17

L.T. Insulators and Electrical Porcelain

PRODUCT CODE	:	94336 and 94339
QUALITY AND STANDARDS	:	IS 1445:1997 IS 1283:2976
MONTH AND YEAR OF PREPARATION	:	January, 2003
PREPARED BY	:	Small Industries Service Institute Okhla Industrial Estate, Opp. Modi Flour Mills, New Delhi-110020 Phone Nos.: 26838118, 6838068, 26838269 Fax No.: 26838016 Gram: "SMALLIND" Email: sisi@del3.vsnl.net.in

Introduction

Electrical Porcelain and L.T. Insulators are of semi vitreous body. These products are in a position to withstand normal domestic voltage up to 440 volts. Glazed products are made for use in exposed weather and unglazed products are used in dry conditions. The main types of product(s) are: LT insulators, shackle insulators, split insulators, kit-kats, outlet boxes, switch boxes, connectors, plugs, sockets, lamp holders, bushes, cleats, label racks, bobbins etc.

They are used in telephone and power supply to houses and other electric applications like electric iron, toasters, stabilisers, transmission and distribution of power line at low voltage 220-440 volts in the telephone and telegraphic lines.

Market Potential

Due to developmental projects of Govt. of India and States for electrification of rural and urban areas in the country, the demand of these items and products is increasing day by day. The growth rate is anticipated to be around 15% per annum. The porcelain insulators are used in L.T. Electrical energy distribution systems and telegraphic communication system wherein these items are consumed for new erection and replacement by the State Electricity Boards, P&T Department, Railways etc. and private sector companies.

The demand of various types of insulators also exists due to upsurge in the building construction activities by private enterprises, societies and builders. The use of electrical appliances

is also increasing. These factors contribute to the increased demand of various types of ceramic insulating material in the domestic market. The industry has successfully tapped export market as well. Hence there is a good scope to set up this industry in the SSI sector.

Basis and Presumptions

By considering that the unit will work on single shift basis for 300 days in a year. However, the firing will carry out continuously on three-shift basis till particular firing cycle is completed in all aspects.

Margin money will vary from 10-25% depending upon the location and scheme adopted by the entrepreneurs.

Labour and wages are taken as per the prescribed minimum wages of Govt.

To achieve full plant capacity 1-2 months of production trial is necessary.

The costs of land, construction charges, machinery and equipment, raw materials and consumables, other contingent expenses etc. is taken in the profile as per prices prevailing in the market at the time of preparation.

Operative period of the project is around 10 years considering technology obsolescence rate and period of replacement of loan.

Implementation Schedule

Sl. No.	*Activity*	*Period*		
		Starting		*Completion*
1.	Survey for data collection in respect of demand, raw material, power and fuel technology and pollution control etc.	0	To	2nd month
2.	Arrangement of margin money	2nd	To	3rd month
3.	Preparation of project document and registration	2nd	To	3rd month
4.	Arrangement for financial assistance	4th	To	6th month
5.	Selection of site and development of land	4th	To	6th month
6.	Make shift office			7th month
7.	Clearance for pollution	3rd	To	5th month
8.	Electricity, fuel and water tie-up for availability	4th	To	6th month
9.	Selection of machine, placement order, construction and installation etc.	5th	To	10th month
10.	Selection of raw material, placement of orders and receipt of raw materials	9th	To	10th month
11.	Installation of laboratory	9th	To	10th month
12.	Trial production			12th month

Technical Aspects

Process of Manufacture

Main raw materials like china clay, ball clay, quartz, felspar, plastic fire clay are used for the preparation of body. Materials like whiting, barium carbonate, zinc oxide etc. are used for the preparation of glazes. The non-plastic raw materials are ground in ball mill to the fineness of 100-120 number mesh and water is added in desired proportion. China clay and other soft clays with 30-40% water are blunged in the blunger and sieved through 120 No. mesh and then passed through electromagnet in order to remove the iron particles.

Both slurries are mixed proportionately in the agitator tank. The slurry from the agitator tank is passed through filter press for dewatering to make cakes. L.T. Insulators like pin, shackles etc. are made by pressing or throwing process followed by turning on leather hardening.

For making the electrical pressed porcelain items, the cakes are dried and powdered in a disintegrator. Dry broken green articles are also mixed with this body with approx. 6% water and 3% oil is mixed to form consistent and uniform granules. The prepared mass is again passed through a sieve granulator, so that any lump formed during mixing is broken to form granules.

The mass is then pressed into shapes in a piller press/toggle press fitted with dies of desired shapes. The articles are then dried and finished. The articles are glazed, if required and then fired at the temperature of about 1280 °C in a shuttle kiln. The articles are taken out from the kiln are sorted and packed for selling.

Quality Control and Standards

The BIS has formulated and published IS 1445:1977 and IS 283:1976 for carrying out the various tests and specifications which may be used as basis for quality control.

Production Capacity

Quantity : 900 MT

Value : Rs. 1,04,40,000.

Motive Power

85 HP.

Pollution Control

Cyclonic dust collector to be installed to control the airborne dust during the crushing. The Kiln should conform to the specification to ensure clean operation as per the Pollution Control Act.

Energy Conservation

Industry needs energy conservation in fuel as well as in power consumption. The use of ceramic fibre in the shuttle kiln conserves 20-40% of fuel energy compared to conventional type of D.D. Kiln.

Financial Aspects

A. Fixed Capital

(i) Land and Building	Rate (Rs.)	Value (Rs.)
a) Land 2000 sq. metre	550 sq. meter	11,00,000
b) Building		
i) Machinery shed- 300 sq. metre	1800 sq. meter	5,40,000
ii) Kiln shed- 150 sq. metre	1800 sq. meter	2,70,000
iii) Raw material shed- 100 sq. metre	1200 sq. meter	1,20,000
c. Finished Goods		
i) Godown- 100 sq. metre	1800 sq. meter	1,80,000

(i) Land and Building	Rate (Rs.)	Value (Rs.)
ii) Office-60 sq. metre	2200 sq. meter	1,32,000
iii) Boundary wall	L.S.	91,000
	Total	24,33,000

(ii) Machinery and Equipments

Particular/items	Qty.	Value (Rs.)
Ball Mills, size 1800 mm×1800mm with all accessories and 10 HP Motor	2	1,40,000
Ball mill size 900 mm×900 mm with all accessories with 7.5 HP Motor	1	50,000
Screw Blunger, capacity 5000 litre vat size 2.8 metre x 1.8 metre with 2 HP motor including cemented tank	1	60,000
Vibrating screen size 900 mm x 600 mm with all accessories with 1 HP Motor	2	25,000
Electromagnetic separator with rectifier 200 volts AC	1	15,000
Agitator size 2.4 mx18m with 3 HP motor	1	45,000
Diaphram pump, stroke 225 mm, section 75mm with 7.5 HP motor	1	60,000
Filter press chamber dia 300mm and 50plates.	1	1,10,000
De-airing pug mill with all accessories and 10 HP, 1HP Motor each	1	1,15,000
Turning machine/lathe machine with 2 HP motor each	2	70,000
Disintegrator size 550 CM with all accessories and 7.5HP motor	1	55,000
Granules making machine with 2 HP motor	1	25,000
Toggle press, hand operated	7	1,69,000
Jigger and Jolly for shaping with 1 HP motor	1	35,000
Water pump set with 2 HP motor	1	25,000
Saggar press hand operated	1	28,000

Particular/items	Qty.	Value (Rs.)
Engineering workshop lathe bench, drilling machine, Arc welding other misc. tools etc.	L.S.	1,45,000
Testing equipments	L.S.	90,000
Electrification + installation charges	L.S.	1,17,000
	Total	13,79,000
Misc. Tools, dies, trolleys, weighing platform etc.		90,000
Cost of office furniture and fixture	L.S.	64,000
	Total	14,16,000

Shuttle Kiln	Qty.	Value (Rs.)
Ceramic lined shuttle kiln having two ears control system, oil storage tank and two extra ears.	1 No.	13,75,000
(iii) Pre-operative Expenses	L.S.	60,000
	Total	29,68,000
(+) Land and Building		24,33,000
Total Fixed Capital		54,01,000

B. Working Capital (Per Month)

(i) Salary and Wages (per month)

Description	No	Salary/ month	Total (Rs.)
Manager-cum ceramist	1	7,500	7,500
Supervisor	1	4,000	4,000
Accountant	1	3,500	3,500
Clerk-cum typist	1	3,000	3,000
Skilled workers	14	2,500	35,000
Semi-skilled workers	20	2,000	40,000
Peon	1	1,500	1,500
Watchmen	2	1,500	3,000
		Total	97,500
Perquisites @ 15% of total			14,625
		Total	1,12,125

(ii) Raw Material (per month)

Particular items	Qty. (MT)	Rate (Rs./MT)	Value (Rs.)
Quartz/silica sand	20	500	10,000
Felspar	25	600	15,000
China clay	20	1400	28,000
Ball clay/Fire clay	30	600	18,000
Glazing materials	2	7000	14,000
L.D.O (Fuel)	23 kL	14000 kL	3,22,000
Kiln furniture	LS		5000
Packing material	LS		10,000
		Total	4,22,000

(iii) Utilities (per month)		Value (Rs.)
a) Power 60 kWH x Rs.3.00x 8hrs.x25 days		36,000
c) Water	L.S.	500
	Total	36,500

(iv) Other Contingent Expenses (per month)	(Rs.)
Postage and Stationery	1,000
Consumable stores	2,000
Repair and Maintenance	6,000
Advertisement	1,000
Insurance	2,000
Misc. Expenses	1,500
Transport	1,500
Total	15,000

(v) Total Recurring Expenditure (per month)	(Rs.)
Salaries and wages	1,12,125
Raw materials	4,22,000
Utilities	36,500
Other Contingent expenses	15,000
Total	5,85,625
Total For 3 months	17,56,875

C. Total Capital Investment

Total fixed investment	Rs. 54,01,000
Total working capital	Rs. 17,56,875
Total	Rs. 71,57,875

Financial Analysis

(1) Cost of Production (per annum)	Value (Rs. lakhs)
Total recurring cost	70,27,500
Depreciation on building @ 5%	66,650
Depreciation on machinery and equipment @ 10%	1,37,900
Depreciation on mould, dies furniture and fixtures @ 20%	30,800
Depreciation on Kiln @ 20%	2,75,000
Interest on total investment @ 14%	10,02,102
Total	85,39,952

(2) Turn-over (per year)

Particular items	Qty.	Rate (Rs.)	Value (Rs.)
L.T. Insulator and Electrical porcelain items	900MT	11600	1,04,40,000

(3) Net Profit (per year)

= Sales – Cost of production

= Rs. 1,04,40,000 – 85,39,952

= Rs. 19,00,048

(4) Net Profit Ratio

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

$$= \frac{19,00,048 \times 100}{1,04,40,000}$$

= 18.2%

(5) Rate of Return

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

$$= \frac{19,00,048 \times 100}{71,57,875}$$

= 26.55%

(6) Break-even Point

Fixed Cost	(Rs.)
Total Depreciation	5,10,350
Interest on total Investment @ 14%	10,02,102
40% of salary and wages	5,38,200

Fixed Cost	(Rs.)
40% of other Contingent expenses	62,400
Insurance	24,000
Total	21,37,052

$$B.E.P. = \frac{21,37,052 \times 100}{21,37,052 + 19,00,048}$$

$$= 52.94\%$$

Addresses of Machinery Suppliers

1. M/s. Modern Engg. and Fabricating Works
Behind Kubeshwar Mahadev,
Saijpur (Ambavadi) Naroda Road,
Ahmedabad (Gujarat)
2. M/s. Perfect Machine Tools Corporation
1, Smith Road, Chennai-600001,
(Tamil Nadu)
3. M/s. St. Vincent Industries
Convent Road,
Calicut, (Kerala)
4. M/s. Jawa Traders
12, Getanjali, 1st Floor,
Fort Bay-378,
Mumbai-400 005
5. M/s. Sabarwal Metal Industries
9, Industrial Estate, Kalpi Road,
Kanpur-208012, (U.P.)

Tunnel Kiln/Shuttle Kiln

6. M/s. Bengal Lion (Industrial Furnace) Ltd.
27-B, Camal Street,
Kolkata-700016, (West Bengal)
7. M/s. Unifire Ltd.
16-18, Shakespere Sarai,
4th Floor,
Kolkata-700071. (West Bengal)
8. M/s. Teksaga Bhagat Carakiln (P) Ltd.
D-828-M, New Friends Colony,
New Delhi-110065. N.C.T.
9. M/s. Sharma Kiln Technology (P) Ltd.
206, Hare Krishna Complex,
Ashram Road,
Ahmedabad-280006

For Ceramic Fibre

10. M/s. Orient Cerawool Ltd.
99, KM Stone,
Ahmedabad-Surendra Nagar Highway,
Lakhtar,
Distt. Surendranagar,
(Gujarat)
11. M/s. Murugappa Morganite Ceramic Fibres Ltd.
28, Rajaji Road,
Post Box No. 1570
Chennai-600001
(Tamil Nadu)

Raw Material Suppliers

1. M/s. Wolkan (P) Ltd.
Mewar Indl. Estate,
Post Box No.21,
Udaipur,
(Rajasthan)
2. M/s. Multani Minerals
Station Road,
Junagadh,
(Gujarat)
3. M/s. Udayar Enterprises
1, Gandhi Road,
Salurn-676007.
4. M/s. United Mineral Ltd.
Comm. Bldg.,
102-Netaji Subhash Road,
Kolkata-70001.
5. M/s Tohla Ram and Sons
Rathkhna, Bikaner,
(Rajasthan)
6. Locally available.

Borax

M/s. Borax Morarji Co. Ltd.
Mahatma Gandhi Road,
Ambernath, Distt. Thane
(Maharashtra).

Soda Ash

1. M/s. Tata Chemicals
   Meethapur (Gujarat)
2. M/s. Sahn Chemicals Works
   Sahanpur, Varanasi.

Refractories

1. M/s. Belpahar Refractories Ltd.
   48, Chaurayee Road,
   Kolkata.
2. M/s. Carborundum Universal Ltd.
   11/12, North Bitch Road,
   (Chennai)
3. M/s. Orissa Industries Ltd.
   P.O. Narang Distt.
   Cuttack (Orissa)
4. M/s. Kumar Dubhi Fire Clay and Silica Works
   P.O. Kumar Dubhi,
   Distt. Dhanbad.