

UPDATED PROJECT PROFILE ON
ALUMINIUM CASTINGS

QUALITY AND STANDARDS : As per IS Standard

PRODUCTION CAPACITY : 120 MT per year

**MONTH AND YEAR OF
PREPARATION** : March, 2011

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ALUMINIUM CASTINGS

I. Product and Its Uses:

Aluminium plays a major role in the modern world through its innumerable applications, because of its intrinsic and versatile properties of lightness, strength to weight ratio, corrosion resistance, electrical and thermal conductivity, non-toxicity etc. In the form of castings, either as cast or heat treated, aluminium is gradually replacing Gunmetal, bronze, stainless steel and many grey iron and malleable iron castings. The typical products and fields of use are mentioned below.

Engine components like automobile and diesel pistons, automotive timing gear, gear boxes, crank cases, clutch housing, pump bodies, bracket, arms and hangers for different industries, components, fittings for chemical and marine uses, railways, storage tanks, flywheel housing and propellers, artificial limbs, ornamental hardwares, ashtrays, water jugs, art metal work, moulding flasks, core drying plates and pattern castings, rotor of ceiling fans and many other components in different fields are made of Al-castings.

II. Market Potential:

It is difficult to assess the exact market for each and every item of Aluminium castings mentioned. However, there is a good demand for the following items in the country:-

1. Moulding flasks
2. Core drying plates
3. Pattern castings.

These items are very much required by the ferrous and non-ferrous foundries whose number is increasing day by day. Similarly, the rotor of ceiling fans, which is normally made of grey iron, is now gradually being replaced by Aluminium rotor. Besides, there are many components and fittings made out of Aluminium castings which are very much needed by chemical, marine industries, railways, breweries, electrical industries, pump manufacturers etc. In view of the above the market potential for Aluminium castings is good and also expected to be bright in near future.

III. Production Targets (Per Annum):

Production targets is fixed at 120 tones of finished sand mould and permanent mould and permanent mould (gravity die casting) castings of different Aluminium alloys corresponding mostly to LM-5, LM-6, LM-24 etc. per annum.

IV. Basis and Presumption:

The production target fixed is on the basis of single shift of 8 hours and 300 working days in a year. In this scheme, only sand mould castings and gravity die

casting methods (permanent mould casting methods) are included. The pressure die casting method is excluded since this is covered under reserved item. The process is economical only if the items are mass produced in thousands per day. In the initial phase, the production will be restricted to only such items like- Aluminium patterns, moulding flasks, various components and fittings for chemical; marine and electrical industries, railways, pump housing and rotor of ceiling fans for which there is a good demand. In the 2nd phase, the production of more sophisticated items like automobile and diesel pistons, gear box, crank cases, flywheel housing and propeller etc. will be taken up.

V. Implementation Schedule:

Project implementation will take a period of 8 months the date of approval of the project. Break-up of activities with time-period for each activity is shown below:

Sr. No.	Nature of activities	Time period in months (Estimated)
1.	Scheme preparation and approval	0-1
2.	SSI Provisional registration	1-2
3.	Sanction of loan	2-5
4.	Clearance from Pollution Control Board	3-4
5.	Placement of order for delivery of machinery	4-5
6.	Installation of machines	6-7
7.	Power connection	6-7
8.	Trial run	7-8
9.	Commencement of production	9 months

VI. Technical Aspects:

a. Production Details & Process of manufacturing:

1. The Aluminium alloy ingots along with other additions are melted in oil fired crucible furnace.
2. The molten metal at specified temperature is transferred by crucibles/ladles into the prepared sand mould or permanent mould.
3. The casting are taken out from the moulds when cold and fettled.
4. The fettled castings are inspected and sent for dispatch.
5. The fettlings and rejected castings constitute the foundry returns (generated scrap) and are returned to melting furnace for re-use.

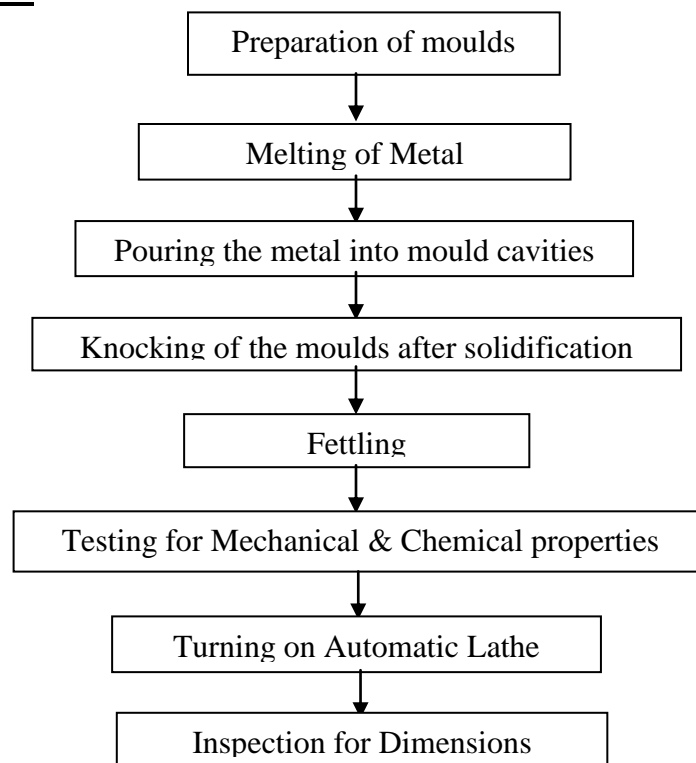
b. Quality Control and Standards:

In the present scheme, ingots of required specification are selected as raw material. Accordingly, composition adjustment is normally not

necessary. But in using the scrap, composition adjustment will be necessary since during each melting the loss of alloying elements or the base metal Aluminium has to be compensated by suitable addition of Virgin Aluminium or master alloys. The correct amount of addition can be arrived at only if the bath composition is ascertained by chemical analysis which may take some time. However, control of composition is important and is to be resorted to particularly when the customer's specification is quite rigid. Melting of Aluminium and its alloys must be controlled as per the norms for a sound casting to be produced. Similarly, quality control of moulding sand with respect to sand grain size, moisture, permeability and green compression strength is equally important. A proper surface either in the sand mould or in the permanent mould for gravity die casting must be ensured for soundness and good surface finish of the casting.

Casting alloys selected are those conforming to B.S. 1490, LM-5, LM-6, and LM-24 since these do not require any heat treatment and can be disposed of as cast condition duly fettled.

VII. Process Flow Chart:



VIII. Production Capacity:

Quantity	:	120 MT/Annum
Value	:	Rs. 3,30,60,000/-

IX. Motive Power Requirement : 5 HP

X. Pollution Control Measures:

While heating provision for smoke emitting equipment be made with chimney to pass through flue gases.

XI. Energy Conservation:

Energy audit is an essential part for energy conservation. The following factors should be taken care of with regard to fuel economy in industrial furnace.

- a. Proper heat distribution, complete combustion with minimum excess air.
- b. Operating at the desired temperature
- c. Reducing heat losses from openings, Waste heat recovery from fuel gases
- d. Control of chimney draught.

XII. Financial Aspects:

a. Land and Building

Built up shed – 50' x 50' – Rented

Rs. 10,000/-

b. Machinery and Equipment:

Sr. No.	Particulars	Nos.	Rs.
1.	Oil fired melting furnaces – lifting crucible type (150 Kgs. Cap.) overhead tank with common 3 HP motorized blower, pipeline, preheated and two burners separately connected to each of the furnace (self constructed)	02	50,000/-
2.	Sand mixer (100 Kgs./batch)	01	20,000/-
3.	Hand operated pin lift moulding machine fitted with column squeezing arm, plunger and pressure plate	01	15,000/-
4.	Vibrating sand sieving machine		15,000/-
5.	Immersion type Pyrometer with indicator (Temp.) range 20-900 deg. C.	01	6,000/-
6.	Patterns	L.S.	8,000/-
7.	Gravity die casting dies	L.S.	50,000/-
8.	Metal transferring crucibles (silicon carbide)	10	18,000/-

	cap. 15 Kgs. To 50 Kgs.		
9.	Foundry tools	L.S.	8,000/-
10.	Platform weighing m/c. 200 Kgs. – cap.	01	10,000/-
11.	Material handling equipments-hand trolleys etc.		10,000/-
12.	Moulding boxes	L.S.	15,000/-
13.	Foundry sand testing equipments e.g. sand rammer, green compression strength equipment, permeability tester, speedy moisture tester.		25,000/-
14.	Chemical testing equipments and accessories		50,000/-
15.	Arc welding machine with accessories 300 Amps. – 3 Phase.		15,000/-
16.	Bench drilling machine ¾” cap.	01	10,000/-
17.	General purpose lathe m/c. 5’ bed length	01	70,000/-
18.	Double ended bench grinder 8” wheel with 2 wheels		10,000/-
19.	Measuring tools	L.S.	8,000/-
20.	Office furniture		50,000/-
21.	Cutting and fettling tools	L.S.	10,000/-
	Total:		4,73,000/-
	Erection and commissioning @ 10% of the cost of machinery and equipment		47,300/-
	Total:		5,20,300/-

c. Staff and Labour (Per Month):
Indirect Labour

Sr. No.	Particulars	Nos.	Amount (Rs.)
1.	Manager (Technical)	01	8,000/-
2.	Supervisors (Technical)	02	12,000/-
3.	Store-keeper	01	5,000/-
4.	Clerk-cum-Typist	01	5,000/-
5.	Peon	01	3,000/-
6.	Watchman	01	2,000/-
	Total:		35,000/-

Direct Labour

Sr. No.	Particulars	Nos.	Amount (Rs.)
1.	Skilled workers	04	12,000/-

2.	Semi-skilled workers	04	12,000/-
3.	Helpers	08	16,000/-
	Total:		38,000/-
	Insurance and PF at the rate of 15%		5,700/-
	Total:		43,700/-

d. Raw Materials (Per Month):

Sr. No.	Particulars	Amount (Rs.)
1.	12 tones of commercial aluminium and Aluminium alloy in-gots conforming to LM-6, LM-5, LM-24 specifaions, at an average rate of Rs. 1,80,000/- tonnes	21,60,000/-
2.	Various master alloys and addition Qty. and rate	10,000/-
	Total:	21,70,000/-

e. Utilities (Per Month):

Sr. No.	Particulars	Amount (Rs.)
1.	Power, light and water	10,000/-
2.	Furnace oil-2000 litres @ Rs. 35/- litres	70,000/-
	Total:	80,000/-

f. Other Expenses (Per Month):

Sr. No.	Particulars	Amount
1.	Repairs and renewals	80,000/-
2.	Postage and stationery	5,000/-
3.	Advertisement	8,000/-
4.	Travelling and conveyance	10,000/-
5.	Packing and transport	10,000/-
6.	Rent	10,000/-
7.	Insurance	7,000/-
	Total:	1,30,000/-
8.	Consumables: 1. Foundry sand, bentonite, die coats, degreaser, refractories etc. 2. Chemicals for chemical testing lab.	10,000/- 10,000/-
9.	Miscellaneous	5,000/-
	Total:	25,000/-

XIII. Working Capital (Per Month):

Sr. No.	Particulars	Amount
1.	Raw materials	21,70,000/-
2.	Staff & Labour	78,700/-
3.	Utilities	80,000/-
4.	Other expenses	1,55,000/-
	Total:	24,83,700/-

XIV. Total Capital Investment:

Sr. No.	Particulars	Amount
1.	Machinery and equipment	5,20,300/-
2.	Working capital for three months	74,51,100/-
	Total:	79,71,400/-

XV. Cost of Production (Per Annum):

Sr. No.	Particulars	Amount
1.	Working capital	2,98,04,400/-
2.	Interest on total investment @ 12.5%	9,96,425/-
3.	Depreciation on Machinery @ 10%	46,030/-
4.	Depreciation on furnace @ 20%	10,000/-
5.	Depreciation on furniture @ 20%	2,000/-
	Total:	3,08,58,855/-
	Minus the generated scrap to the extent of 23 tones at the rate of Rs. 8000 MT	1,84,000/-
	Total:	3,06,74,855/-

XVI. Total Sales (Per Annum):

120 tones of finished sand mould and gravity die castings of different Aluminium alloys at an average rate of Rs. 2,75,000/- **3,30,00,000/-**

XVII. Net Profit Per Year:

= Turnover per year - Cost of Production per year

$$= 3,30,00,000/- - 3,06,74,855/-$$

$$= 23,25,145/-$$

XVIII. Net Profit Ratio:

$$= \frac{\text{Net Profit per year} \times 100}{\text{Turnover per year}}$$

$$= \frac{23,25,145/-}{3,30,00,000/-} \times 100 = 7.0\%$$

XIX. Rate of Return:

$$= \frac{\text{Net Profit per year} \times 100}{\text{Total Investment}}$$

$$= \frac{23,25,145/-}{79,71,400/-} \times 100 = 29.16\%$$

XX. B.E.P.:

(i) Fixed Cost (FC):

1.	Rent	1,20,000/-
2.	Depreciation on machinery	46,030/-
3.	Depreciation on furnace	10,000/-
4.	Deprecation on Office equipments	2,000/-
5.	Interest on total investment	9,96,425/-
6.	Insurance	68,400/-
7.	40% Salary & Wages	31,480/-
8.	40% Contingent expense	62,000/-

Total: **13,36,585/-**

(ii) **Net Profit per year:** **23,25,145/-**

$$\begin{aligned}
 &= \frac{\text{Fixed cost} \times 100}{\text{Fixed cost} + \text{Profit}} \\
 &= \frac{13,36,335/- \times 100}{13,36,335/- + 23,25,145/-} \\
 &= \mathbf{36.49\%}
 \end{aligned}$$

XXI. Names and Addresses of Machinery and Equipment Suppliers:

1. M/s. Wesman Engg. Co. Private Limited, A1-Lenby Road, Calcutta-20.
2. M/s. Design Engg. Co., 633, Old Laxmi Mill Compound, Wadala, Mumbai – 31.
3. M/s. Leading Engineering Works, 31, Rohtak Road, New Delhi.
4. M/s. Machine Tool Traders, 25, Ganesh Ch. Avenue, Calcutta-10.
5. M/s. Bedi Brothers, 7-1-101, Ameerpet, Hyderabad – 16.

XXII. Names and Addresses of Raw Materials, Components Spares Suppliers:

1. M/s. Rashtriya Metal Industries Limited, Kurla, Andheri Road, Mumbai.
2. M/s. Madras Aluminium Co. Limited, Mettur Dam-636 402, Salem
3. M/s. Achoe Foundry Flux & Co., Hadapsar, Poona – 13.
4. M/s. Greaves Foseco Ltd., Jolly Bhawan, 2, New Marine Lines, Mumbai –
