STANDARD FORMAT FOR PROJECT PROFILE

PRODUCT	Preformed Foam Cellular Concrete Blocks
PRODUCT CODE	23952 (based on NIC 2008)
QUALITY	IS 2185 (Part 4) – 2008: Indian Standard on Concrete Masonry Units – Specification Part 4 – Preformed Foam Cellular Concrete Blocks
CAPACITY	Quantity: 90000 Nos. per annum. Value: Rs. 9900000 per annum
MONTH & YEAR	MARCH 2021
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A. **ABOUT THE PRODUCT**

Preformed foam cellular concrete blocks are concrete blocks having homogeneous, uniformly distributed and stable void or air cells. The cell structure is attained with the addition of preformed stable foam in the concrete mix. These blocks are light weight, eco-friendly, economical and better alternative to conventional burnt clay bricks and cement concrete blocks in the modern building industry.

The blocks are larger in dimensions, true in size, shape, plain surfaces, attractive appearance, uniform structure and light weight. These blocks have several advantages such as durability, strength, structural stability, fire resistance, sound absorption and thermal insulation.

The dimensions of preformed foam cellular concrete blocks are usually in the following range: Length – 400, 500 or 600mm; Width – 100, 150, 200 or 250 mm; and Height – 250 or 300mm. The large dimension of the blocks means fewer joints, less mortar and plastering, resulting in faster rate of construction.

The preformed foam cellular concrete blocks can be manufactured at sites of large construction projects or in factories and supplied to the site of customers. When manufactured at site, foamed cellular concrete can be poured into moulds to form blocks or poured in-situ construction.

The blocks are used for construction of load bearing walls for low-rise buildings and non-load bearing walls in RCC buildings depending on the density and compressive strength of blocks. Density of the blocks varies from 800 kg/m^3 to 1800 kg/m^3 and Compressive strength from 2.5 N/mm^2 to 25 N/mm^2.

B. **MARKET**

Preformed cellular concrete blocks are modern building materials and alternative to conventional burnt clay bricks and concrete blocks. The demand for housing in the country is much higher than supply. There is a demand-supply gap of 37.5 lakh units per year in the urban housing sector to meet the shortage by the year 2022.

Housing for all and affordable housing is the larger objective of the government. Housing loans are included in the priority sector credit. Affordable housing projects are given the infrastructure status in the union budget for 2017-18. Government of India has announced in the month of March 2017 that the home loans are given with a front-end interest subsidy of 3 to 4% to the first-time home buyers. All these measures will benefit construction industry and home buyers and increase the demand for the product.

C. **BASIS AND PRESUMPTIONS**

1. Salaries and wages: Minimum applicable wages were considered.
2. Interest rate: 10% on total capital investment is taken into consideration.
3. Efficiency: 75% efficiency of manpower and 75% of capacity utilization of machinery.
4. No. of shifts per day: Single shift of 8 hours per day and 300 days in a year.
5. Margin money: The promoter may bring in 25% of the total capital investment.
6. Payback period: About 4 years.

D. **IMPLEMENTATION SCHEDULE: 6 months**

Sl No	Description of the activity
1	Selection of product
2	Preparation of the project report.
3	Selection of location
4	Marketing arrangements
5	Arrangements for financial assistance
6	Purchase of land
7	construction of building
8	Procurement of machinery and equipments
9	Obtaining EB connection
10	Erection and commissioning
11	Recruitment of manpower.
12	Trial runs
13	Commencement of commercial production
14	Registration of the enterprise

E. **TECHNICAL ASPECTS**

1. RAW MATERIALS

Preformed foam cellular concrete is a mixture of Ordinary Portland Cement, Fly Ash, Preformed stable foam and Water. Sand, pozzolana and other ingredients may be added as part of the fine aggregate. Coarse aggregate is usually not used.

The preformed stable foam is made using a foaming agent, compressed air and water in an equipment called foam generator. The foaming agent or foam concentrate should be such that it produces stable foam cells in concrete which can resist the physical and chemical forces imposed during mixing, transporting, pouring and setting of concrete.

2. PROCESS OF MANUFACTURE

The process of manufacture of preformed foam cellular concrete blocks involves the following eight stages:

1) Mix
2) Batching
3) Mixing
4) Moulds
5) Placing
6) De-Moulding
7) Curing
8) Drying

1. **Mix:** The concrete mix design consists of determining suitable raw materials and their proportions keeping in view the desired properties in the final product.
2. **Batching:** All the raw materials should be proportioned by weight in each batch of the mix. Moisture content in the raw materials like fly ash and water content in the preformed stable foam should be taken into consideration in the batching. The cement, fly ash, foam and water should be weighed separately for each batch.
3. **Mixing:** The raw materials are mixed in a mechanical mixer having a rotating drum. The objective of mixing cement, fly ash, foam and water is to ensure that the mix is homogeneous. Dry ingredients are added first along with cement to ensure even

distribution of cement. Water is added thereafter continuing the mixing. The preformed stable foam is added in measured amount to the slurry of cement, sand, fly ash and water in the batch mixer. After an additional mixing to get uniform consistency, the slurry form of foamed cellular concrete is ready to be collected and poured into moulds.

4. **Moulds:** Gang moulds may be made of wood, rigid plastics, aluminium, steel or other materials. The moulds should be pre-coated with an appropriate mould-releasing agent to ensure proper release and surface finish when the block is demoulded.

5. **Placing:** The tub-cum-trolley containing the cellular concrete is towed to the moulds and the concrete is poured into moulds. The cellular concrete slurry being a fluid mass and without coarse aggregate fills up and levels into moulds easily. There is no need for external vibration or compaction.

6. **De-moulding:** The blocks are demoulded after 24 hours from pouring of cellular concrete into the moulds. Thereafter the moulds are kept ready for reuse. Demoulding can be done after 8 hours from pouring into moulds, provided the blocks are protected until sufficiently hardened to permit handling without damage. This will take about 24 hours in a shelter away from sun and winds.

7. **Curing:** The blocks thus hardened are cured in a curing yard to permit complete moisturisation for at least 14 days. The greatest strength benefits occur during the first three days and valuable effects are secured up to 10 or 14 days. The longer the curing time permitted the better the product.

8. **Drying:** Concrete shrinks slightly with loss of moisture. It is therefore essential that after curing is over, the blocks should be allowed to dry out gradually in shade for 2 to 3 weeks so that initial drying shrinkage is completed before the blocks are used in construction work.

3. QUALITY SPECIFICATIONS

IS 2185 (Part 4): 2008 – Concrete Masonry Units – Specification

Part 4 Preformed foam cellular concrete blocks

The above Indian Standard specifies the requirements for various quality parameters viz. dimensions and tolerances, classification of load bearing and non-load bearing blocks, block density, compressive strength, thermal conductivity, water absorption, drying shrinkage and moisture movement, sampling, number of tests, criteria for conformity, test procedures, etc.

In concrete masonry, as per the standard, a block is defined as having any one of the external dimensions of which is greater than the corresponding dimension of a brick. In simple terms, blocks are larger in overall size than bricks. The height of a block shall not exceed either its length or six times its width.

4. PRODUCTION CAPACITY PER YEAR

The plant and machinery proposed in the project has a production capacity of 120000 Nos. per year of preformed foam cellular concrete blocks of size 600mm×200mm×250mm. At 75% utilization of machinery and equipment and 75% efficiency of manpower, production of 90000 Nos. of blocks per year is taken into consideration.

Blocks of different sizes can be manufactured using different size of moulds. However, for convenience of computations, blocks of size 600mm×200mm×250mm has been considered. Gang moulds with moulding of 4 to 5 blocks at a time may be used.

5. UTILITIES: 15 HP industrial electrical-power connection is required for the project.

6. POLLUTION CONTROL NEEDS: Suitable masks and gloves may be used by workers. Registration and norms of pollution control board are to be followed.

7. ENERGY CONSERVATION NEEDS: Energy efficient motors and LED lighting may be used.

F. **FINANCIAL ASPECTS**

FIXED CAPITAL

1. Land & Building

Sl. No.	Description	Qty	Unit	Rate	Amount (Rs)
1	Land	1000	Sq. Meters	600	600000
2	Shed	50	Sq. Meters	8000	400000
3	Concrete platform	250	Sq. Meters	1600	400000
4	Bore well with pump				100000
	TOTAL				1500000

2. Machinery and equipment:

Sl. No.	Description	Qty	Unit	Rate (Rs)	Amount (Rs)
1	Foam concrete mixer – 750-liter capacity	1	No.	250000	250000
2	Foam generator	1	No.	60000	60000
3	Foam concrete collecting tub-cum-trolley	1	No.	40000	40000
4	Air compressor	1	No.	40000	40000
5	Gang Moulds (5 blocks/mould)	75	Nos.	6000	450000
6	Blocks transfer trolley	2	Nos.	20000	40000
7	Electrical & EB Charges	LS			50000
8	Erection & Commissioning	LS			50000
9	Office equipment	LS			120000
	TOTAL (Rs)				1100000

3. PREOPERATIVE EXPENSES Rs. 200000
4. TOTAL FIXED CAPITAL (F.1+F.2+F.3)=(1500000+1100000+200000) Rs. 2800000
5. WORKING CAPITAL

i. Personnel (per month)

Sl. No.	Designation	No	Salary (Rs)	Amount (Rs)
1	Skilled workers	2	10000	20000
2	Semi skilled workers	4	7500	30000
	Perquisites @ 15% (Rs)			7500
	TOTAL (Rs)			57500

ii. Raw materials (per month)

Sl. No.	Description	Qty	Unit	Rate (Rs)	Amount (Rs)
1	Cement	50	Tons	8000	400000
2	Fly ash	125	Tons	1000	125000
3	Foaming agent	250	Kg.	120	30000
	TOTAL (Rs)				555000

iii. Utilities (per month)

Sl. No.	Description	Qty	Unit	Rate (Rs)	Amount (Rs)
1	Power	750	kWh	6	4500
2	Water	500	KL	5	2500
3	Lubricants	LS			3000
	TOTAL (Rs)				10000

iv. Expenses (per month):

Sl. No	Particulars	Rate	Amount (Rs)
1	Consumables, repairs and maintenance	LS	12500
2	Sales expenses, office expenses, insurances, taxes	LS	12500
	TOTAL (Rs)		25000

v. Total recurring expenditure (per month) : Rs. 647500

vi. Working Capital (on 3-months basis) : Rs.1942500

6. TOTAL CAPITAL INVESTMENT

Sl. No.	Description	Amount (Rs)
1	Fixed Capital	2800000
2	Working Capital	1942500
	TOTAL (Rs)	4742500

G. **FINANCIAL ANALYSIS**

1. Total Expenditure (per year):

Sl. No.	Description	Amount (Rs)
1	Total recurring expenditure	7770000
2	Depreciations and Amortizations	265000
3	Interest on capital investment @ 10% per annum	475000
	TOTAL (Rs)	8510000

2. Revenue (per year):

Sl. No.	Item	Quantity	Unit	Rate (Rs)	Amount (Rs)
1	Preformed foam cellular concrete blocks	90000	Nos.	110	9900000

3. Net profit per year (G.2 – G.1) : Rs 1390000

4. Net profit ratio (per cent) $= \frac{\text{Net Profit per year}}{\text{Sales Turnover per year}} \times 100 = \frac{1390000}{9900000} \times 100 = 14\%$

$= \frac{\text{Net Profit per year}}{\text{Sales Turnover per year}} \times 100 = \frac{1390000}{9900000} \times 100 = 14\%$

5. Rate of Return (per cent) $= \frac{\text{Net Profit per year}}{\text{Total Capital investment}} \times 100 = \frac{1390000}{4742500} \times 100 = 29\%$

$= \frac{\text{Net Profit per year}}{\text{Total Capital investment}} \times 100 = \frac{1390000}{4742500} \times 100 = 29\%$

6. Break-even point (% of total production envisaged)

i. Fixed Cost (per year):

Sl No	Description	Amount (Rs)
1	Depreciation and Amortisation	265000
2	Interest on capital investment	475000
3	Insurance	30000
4	40% of salaries & wages	276000
5	40% of utilities and other expenses (excluding insurance)	108000
	TOTAL (Rs)	1154000

ii. Net profit per year (as per at Sl.No.G.3) Rs 1390000

iii. Break Even Point: $BEP = \frac{Fixed\ Cost \text{ per annum}}{\text{Fixed Cost per annum+Net Profit per annum}} \times 100$

$$= \frac{1154000}{1154000+1390000} \times 100 = \frac{1154000}{2544000} \times 100 = 45\%$$

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$$BEP = \frac{Fixed\ Cost \text{ per annum}}{\text{Fixed Cost per annum+Net Profit per annum}} \times 100$$

H. ADDRESSES OF SUPPLIERS OF MACHINERY & EQUIPMENT

1. EQUAD Consultancy Services, No.1, VOC Street, Mahalakshmi Nagar, Selaiyur, Tambaram East, Chennai – 600073. (www.eliteclc.com).
2. Engineers Enterprises, No.189, Bharathiyar Road, Ganapathy, Coimbatore – 641006 (www.eng-ent.com).

I. ADDRESSES OF SUPPLIERS OF RAW MATERIALS

1. Ordinary Portland Cement – from local stockists and dealers.
2. Fly Ash – from Thermal Power Stations from nearby locations.