

Aluminium Powder

PRODUCT CODE	: 33590300
QUALITY AND STANDARDS	: IS 438:1972
MONTH AND YEAR OF PREPARATION	: July, 2002
PREPARED BY	: Small Industries Service Institute Kurla, Andheri Road, Saki Naka, Mumbai-400 072

INTRODUCTION

Aluminium powder is a fine granular powder made from Aluminium. In form of powders, Aluminium is used for several applications such as manufacture of slurry, explosive and detonators, thermit process used for manufacture of ferro alloys and for specialised welding applications such as rails, pyrotechnic to manufacture crackers, sparkles and other pyrotechnic products; manufacture of aluminium paste, paints and several powder components used in automobiles. The most important property of aluminium powder to undergo a vigorous exothermic reaction when it gets oxidised finds application in pyrotechnic process. In foundry, aluminium powder is used as a deoxidant and exothermic tapping compounds to increase the yield of casting.

MARKET POTENTIAL

The aluminium powder is a consumable product. Presently there are four major organised manufacturers of aluminium powder. They are Metal Powder Company, Thirumangalam,

INDAL, Mumbai, Khosla Metal Powder Company, Pune and Arasan Aluminium Industries, Sivakasi. In addition, there are a number of small scale industries located in Karnataka, M.P., Maharashtra, Gujarat and Delhi with an installed capacity of 1 tonne per day. In a recent report of DSIR, the total production of aluminium powder in the country has been estimated at more than 10,000 MT per year. DGTD has estimated the growth of demand between 8 to 10% per annum. In conclusion, it can be said that production of aluminium powders of various grades and products such as aluminium paste is well established in the country. The aluminium powder industry is of a remarkable size. There is a growing market for export of aluminium powder and paste. Good opportunities exist in the field of setting up new units in small scale sectors with proven technology and appropriate quality orientation.

BASIS AND PRESUMPTIONS

1. The production target has been assessed on the basis of 300 working days in a year on two shift basis, since it is a continuous

process and the raw material is available indigenously. The melting losses have been considered as 3.5%.

2. The capacity utilisation in the first year of manufacturing would be around 60% to 70% and full capacity utilisation would be attained gradually in a phased manner.
3. The wages are based on local market.
4. The interest rate for working and fixed capital would be around 18% per annum.
5. The margin money requirements for obtaining financial assistance would be around 30% of the fixed capital.

IMPLEMENTATION SCHEDULE

The project can be implemented in a period of 18 to 24 months by performing the various activities in a systematic manner and simultaneous application of various common activities.

TECHNICAL ASPECTS

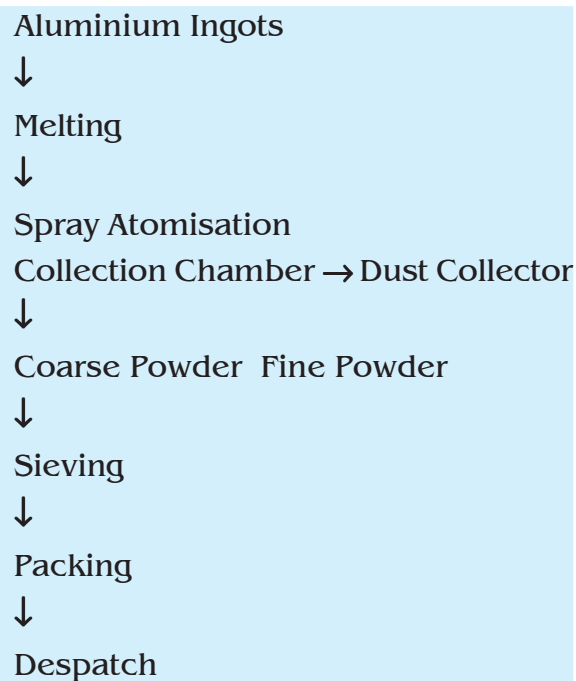
Process of Manufacture

The aluminium powder is manufactured in several forms such as flake-like particles, granular powder (atomised aluminium) etc. For the production of aluminium powder, there are several processes, one can use any of them.

The metal is melted in furnaces and the temperature maintained is around 720° to 760°C. Atomised Aluminium is produced by blasting the stream of molten Aluminium into small particles by air jet. For this purpose, an atomiser is used which consists of a straight tube with lower end dipped in molten metal and upper end terminating as a small

orifice. A jet of hot air under pressure is passed through armular opening near the top which impinges on a stream of molten Aluminium drawn by suction through the orifice. This leads to the formation of small particles of Aluminium. These particles are drawn by suction, through a collecting duct placed above the nozzle and finally into a cyclone collecting system. The particle size can be controlled to some extent by varying nozzle opening air pressure etc. The different sizes of Aluminium powders are segregated by sieving. Then packing is done as per market requirement for specific quantity.

The Process Flow Chart is as under:



Quality Control and Standards

The powder produced will meet standard specifications for air atomised powder and by using proper control equipment consistent quality of the product can be fully ensured with minimum losses. The quality control standards as per IS-438-1972 are to be followed.

Pollution Control

This item is not exempted by the Pollution Control Board. Therefore, a clearance certificate is required from the Pollution Control Board as per their requirements. Necessary pollution control measures are to be incorporated in the control profile.

Energy Conservation

The requirement of energy is given under the head "Utility". As manufacture of this product requires furnace oil, the need for energy conservation is important. In furnace, for supply of furnace oil, efforts are to be made for maximum utilisation of energy with respect to the maximum capacity of furnace and the burners are to be used of standard quality.

FINANCIAL ASPECTS

A. Fixed Capital

(i) Land and Building		(Rs.)
Land-5000 sq. ft. @ Rs. 20 per sq. ft.		1,00,000
Built-up Area		
Office and Shed-4000 sq. ft. @ Rs. 150 per sq. ft.		6,00,000
Boundary Wall, Gate, etc.		45,000
Total		7,45,000

(ii) Machinery and Equipment

Description		(Rs.)
1) Oil Fired Furnace-250 kg.	1 No.	1,00,000
2) Oil Tank (2000 ltrs Cap.)	1 No.	5,000
3) Ball Mill, Cap.—50 ltrs., driven by 1 H.P. Motor	1 No.	35,000
4) Compressor	1 No.	45,000
5) Hot Air Chamber		45,000
6) Powder Collecting Duct complete with suction arrangements etc.		35,000

7) Water cooling tank, pumps	20,000
8) Weighing Platform— 500 kg. Cap.	15,000
9) Misc. Items e.g. Thermo- couple, Thread Wire, Testing Equipments	50,000
10) Office Furniture and Equipment	45,000
11) Mechanical and Electrical Installation-@10%	45,000
Total	4,40,000

(iii) Pre-operative Expenses **Rs. 50,000**

Total Fixed Capital-(i+ii+iii) Rs. 12,35,000

B. Working Capital (per month)

(i) Personnel	Salary (In Rs.)	Nos.	Amount (In Rs.)
1) Works Manager	8,000	1 No.	8,000
2) Supervisor	5,000	1 No.	5,000
3) Storekeeper	3,000	1 No.	3,000
4) Typist/Clerk	3,000	1 No.	3,000
5) Skilled Workers	3,000	4 Nos.	12,000
6) Semi-skilled Workers	2,500	3 Nos.	7,500
7) Helpers	2,000	3 Nos.	6,000
8) Peon	1,500	1 No.	1,500
9) Security Guard	1,500	1 No.	1,500
<i>Perks to Staff @ 15%</i>			7,000
Total			54,500

(ii) Raw Material (per month)	(Rs.)
Aluminium Ingots-Indigenous 21 M.T. @ Rs. 70,000 per M.T.	14,70,000
Total	14,70,000

(iii) Utilities (per month)	(Rs.)
1) Power-1000 Units @ Rs. 1.50 per unit	1,500
2) Water	250
3) Furnace Oil-1000 Ltrs. @ Rs. 7.50 per ltr.	7,500
Total	9,250

(iv) Other Contingent Expenses (per month) (Rs.)

1) Publicity	1,200
2) Postage and Stationery	600
3) Telephone	1,800
4) Travelling and Conveyance	3,000
5) Consumables like flux etc.	2,400
6) Packing Bags etc.	3,000
7) Repairs and Renewals	1,800
8) Insurance	600
Total	14,400

(v) Total Recurring Expenditure (per month) (Rs.)

i + ii + iii + iv	15,48,150
-------------------	-----------

(vi) Total Working Capital (for 3 Months) (Rs.)

Total Recurring Expenditure × 3	46,44,450
---------------------------------	-----------

C. Total Capital Investment

1) Total Fixed Capital	Rs. 12,35,000
2) Working Capital for 3 Months	Rs. 46,44,450
Total	Rs. 58,79,450

MACHINERY UTILIZATION

Machine shall be utilised at full capacity utilization.

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

1) Total Recurring Cost i.e. 15,62,550 × 12	1,85,77,800
2) Depreciation on Building @ 5%	37,250
3) Depreciation on Machinery and Equipments @ 10%	29,500
4) Depreciation on Furnace @ 20%	20,000
5) Depreciation on Office Equipment @ 20%	9,000
6) Interest on Total Investment @ 18%	10,58,112
Total	1,97,31,662
Say	1,97,31,700

(2) Turnover (per year)

By selling 240 M.T. of different grades of Aluminium Powder @ Rs. 90,000 M.T. Rs. 2,16,00,000

(3) Net Profit (per year) (Before Income Tax)

= Total Sale (per annum)—Cost of Production
= Rs. 2,16,00,000—1,97,31,700
= **Rs. 18,68,500**

(4) Net Profit Ratio

= $\frac{\text{Net Profit per annum} \times 100}{\text{Turnover per annum}}$
= $\frac{18,68,500 \times 100}{2,16,00,000}$
= **9.0%**

(5) Rate of Return

= $\frac{\text{Net Profit Per Annum} \times 100}{\text{Total Investment}}$
= $\frac{18,68,500 \times 100}{58,78,400}$
= **31.0%**

(6) Break-even Point

Fixed Cost (per annum)	(Rs.)
1) Depreciation on Machinery and Equipment	29,500
2) Depreciation on Furnace	20,000
3) Depreciation on Office Equipment	9,000
4) Interest on Total Investment	10,58,112
5) Insurance	7,200
6) 40% of Salary and Wages	2,16,600
7) 40% of Other Contingent Expenses (Excluding Insurance)	66,240
Total	14,06,652

B.E.P.

= $\frac{\text{Fixed Cost} \times 100}{\text{Fixed Cost} + \text{Profit}}$
= $\frac{14,06,652 \times 100}{14,06,652 + 18,68,500}$
= $\frac{140665200}{32,74,952}$
= **43%**

Addresses of Machinery and Equipment Suppliers

- 1) M/s. Indian Furnace Co. Ltd.
NSE Estate, Goregaon (East),
Mumbai.
- 2) M/s. Amie Engg. Co. Ltd.
B.T. Road, Kolkata.
- 3) M/s. G.R. ENGG. Works (P) Ltd.
Poonan Chambers,
Dr. Annie Besant Road, Worli,
Mumbai.

Addresses of Raw Material Suppliers

- 1) M/s. Hindustan Aluminium Co. Ltd.

Renukoot,
Mirzapur (U.P.).

- 2) M/s. Machas Aluminium Co. Ltd.
Mattur Danu-636 402.
- 3) M/s. Indian Aluminium Co. Ltd.
Hirakud, Sambalpur,
Orissa.
- 4) M/s. Bharat Aluminium Co. Ltd.
Korba,
Chhattisgarh.
- 5) M/s. National Aluminium Co. Ltd.
Angul,
Orissa.