Graphite Crucibles

PRODUCT CODE	:	29127 and 29128
QUALITY AND STANDARDS	:	IS 1748:1981
PRODUCTION CAPACITY	:	Quantity: 420 MTs. Value : Rs. 96, 60, 000
MONTH AND YEAR OF PREPARATION	:	March, 2003
PREPARED BY	:	Small Industries Service Institute Narsapur X Roads, Balanagar, Hyderabad - 500 037 Phone. Nos.: 23078131 - 133 Fax No. : 23078857 E-mail: sisihyd@hd2.net.in

Introduction

Graphite Crucibles are refractory containers specially shaped for metallurgical operations. These are made of a mixture of Graphite, Refractory Clay, Grog and other additives. These crucibles are termed as clay bonded Graphite crucibles according to the raw materials used. The crucibles are available with or without spout. These crucibles are used for melting ferrous, non-ferrous metals alloys and noble metals.

Market Potential

The main market for the product is foundry industry. With the growing industrial sector the need for specialized metal and alloy castings is increasing day-by-day. With the advent of many multinational automobile industrial units, many auto spare are manufactured in large numbers in Haryana, Delhi, Punjab and Maharashtra States. There is a good demand in these States for graphite crucibles. As per an assessment 8.5% growth in foundry and Casting Industry is estimated in the country. The use of Graphite Crucibles shall accordingly increase. There is a good scope of development of modern small-scale industries with the growing prospects of special casting metallurgical industry both for domestic and export market.

Basis and Presumptions

i. The envisaged production capacity is based on single shift basis on 300 working days in a year.

ii. The unit will purchase the technology from National Metallurgical Laboratory, Jamshedpur which have developed improved technologies for Graphite Crucibles.

iii. The costs given are based on the current market rates and may vary from time to time.

iv. The wages are as per the prevailing norms.

IMPLEMENTATION SCHEDULE

Sl. No.	*Activity*	*Period (in months)*
1.	Preparation of Project Report and preliminary work with institutions, site selection	2
2.	Follow-up action for Term Loan sanction	1
3.	Acquisition of land and construction of buildings, selection of machinery, placing orders	3
4.	Supply of machineries and erection	2
5.	Getting power connection, completion of other formalities with various agencies, working capital, loan sanction etc., trial run and production	1
6.	Total implementation of the project including commencement of production	12

TECHNICAL ASPECTS

Process of Manufacture

The manufacturing process of the products is based on the improved technology developed by National Metallurgical Laboratory, Jamshedpur. The raw materials such as graphite, Refractory/plastic clay, grog and other additives are mixed in a pan mixer after taking proper batch proportions. The wet mass is then kept for ageing. The aged mix is then extruded in a de-airing pugmill and blanks are made. The crucibles are prepared from the blanks either by pressing in a hydraulic press or by jiggering. The shaped crucibles are then dried, glazed and fired in a kiln to develop strength and glaze.

Quality Control and Standards

The following BIS specifications may be referred for day-to-day quality control:

IS 1748:1981	Sizes of Graphite Crucibles
IS 8977:1978	Clay bonded Graphite Crucibles
IS 9927:1981	Methods for determination of life of Graphite Crucibles
IS 11321:1985	Graphite for Graphite Crucibles

Production Capacity

Clay-Graphite Crucibles of different sizes upto No. 500

Qty. : 450MT (per annum)

Value : Rs. 96.60 lakhs.

Motive Power 60 HP.

Pollution Control

The unit should be equipped with proper flue-gas exhaust system and dust collectors to control environment pollution. It has to follow the guidelines prescribed by State Pollution Control Board.

Energy Conservation

It is suggested to construct a low thermal mass kiln for firing of the product to save energy.

FINANCIAL ASPECTS

A. Fixed Capital

(i) Land and Building	(Rs.)
Land 1 Acre	3,00,000
Office: 50sqm. @2,000 sq. m.	1,00,000
Manufacturing sheds: 400sqm @1,200 sq. m.	4,80,000
Stores: 50sqm @2,000 sq. m.	1,00,000
Workers quarters 200 sq. m. @1,500 sq. m.	3,00,000
Water well, pump, pipelines and compound wall etc.	1,20,000
Total	14,00,000

(ii) Machinery and Equipments

Description	Qty (Nos)	Value (Rs.)
Roller Crusher, Single roller size 350 x 300mm with a 7.5HP motor and accessories	1	1,00,000
Disintegrator 14" size with 5HP Motor	1	40,000
Pan Mixer, 0.5MT capacity with a 3 HP motor and other accessories	1	1,00,000
Deairing pugmill, capacity 250 kg/hr. with a 5HP motor vacuum pump and other accessories	1	2,50,000
Hydraulic press with all accessories cap: 1MT/day	1	3,00,000
Jigger and Jolly with individual 1HP/2HP motor and accessories for making large size crucibles	4	40,000
Electro Magnet	1	50,000
Saggar Press, Hand operated with ram	1	75,000
Glazing equipment comprising of a glaze tank, compressor, booth, spray gums and other fittings	1	75,000
Wheel barrows for internal transportation of large crucibles	4	15,000
Rotary screen for grading of grog with a 3Hp motor and other accessories erected on a platform	1	30,000
Weighing scales 250kg. and 25kg.	1	15,000
Test Eqpt. Misc. Eqpt. and tools	1	50,000
5 Tonne capacity oil fired down draft kiln with good thermal insulation (back-up) and with a 25 metres high chimney, thermocouples and other draft measuring equipment	1	8,00,000
Installation and wiring	LS	1,50,000
Office furniture and equipments		50,000
Pollution Control equipments and dust collator		2,00,000
Total		23,40,000
(iii) Pre-operative Expenses		1,50,000
Total		38,90,000

B. Working Capital (Per Month)

(i) Staff and Labour (per month)

Designation	Nos.	Salary	Total (Rs.)
Works Manager	1	7,500	7,500
Technical supervisor	2	4,000	8,000
Accountant	1	3,500	3,500
Clerk	2	2,500	5,000
Mechanic (Maintenance)	1	2,000	2,000
Skilled operators	4	3,000	12,000
Semi-skilled workers	4	2,000	8,000
Firemen	2	2,500	5,000
Unskilled labour	10	1,500	15,000
Watchmen	2	1,500	3,000
Total			69,000
Perks @ 15%			10,350
Total			79,350

(ii) Raw Materials (per month)

Description	Qty	Rate/MT	Total
Graphite Powder (Flaky and Lump IS 11321 grade)	14MT	20,000	2,80,000

Description	Qty	Rate/MT	Total
Crucible Grog	2MT	5,000	10,000
Silicon Carbide granules	2MT	55,000	1,10,000
Fireclay and Plastic Clay	40MT	1,000	40,000
Fireclay Grog	3MT	1,000	3,000
Coke Dust/Granules	10MT	2,500	25,000
Glaze and Chemicals	LS		25,000
Consumables	LS		10,000
Packing Materials	LS		10,000
	Total		5,13,000

(iii) Utilities (per month)		(Rs.)
Power and Water	50 kWH	30,000
Furnace oil	8 kL @ 9000 per kL	72,000
	Total	1,02,000

(iv) Other Contingent Expenses (per month)	(Rs.)
Postage and stationery	1,000
Transport and Conveyance	3,500
Advertisement and Publicity	4,000
Telephone	2,000
Maintenance	4,000
Insurance	2,000
Other Contingent Expenses	3,500
Total	20,000

Total recurring expenditure (per month) (i+ii+iii+iv) Rs. 7,14,350

C. Total Capital Investment

Fixed capital	Rs. 38,90,000
Working capital (3 month)	Rs. 21,43,050
Total	Rs. 60,33,050

FINANCIAL ANALYSIS

(1) Cost of Production (per annum)	(Rs.)
Total recurring cost	85,72,200
Depreciation on building @5%	55,000
Depreciation on plant and Machinery @10%	1,34,000
Depreciation on kiln @15%	1,20,000
Depreciation on office furniture @20%	10,000
Interest on total capital investment @14%	8,44,827
Total	97,36,027

(2) Total Sales Turnover (per annum)	(Rs.)
By sale of 420MT of Graphite Crucibles (After allowing nearly 7% rejections) @ of 27,000 per MT	1,13,40,000

(3) Profit (per annum)

= Sales – Cost of production

= Rs. 1,13,40,000 – 97,36,027

= Rs. 16,03,973

(4) Net Profit Ratio

$$= \frac{\text{Net profit per year x 100}}{\text{Turnover per year}}$$

$$= \frac{16,03,973 \times 100}{1,13,40,000}$$

= 14.14%

(5) Rate of Return

$$= \frac{\text{Net profit per year x 100}}{\text{Total investment}}$$

$$= \frac{16,03,973 \times 100}{60,33,050}$$

= 26.59%

(6) Break-even Point

Fixed Cost	(Rs.)
Depreciation on building @5%	55,000
Depreciation on Plant and Machinery @10%	1,34,000
Depreciation on Kiln and Chimney @15%	1,20,000
Interest on capital investment @14%	8,44,627
40% of salaries	3,80,880
40% of other Contingent expenses	86,400
Insurance	24,000
Total	16,44,907

$$B.E.P. = \frac{\text{Fixed cost} \times 100}{\text{Fixed cost} + \text{Net profit}}$$

$$= \frac{16,44,907 \times 100}{16,44,907 + 16,03,973}$$

$$= 50.63\%$$

Addresses of Plant and Machinery Suppliers

1. M/s. Keshab Engn. Co. Ltd.
   Bose Park, P.O. Sikchar,
   24, Paraganas (North),
   (West Bangal)
2. M/s. Amic Industries (P) Ltd.
   10, B.T. Road,
   Kolkata - 700 056
3. M/s. Pappu Veeranna and Sons
   Dhowleswaram Rajahmundry,
   East Godavari District
4. M/s. Hari Machines Ltd.
   Rajgangapur - 770 017
5. M/s. Gloheat Instruments (P) Ltd.
   No. 73, 6th Main,
   3rd Phase 4,
   P. O. Box No. 5042, Peanya
   Industrial Area,
   Bangalore.

Raw Material Suppliers

1. M/s. Patna State Graphite Minerals Co.
   Titagarh (PO),
   (Orissa)
2. M/s. Laxmi Narayan Agarwal Co.
   Sambhalpur,
   (Orissa)
3. M/s. Hindustan Graphite Refining and Products Co.
   Opp. Petrol Pump,
   G.T. Road Kovvur,
   West Godavari Dist., (A.P)
4. M/s. Grindwel Narton (P) Ltd.
   4th Floor, 114 MG Road,
   Bangalore
5. M/s. Indian Metal and Ferro Alloys
   Terubali, Rayagada Dist.,
   (Orissa)
6. M/s. Elector Thermics
   C-5, SBH Colony,
   Hyderabad - 500 034
7. M/s. East India Minerals
   Fireylal Chowk, Ranchi,
   (Jharkhand)

Shuttle Kiln Fabricators

1. M/s. Unifire
   Shakespere, 16-12, Sarani,
   4th Floor, Kolkata
2. M/s. Bengallium Industrial Funales
   24-B, Carmae Street,
   Kolkata - 700 016
3. M/s. Techno Thermo Projects Pvt. Ltd.
   225/2, C.I.T. Road,
   Scheme VII-M,
   Kolkata - 700 054
4. M/s. N.M. Kiln Pvt. Ltd.
   A-706, Rail Vihar, Seetu
   15-11, Jharza Road,
   Gurgaon - 122 001
5. M/s. Sharma Kiln Technology
   206, Hare Krishna Complex,
   Opp. Kottawala Flats,
   Ashram Road,
   Ahmedabad - 380 007
6. M/s. Associated Industrial Furnaces
   2/5, Sarai Julane, 1st Floor,
   Okhla Road,
   New Delhi - 110 025.