

PROJECT PROFILE

PRODUCT:- Refractory Monolithics

Quality Standards: IS: 1335-1979, IS: 10047-1981, and IS: 10570-1983 may be used to carry out the various tests of monolithics.

PROJECT COST : **Rs 3,34,24,000/-**

Month & year of Preparation: Feb - 2021

Prepared by: MSME-Development Institute
Govt of India, M/o of MSME
65/1 G S T Road, Guindy
CHENNAI - 600032, Tamil Nadu
TEL: 044-22501011-12-13-14 (4Lines)

PROJECT PROFILE ON REFRACTORY MONOLITHICS

GENERAL ASPECTS

INTRODUCTION: - Monolithic refractory is the name generally given to all unshaped refractory products, the word monolithic coming from the word *monolith* meaning 'big stone'. These are materials which are installed as some form of suspension that ultimately harden to form a solid mass.

Monolithic refractories have a myriad of industrial applications throughout the steel, cement, non-ferrous metallurgical, waste disposal and petrochemical industries. They are available in many forms and different formulations. The main properties of these materials are their respective chemical inertness, mechanical integrity, abrasion resistance and thermal shock resistance at high temperatures.

Types of Monolithic Refractories :-

Castable Refractories

These are materials which consist of precision graded coarse and fine refractory grains. They are gelled by means of a binder system in the materials green state. Following the heat-up of the material the binder either transforms or volatilises facilitating the formation of a ceramic bond. The most common binder used in castables is HAC (high alumina cement). Other binders that are often used include hydratable aluminas and colloidal silica. Castables are mixed with water and then installed by either pouring or pumping. Placement of the material then requires vibration.

The cement-containing castables are often classified by the amount of cement they contain. Conventional castables can contain around 15-30% cement binder. As refractory technology evolved chemical additives were included in the package to reduce the amount of cement and water the product required - the impact of this was material with improved strengths and durability. Low cement castables contain between about 3-10% weight cement. Ultra low cement castables contain less than 3% cement component.

A specialised type of refractory castable is the free flow castable which is able to be installed without vibration. They require a much lower water addition than traditional castables. This is due to the fact that they have particle packing and dispersing agents which modify the surface chemistry of the fine particles to improve the flow of the material.

Certain castable formulations may be installed via gunning techniques which involves spraying the material through a nozzle at a high speed. At the nozzle, cement accelerators are often added to promote rapid hardening of the material. This technique allows applications to be lined very quickly.

Plastic Refractories

These are monolithic refractory materials which are tempered with water and/or added with a binder. They have sufficient plasticity to be pounded or rammed into place.

Ramming Refractories

These materials are very similar to plastic refractories though are much stiffer mixes.

Patching Refractories

These materials are similar to plastic refractories though have a very soft plasticity allowing them to be pounded into place.

Coating Refractories

This type of product is used to protect refractory linings usually against chemical attack. Coating refractories are normally intended to cover just the working surface of a lining. They tend to be fairly thin layers.

Refractory Mortars

Mortars consist of finely ground refractory materials which are then mixed with water to form a paste. They are used for laying and bonding shaped refractory products such as bricks. They are normally applied by trowelling.

Insulating Castables

Insulating castables are specialised monolithic refractories that are used on the cold face of applications. They are made from lightweight aggregate materials such as vermiculite, perlite, extend-o-spheres, bubble alumina and expanded clay. Their main function is to provide thermal insulation. They are typically of low density and low thermal conductivity. Insulating refractories have inferior mechanical strength to that of conventional castables.

MARKET POTENTIAL: - Monolithic refractories have increased in market share of the total refractories industry over the last two decades and will continue to do so. The main drivers for this have been economic considerations (rapid installation time reducing the down time of a given application, cost of raw materials for their manufacture, less manpower required in their installation), and the availability of skilled people within the industry - as the refractories industry has decayed there are less skilled people available such as refractory brick layers to install conventional products.

Monolithic refractories do not require pre-firing, thus reducing the amount of energy used (and associated pollution) compared to producing fired refractories.

Monolithic refractories may be applied when the furnace, ladle, or other surface is hot. This allows the customer to continue operating the equipment rather than shutting it down and going through a long cool-down and reheating process to repair the underlying brick or cast refractory. It can take as long as one week for a typical furnace to be brought back to standard operating temperatures after a repair, which means a great deal of energy is lost during cool down and is used during reheating.

As far as the state of Tamil Nadu is concerned, the existing & enhancement of the installed capacities of the existing Iron and Steel industries and also lot of upcoming projects are directly creating a huge demand for the product.

BASIS AND PRESUMPTION:-

- The unit will operate single shift in day twenty five working days in a month and twelve months in a year.
- Rate of interest on both the fixed and working capital has been considered as 13% per year.
- All unskilled workers are taken as contract laborers

TECHNICAL ASPECTS

PROCESS OF MANUFACTURE:-

This project envisages to manufacture the 800 MT of Basic monolithics of following category

1. Basic Gunning Mass
2. Basic Ramming Mass
3. Basic Castable
4. Basic EBT Filling mass
5. Basic Tundish Spray Mass
6. Nozzle Filling Compound

And 400 MT of high alumina monolithics of following category

1. High Alumina Castable upto 90%
2. High Alumina Ramming Mass upto 70%
3. High Alumina Mortar
4. Lo Cement Castable

Process of manufacture of monolithic refractories includes the following operations.

- Weighing of different processed raw materials.
- Proportioning and mixing
- Physical & Chemical Testing of monolithic refractory mixture
- Weighing and packing prior to sale.

POLLUTION CONTROL:-

The unit is operating mostly with processed powder raw materials having likely chance creating dust pollution hence the unit has to adopt technology to reduce dust pollution and workmen be provided with masks to protect. The process will not leads to other type of pollutions.

ENERGY CONSERVATION:-

Proper energy conservation measures will be taken for all electrical equipments.

QUALITY STANDARDS:-

IS: 1335-1979, IS: 10047-1981, and IS: 10570-1983 may be used to carry out the various tests of monolithic.

PRODUCTION CAPACITY PER ANNUM:-

- Quantity: Basic Monolithics: 9600 MT
 High Alumina Monolithics: 4800MT
- Value: Rs.24,48,00,000/-

FINANCIAL ASPECTS

LAND & BUILDING:-

LAND :

The Total land of 904 decimals @ Rs.4000/- per decimal has taken for the purpose. The total cost is

36,12,000/-

BUILDING:

SL.No	Description	Area	Rate	Amount
1	Work Shed (Asbestos roof)	18000sft	250/-	45,00,000/-
2	Office Building (RCC)	1500sft	900/-	13,50,000/-
3	Hutment for workmen	LS		3,50,000/-
4	Bore well	LS		1,20,000/-
5	Water connections	LS		1,00,000/-
6	Laboratory Building (RCC)	400sft	900/-	3,60,000/-
Total				67,80,000/-

MACHINERY & EQUIPMENT:-

SL.No	Description	Quantity	Rate	Amount
1	Pan type Mixer (350 kg/Batch)	2	2,50,000	5,00,000
2	Pan type Mixer (350 kg/Batch)	1	5,00,000	5,00,000
3	Weighing Machine (Electronic)	2	20,000	40,000
4	Pallet Trucks hydraulic	3	15,000	45,000
5	Jaw Crusher (2MTcap)	1	1,00,000	1,00,000
6	Electric Hoist with structural's	2	3,50,000	7,00,000
7	Electrical substation with 63 KVA Transformer	1	4,50,000	4,50,000
8	Electrical connections & Wiring	LS		2,00,000
9	DG Set 25 KVA (Silent)	1	4,00,000	4,00,000
10	Factory & Street Lighting	LS		2,50,000
11	Lab equipments	LS		4,00,000
12	Utility Van	1	7,50,000	7,50,000

13	Office Furnishing	LS		3,00,000
14	Preoperative Expenses	Ls		2,00,000
TOTAL				48,35,000

TOTAL FIXED CAPITAL

i)	Land	36,12,000
ii)	Building	67,80,000
ii)	Machinery & equipment	48,35,000

TOTAL		1,52,27,000

WORKING CAPITAL

I) RAW-MATERIAL PER MONTH:-

SL.No	Description	Quantity	Rate	Amount
1	Dead Burnt Magnesite Indigenous (of different grades)	400MT	17,650	70,60,000
2	Fused Magnesite of Chinese origin	20.4MT	25,000	5,10,000
3	Hydrated Lime	245MT	8,000	19,60,000
4	Calcined Bauxite of Chinese Origin	81.6MT	23,000	18,76,800
5	Calcined Bauxite Indigenous	214.2MT	12,000	25,70,400
6	Calcined Fire Clay	77.5MT	5,000	3,87,500
7	High Alumina Cement	12.24MT	35,000	4,28,400
8	Low Alumina Cement	8.00MT	22,000	1,76,,000
9	Chemicals, Binders & Additives	43 MT	40,000	17,20,000
TOTAL				1,66,89,100

Say 1,66,89,000

II) STAFF & LABOUR PER MONTH:-

SL.No	Description	Nos	Salary	Amount
1	Executive Director	1	1,20,000	1,20,000
2	General Manager (Tech)	1	50,000	50,000
3	Manager (Admn. & Hosp.)	1	30,000	30,000
4	Works Manager	1	30,000	30,000
5	Supervisors	2	10,000	20,000
6	Lab Chemist	1	15,000	15,000
7	Office Boy & Attendants	4	4,000	16,000
8	Executive Asst.	4	10,000	40,000
9	Electrician	1	7,500	7,500
10	Mech. Fitter	1	7,500	7,500
11	Workmen through contractor	20	5,000	1,00,000
12	Security	3	5,000	15,000
13	Gardening & Cleaning	2	5,000	10,000
14	Driver	2	8,000	16,000
	Fringe benefits 15%			71,550
TOTAL				5,48,550

III) UTILITIES PER MONTH:-

i) Packing Materials(1200MT@Rs.500/-) 6,00,000

(Packing materials like HDPE Jumbo bags
& small bags (for 1 MT of FP)

ii) Power (25000units @ Rs.4/unit) 1,00,000

TOTAL **7,00,000**

IV) OTHER EXPENDITURE PER MONTH:-

i)	Postage & Stationary	3,000
ii)	Telephone	6,000
iii)	Transportation	40,000
iv)	Consumable Stores	20,000
v)	Repairs & Maintenance	40,000
vi)	Insurance	20,000
vii)	Advertisement & Sales Promotion	1,10,000
viii)	Other Miscellaneous Expenses	20,000

	TOTAL	2,59,000

WORKING CAPITAL PER MONTH:-

i)	Raw-materials	1,66,89,000
ii)	Staff & Labour	5,48,550
iii)	Utilities	7,00,000
iv)	Other Expenses	2,59,000

	TOTAL	1,81,96,550
	Say	1,81,97,000

WORKING CAPITAL FOR ONE MONTH **1,81,97,000**

TOTAL CAPITAL INVESTMENT:-

i)	Total Fixed Capital	1,52,27,000
ii)	Working Capital for one month	1,81,97,000

	TOTAL	3,34,24,000

COST OF PRODUCTION PER ANNUM (8Months Basis):-

1) Total recurring expenses for 12 months	21,83,64,000
2) Depreciation on Machinery & Equipment @ 10% per annum	4,63,500
3) Depreciation on building @ 5% per annum	3,39,000
4) Interest on total capital investment @ 13% per annum	43,45,120
TOTAL	22,35,11,620
	Say 22,35,12,000

TURNOVER PER ANNUM:-

1) By sale of 9600MT of basic monolithics @ Rs 18000/- per MT, the total revenue is = 17,28,00,000	
2) By sale of 4800MT of high alumina monolithics @ Rs 15000/- per MT, the total revenue is = 7,20,00,000	
Total	24,48,00,000

PROFIT PER ANNUM:-

Turnover	24,48,00,000
Less Cost of Production	22,35,12,000

PROFIT	2,12,88,000

RATE OF RETURN ON CAPITAL INVESTMENT:-

$$\frac{2,12,88,000 \times 100}{3,34,24,000} = \underline{63.70\%}$$

RATE OF RETURN ON SALES:-

$$\frac{2,12,88,000 \times 100}{24,48,00,000} = \underline{\underline{8.69\%}}$$

BREAK EVEN POINT:-

$$\frac{\text{Fixed cost} \times 100}{\text{Fixed cost} + \text{Profit}} = \frac{90,24,000 \times 100}{3,03,12,000} = \underline{\underline{29.77\%}}$$

FIXED COST:-

i) Total interest	43,45,120	
ii) Total Depreciation	8,02,500	
iii) 40% Staff & Labour	26,33,040	
iv) 40% Other expenses	12,43,200	

total	90,23,860	Say 90,24,000

Suppliers of Machinery & Equipment

- 1) M/s Amic Industries(P)Ltd,
86D, Suresh Sarkar Road, Kolkata
- 2) M/s Hari Machines Ltd,
O B No: 5, Rajgangpur, Sundargarh, Orissa
- 3) M/s D K Engineering Works,
8/C, Panchanantala New Road, Belgharia
Kolkata
- 4) M/s Hindustan Engineering Company,
123/7 G L Tagore Road, Baranagar
Bonhooghly, Kolkata- 35