

Manufacturing of S.G. Iron Castings

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. 2,10,50,000
MONTH AND YEAR OF PREPARATION	: September, 2002
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UPDATED ON	: March 2011
UPDATED BY	: MSME-DI, Thrissur.

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 maybe 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.(as cast) 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. 300/ Sq. mtr.	4,50,000
ii.	Building	
	Office / Laboratory 300 sq. mtr. @ Rs.1200/ sq. mtr.	3,60,000
	Factory shop floor 1000 sq. mtrs. @ Rs. 750/ sq. mtr.	7,50,000
	Total	15,60,000

(ii) Machinery and Equipment

Sl. No.	Description	Quantity (No.)	Amount (Rs.)
1.	200 KG medium frequency Induction 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	25,00,000
2.	One overhead tank, one underground Water tank pipelines with cooling towers	1	3,00,000
3.	Water Softening Plant	1	1,50,000
4.	Plate Type Heat Exchanger	1	1,50,000
5.	Immersion Pyrometer	1	40,000
6.	Air Compressor (7.5 HP)	1	1,50,000
7.	EOT Crane (1.5 Ton Capacity)	1	2,00,000
8.	Grinders (flexible shaft)	2	1,50,000
9.	Grinders (swing frame type)	2	1,50,000
10.	Platform Weighing Scale	1	1,00,000
11.	Transformer, cables and cost of Power connection	1	5,00,000
12.	D.G. set (60 KVA)	1	1,00,000
13.	Hand operated Moulding machine with squeezing arm, plunger and pressure plate	1	1,00,000
14.	Sand Mixer, 250 kg batch with 7.5 HP motor and accessories	1	1,00,000
15.	Heat Treatment Furnace (2.5 mtr.×1.5 mtr.×1.5 mtr.)	1	1,50,000
16.	Core and mould drying oven, Oil fired provided with Blower, Burner etc.	1	75,000
17.	Fettling and Cutting Tools (Mechanised)	LS	50,000
18.	Chemical laboratory equipment for routine testing [UTM, C-S apparatus, Ultrasonic Magnetic Detector etc.]	LS	4,50,000
19.	Sieving Machine with sieves and 15 HP motor	1	60,000
20.	Material Handling Equipment	LS	20,000
Total			54,95,000
21.	Electrification and installation charge @ 10% of the cost of machinery and equipment		5,49,500
22.	Cost of Moulds and Foundry Tools	LS	1,00,000
23.	Patterns	LS	50,000
24.	Cost of Office Equipment	LS	2,50,000
25.	Pre-operative Expenses	LS	75,000

Grand Total 65,69,500

B. Working Capital (per month)

(i) Personnel

Sl. No	Designation	Qty. No.	Salary (In Rs.)	Amount (In Rs.)
1.	Metallurgist	01	20,000	20,000
2.	Melter	01	10,000	10,000
3.	Foreman	01	10,000	10,000
4.	Chemist	01	8,000	8,000
5.	Clerk/Typist	01	7,000	7,000
6.	Store-Keeper	01	6,000	6,000
7.	Furnace Operator	01	10,000	10,000
8.	Skilled Workers	04	8,000	32,000
9.	Unskilled Workers	02	5,000	10,000
10.	Peon	01	4,500	4,500
11.	Chowkidar	01	4,000	4,000

Total 1,21,000

Perquisites @ 15% 18,150

G. Total 1,39,150

Say 140,000

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

1.	Mild Steel scrap 5 MT @ Rate Rs. 23,000 per MT		1,15,000
2.	Pig Iron 15 MT @ Rate Rs. 34000 per MT		5,10,000
2.	Ferro Alloys [Fe-Si, Fe-Mg etc.] 0.5MT @ Rs.80,000 per MT		40,000
4.	Refractory such as hot top and crucible linings and Ramming Mass (Mgo) etc.	LS	25,000
5.	Moulding sand, binder and other materials	LS	15,000
6.	Packaging materials	LS	5,000
Total			7,10,000

(iii) Utilities (Rs.)

1.	Power 25,000 Unit @ Rs. 6.5 per unit,	1,62,500
2.	Water Charges (Lump sum)	10,000
3.	Furnace Oil [1000 litres @ Rs. 30/Litre]	30,000
4.	Diesel [500 litres @ Rs. 40/Litre]	20,000
Total		2,22,500

(iv) Other Contingent Expenses (Rs.)

1. Postage	2,000
2. Telephone	10,000
3. Consumable stores like chemicals, oil for hydraulic power pack grinding wheel etc.	15,000
4. Repair and maintenance	7,000
5. Advertisement and publicity	15,000
6. Insurance	10,000
7. Miscellaneous	10,000
Total	69,000

(v) Total Recurring Expenses (Rs.)

Salary and Wages	140,000
Raw Materials	7,10,000
Utilities	2,22,500
Other Contingent Expenses	69,000
Total	11,41,500

(vi) Total Working Capital (for 3 months)

11,41,500 × 3 = **Rs. 34,24,500**

C. Total Capital Investment

(i) Land and Building	Rs.15,60,000
(ii) Machinery and Equipment	Rs. 65,69,500
(iii) Working Capital (for 3 months)	Rs. 34,24,500
Total	Rs. 1,15,54,000

FINANCIAL ANALYSIS

1. Cost of Production (per annum) (Rs.)

a. Total recurring expenditure	1,36,98,000
b. Depreciation on Building @ 5 %	585,900
c. Depreciation on machinery and equipment @ 10%	2,77,000
d. Depreciation on Furnaces @ 30 %	8,17,500
e. Depreciation on Moulds and Tools, Patterns @ 30 %	45,000
f. Depreciation on office equipment @ 20%	50,000
g. Interest on total investment @ 18%	19,90,620
Total	1,74,63,520

(2) Total Sales (per annum)

by sale of S.G. Iron Castings 300 MT @ Rs. 70,000 per MT **Rs.2,10,50,000**

(3) Profitability (per annum)

Annual Sales – Cost of Production = Net Profit [Before Tax]

Rs.2,10,50,000 – Rs. 1,74,63,520 = **Rs.35,86,480**

(4) Net Profit Ratio

$$\frac{\text{Net Profit} \times 100}{\text{Turnover per year}} = \frac{35,86,480 \times 100}{2,10,50,000} = \mathbf{17.03\%}$$

(5) Rate of Return

$$\frac{\text{Net Profit} \times 100}{\text{Total Investment}} = \frac{35,86,480 \times 100}{1,15,54,000} = \mathbf{31.04\%}$$

(6) Break-even Point

Fixed Cost (per annum) (Rs.)

- i. Total Depreciation 17,74,000
- ii. Interest on total investment @ 18% 19,90,620
- iii. Insurance 120,000
- iv. 40 % of salary and wages 6,72,000
- v. 40 % of Contingent and utility 13,51,200
- expenses (Excluding Insurance)

Total 57,87,820

B.E.P.

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

$$= \frac{57,87,820 \times 100}{57,87,820 + 35,86,480}$$

$$= \mathbf{61.74\%}$$

Addresses of Machinery Suppliers

1. M/s. Inductotherm (India) Ltd.
Shri Kishorebhai D. Vyas Building,
Bopal, Ahmedabad 380 058
Gujarat, India Phone : 91-2717-231961 (8 lines)
Fax: 91-2717-231266
E-mail : iil@inductothermindia.com
Web-Site : www.inductothermindia.com

Ahmedabad.

2. M/s. Electrotherm (India) Ltd.
Survey No. 72,
Village : Palodia, Taluka : Kalol,
Dist. : Gandhinagar - 382 115
Gujarat, India.

Phone : +91-2717-234554, 660550

Fax : +91-2717-237612, 234616

Email : ho@electrotherm.com

3. M/s. Batliboi and Co.
Bharat House, 5th Floor,
104, Bombay Samachar Marg,
Fort, Mumbai - 400 001
Phone: +91 (22) 6637 8200
Fax: +91 (22) 2267 5601
Email : info@batlibol.com
Website : www.batliboi.com

Addresses of Raw Material Suppliers

Locally available.

Ferro-Alloys and Other Consumable
Stores

Locally available.

