.	Interest on total investment @ 18%	7,96,680
Total		68,76,680

(2) Total Sales (per annum)

by sale of S.G. Iron Castings 300 MT= **Rs.85,50,000**
 @ Rs. 28,500 per MT

(3) Profitability (per annum)

Annual Sales – Cost of Production = Net Profit
 (Before Tax)
 Rs. 85,50,000 – 68,76,680= **Rs.16,73,320**

(4) Net Profit Ratio

$$\frac{\text{Net Profit} \times 100}{\text{Turnover per year}} = \frac{16,73,320 \times 100}{85,50,000}$$

= **19.57%**

(5) Rate of Return

$$\frac{\text{Net Profit} \times 100}{\text{Total Investment}} = \frac{16,73,320 \times 100}{44,26,000}$$

= **37.80%**

(6) Break-even Point

Fixed Cost (per annum)	(Rs.)
i. Total Depreciation	4,76,000
ii. Interest on total investment @ 18%	7,96,680
iii. Insurance	24,000
iv. 40 % of salary and wages	2,64,000
v. 40 % of Contingent and utility expenses (Excluding Insurance)	8,30,200
Total	23,90,880

B.E.P.

$$= \frac{\text{Fixed Cost} \times 100}{\text{Fixed Cost} + \text{Profit}}$$

$$= \frac{23,90,880 \times 100}{23,90,880 + 16,73,320}$$

= **58.82%**

Addresses of Machinery Suppliers

1. M/s. Inductotherm (India) Ltd.
Ahmedabad.
2. M/s. Electrotherm (India) Ltd.
Ahmedabad.
3. M/s. Batliboi and Co.
Mumbai.

Addresses of Raw Material Suppliers

Locally available.

Ferro-Alloys and Other Consumable Stores

Locally available.