

Cement Mosaic Flooring Tiles

PRODUCT CODE	: 94436 and 29118
QUALITY AND STANDARDS	: IS 1237
PRODUCTION CAPACITY	: Quantity: 1500MT (8,00,000 nos.) : Value : Rs. 65, 00, 000
MONTH AND YEAR OF PREPARATION	: March, 2003
PREPARED BY	: Small Industries Service Institute, Harsiddha Chambers, 4th Floor, Ashram Road, Ahmedabad - 380 014 Phone Nos. : 7543147, 7544248 E-mail: sisiabd@guj.nic.in

INTRODUCTION

Mosaic floor tiles are also known as terrazzo tiles. The main raw materials used for the manufacture are cement concrete and coloured stone chips. These tiles are made generally in the sizes of 200 x 200 x 20mm, and 300 x 300 x 25mm. These tiles can also be made in various other sizes, shapes according to market demand. The tiles are used for flooring of both residential and commercial buildings. The top surface of the tiles is decorated with marble stone chips of various colours with suitable addition of cement colour. These tiles are impermeable, easy to replace and long lasting.

MARKET POTENTIAL

Construction of floor by laying these tiles is time saving. It is also economical to repair the floor or do patch work by replacing the damaged tiles in course

of use. Since the tiles are available in various decorative colours and sizes, the item is gaining popularity and the demand is increasing day-by-day. There is a great upsurge in the building construction activity due to increase in population. The requirement of residential houses hospitals and commercial buildings is increasing day by day. Government of India in its 10th Five Year Plan has given greater emphasis on housing activity. Socio-economic changes in society, improved standards of living, renovation of old buildings and all-round development in the country, have increased building construction activity and the demand of Mosaic Flooring tiles.

Ceramic vitreous floor tiles, granite and marble stone tiles, red clay flooring tiles are some of the substitute material used in place of mosaic tiles. The demand for Mosaic tiles is estimated to be around 25% of the total requirement of flooring tiles. Taking the above factors

into consideration the demand is expected to increase at the rate of 10% every year during the current plan period. Hence there is a good scope for setting up of new units for the manufacture of mosaic tiles.

BASIS AND PRESUMPTIONS

- i. It has been taken into consideration that the unit will work on single shift basis for 300 days in a year.
- ii. To achieve full plant capacity 1 to 2 months trial production is required.
- iii. Labour and wages mentioned as per the prescribed minimum wages.
- iv. Interest rate at 14% considered in the project profile both for recurring and non-recurring investment.
- v. Margin money will vary from 10-25% depending upon the location and scheme adopted by the entrepreneurs.
- vi. Operative period of the project is around 10 years considering technology obsolescence rate and period of repayment of loan.
- vii. The costs of land, construction charges, machinery and equipment, raw materials and consumables, other Contingent expenses etc. indicated in the scheme are based on the prices prevailing at the time of project preparation. Therefore, these are subject to necessary changes from time to time based on the local conditions.

IMPLEMENTATION SCHEDULE

<i>Sl. No.</i>	<i>Activity</i>	<i>Period (in months)</i>
1.	Project report preparation, selection of site, selection of machinery and registration as SSI etc.	6
2.	Processing for financial assistance, procurement of machinery and civil construction etc.	6
3.	Trial run and marketing set up etc.	2
	Total Time	14

TECHNICAL ASPECTS

Process of Manufacture

The basic raw materials used in the manufacture of mosaic floor tiles are cement (grey and white) stone/marble chips. Fine aggregates like sand, dolomite powder and colouring oxide ordinary portland cement can be used for mosaic tiles of dull colours. For such applications where distinct designs and deep colour shades and marble boundries are desired white cement may be employed. Hard limestone, dolomite chips, crushed cuddappa stone of suitable sizes are to be used as course aggregate. Colours should not be added in quantities exceeding 10% of the cement used in tile mix, otherwise strength of tiles will be adversely affected.

The process for the manufacture of Mosaic tiles consists of three layers, the facing, the intermediate and backing layers. The raw materials (cement, marble chips, marble powder, colouring oxides, sand stone chips) are mixed according to the pre-determined

proportions thoroughly and mixture is kept separately on the platform of hydraulic/mechanical press for ready use. The mixture for three layers is prepared in the following proportions.

1. Facing mixture	Proportion
Grey cement	1.5
Marble chips	4
White cement	1
Marble powder	1
Colouring oxide	0.1 to 0.5%
2. Intermediate Mixture	
Grey cement	1
Sand	1
3. Backing Mixture	
Grey cement	1
Sand	3
Stone chips	1

Suitable iron moulds are fitted with the bottom plate of the press. The facing mixture is first fed into the mould to a thickness of about 6.5mm and then intermediate and backing mixture is spread over to the thickness of about 9mm each. The mixture is pressed under the pressure of around 150kg/sq. cm. which varies according to the size of the tile. The tiles are taken out from the moulds and kept for 24 hours for air setting and then immersed in water for curing for a period of about 15days. The cured tiles, are then taken from the curing tank and kept in shed for a period of about 4-5 days for drying. The tiles are then polished and ground on super (levelling machine. After polishing, the tiles are given final touch of finish by hand and then sent to store for despatch.

Manually operated presses are also used for making the tiles for small batches of production. But the tiles made

by this press do not have uniformity due to difference of pressure in each cycle with variation in pressure of the manually operated presses.

Quality Control and Standards

For maintaining uniformity in quality the following Indian standards specification may be considered:

IS 1237:1980 Cement concrete flooring tiles.

As per IS 1237:1980 the use of raw materials is divided into three forms viz. topping mixture, intermediate mixture and backing mixture.

Production Capacity (per annum)

It is envisaged that unit will produce about 8 lakhs pieces of assorted sizes valued at Rs. 65,00,000

Motive Power 20 HP.

Pollution Control

There is no water pollution in manufacture of mosaic tiles, however, there would be some air pollution while handling dry raw materials like cement and marble powders. Simple methods to cover the discharging bins for mixing or connecting it with cyclonic dust collector would be sufficient to control the pollution. Alternatively, the operator should use dust mask.

Energy Conservation

It is not applicable as far as fuel energy is concerned. Simple precautions and knowledge of effective utilization of electrical power is necessary.

FINANCIAL ASPECTS

A. Fixed Capital

(i) Land and Building		(Rs.)	
i) Land 30,000 sq. mts. @ Rs. 200/m ²		6,00,000	
ii) Building			
Office, Stores etc. 100sq. mtrs @ Rs. 2500/m ²		2,50,000	
Workshed 400 sq. mts. @ 1500/m ²		6,00,000	
Curring Tanks		1,50,000	
Compound wall, sanitation civil work, Gate etc.		1,00,000	
	Total	17,00,000	
(ii) Machinery and Equipments		Nos.	(Rs.)
Hydraulic press (Cap. 150kg/sq. cm) with pressure gauge	3		3,00,000
Hydraulic double piston pump with 5HP motor combined with safety valve, capable of feeding 4 to 5 presses	1		1,00,000
Levelling (grinding) machine complete with all attachments grinding capacity 4 tiles at a time (5HP)			1,50,000
Colour mixing muller for mixing colour with cement (3HP)	1		50,000
Semi polishing machine with 2HP motor for sample polishing for testing	1		25,000
	Total		6,25,000
Erection and installation charges for the above machines @10% of the cost			62,500
Tipping borrows 4 cft/7 cft cap			12,500
Plain and checkered tile moulds complete with frame, plate and plug 3 sizes, 10 sets			50,000
Weighing machine, working tables racks etc.			1,00,000
Testing equipments			50,000
Office equipments and furniture			1,50,000
Total cost of m/c and equipment is			10,50,000
(iii) Pre-Operative Expenses			50,000

Total Fixed Capital		(Rs.)
Land and building		17,00,000
Plant and machinery		10,50,000
Pre-operative expenses		50,000
	Total	28,00,000

B. Working Capital (Per Month)

(i) Staff and Labour (per month)	No.	Salary	(Rs.)
Manager	1	5,000	5,000
Supervisor	2	3,500	7,000
Accountant/Clerk	2	2,500	5,000
Skilled Workers	7	2,200	15,400
Un-skilled Workers	14	1,800	25,200
Watchman/Peons	2	1,800	3,600
	Total		61,200
<i>Perquisites @ 15%</i>			9,180
	Total		70,380

(ii) Raw Material (per month)

Particulars	Quantity	Rate	Amount (Rs.)
Portland (Grey) cement	30 MT	3,000	90,000
White cement	29 MT	6,000	1,74,000
Sand	80 MT	150	12,000
Stone/Marble chips	24 MT	2,000	48,000
Mineral colours	1 MT	5,000	5,000
	Total		3,29,000

(iii) Utilities (per month)		(Rs.)
Power	LS	10,000
Water Charges	LS	1,000
	Total	11,000

(iv) Other Contingent Expenses		(Rs.)
Postage and Stationery		1,000
Telephone		1,000
Consumable Stores		1,500
Repair and Maintenance		2,000
Transport Charges		1,500
Insurance		2,000
Sales Expenses, advertisement and publicity		1,000
	Total	10,000

Total Recurring Cost (per month)	
Staff and Labour	70,380
Raw materials	3,29,000
Utilities	11,000
Other Contingent expenses	10,000
Total	4,20,380
Total working Capital (on 3 months basis)	12,61,140

C. Total Capital Investment

Fixed capital	Rs. 28,00,000
Working capital	Rs. 12,61,140
Total	Rs. 40,61,140

MACHINERY UTILIZATION

Efficiency and working hrs. considered for full capacity	Efficiency 80% of the installed capacity of 8 hrs. and 300 days in a year.
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Time/period of achieving capacity utilization 6 months from the date of commencement of commercial production.

FINANCIAL ANALYSIS

(1) Cost of Production (per year)	(Rs.)
Total recurring cost (per year)	50,44,560
Depreciation on building @5%	55,000
Depreciation on machinery and equipment @10%	62,500
Interest on Capital Investment @14%	5,68,559
Depreciation on mould, racks, tools, testing equipments @25%	53,125
Depreciation on office equipment and furniture @, 20%	30,000
Total	58,13,744

(2) Total Turnover (per annum)

Particulars	Quantity	Rate (Rs.)	Amount (Rs.)
Grey mosaic tiles 10" x 10"	3,00,000	8 tiles	24,00,000
Grey mosaic tiles 8" x 8"	3,00,000	7 tiles	21,00,000
Coloured tiles	2,00,000	10 tiles	20,00,000
	Total		65,00,000

(3) Net Profit (per year)

$$= 65,00,000 - 58,13,744 = 6,86,256$$

(4) Net Profit Ratio

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

$$= \frac{6,86,256 \times 100}{65,00,000}$$

$$= 10.55\%$$

(5) Rate of Return

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

$$= \frac{6,86,256 \times 100}{40,61,140}$$

$$= 16.9\%$$

(6) Break-even Point

Fixed Cost	(Rs.)
Total Depreciation	2,00,625
Total Interest	5,68,559
40% of Salary and wages	3,37,824
40% of other contingent expenses	38,400
Insurance	24,000
Total	11,69,408
or Say	11,69,400

B.E.P.

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

$$= \frac{11,69,400 \times 100}{11,69,400 + 6,86,256}$$

$$= 63\%$$

Addresses of Machinery and Equipment Suppliers

1. M/s. Bhagvati Engg. Works
Nazarbag,
Morvi - 363 691
(Gujarat)
2. M/s. Bhavani Engg. Works
37, Sunshine Industrial Estate,
Behind Maniar Traders,
Near Ajit Mill Rakhial,
Ahmedabad - 380 023
3. M/s. Hydro Engg. Works
K1/116, G.I.D.C., Morvi,
(Gujarat)
4. M/s. Ashok Engg. Works
8/1, Ajit Industrial Estate,
Rakhial, Ahmedabad - 380 023
5. M/s. Jay Khodiyar Engg. Works
6, Pruthvi Plot,
Morvi - 363 691, (Gujarat)
6. M/s. Naveen Engg. Works
K1/102, G.I.D.C.,
Morbi - 363 641, (Gujarat)
7. M/s. Vishwakarma Engg. Works
Behind Sukhram Nagar,
Navneet Prakashan,
Rajpur - Gomtipur,
Ahmedabad - 380 021