

PVC PIPE MANUFACTURING UNIT

Introduction:

Polyvinyl-Chloride (PVC) is a plastic product which has matchless versatility. It effectively replaces wood, paper and metal in several applications. As such plastic pipes have been progressively replacing conventional pipes like G.I., Cast Iron, Asbestos Cement or Stone-ware for a number of important and uses. Among the various types of plastic pipes which are commonly used for such applications PVC pipes are the most widely used all over the world on account of their most favourable balance of properties. PVC pipes are light in weight, rates for use under pressure, easy to install, low frictional loss, low on maintenance cost, and have low frictional loss. Rigid PVC pipes have wide variety of uses in fields like city/town/rural water supply scheme, spray irrigation, deep tube well schemes and land drainage schemes.

Market Potential:

PVC pipes are used for a variety of purposes e.g. water supply schemes, spray irrigation, deep tube well schemes and land drainage schemes. PVC slotted and corrugated pipes are ideal systems for drainages of water from land where water logging is inevitable. It is widely used by various utility services now-a-days too. The major consumer of PVC pipes are the Public Health Engineering Department (PHED) and Irrigation Departments. Besides these two, it is used by the Municipal Corporations, Tea estates as well as in N.E. Region. The usage of PVC pipes also depends upon the size of these pipes too. It is manufactured in different sizes having innumerable usage value.

The World Bank has recently given top priority in rural water supply in developing and under-developed countries. India has also received large amounts from World Bank aid for Rural Water Supply Schemes. However, due to the acute shortage of appliances including pipes this money could not be utilized to a large extent in our country. Thus PVC/HDPE pipe manufacturing industry has received higher priority. The requirement of PVC pipes in N.E. Region is around 10,000 MT out of which the requirement in Assam is more than 50% followed by Tripura and other five states of N.E. Region. At present there exist around 5 PVC pipes manufacturing units in the region.

Plant Capacity:

The production basis for a typical tiny unit would be as under:

Working hours/day	: 8 (1 shift)
Working days in a year	: 300
Annual Production capacity	: 150 MT PVC Pipes as follows:

Sl.No.	Dia of the pipe (mm)	Production in length (meter)	Weight per running meter (Kgs.)	Total production (MT)
1.	90	75,000	1,000	75.00
2.	110	53,571	1,415	75.00

The unit has been assumed to operate at 70%, 80% and 90% of its installed capacity in the first, second and third year and onwards of its operation.

Raw Material:

The main raw material required is compounded PVC resin. Presently both PVC & Polyethylene plastics raw materials are indigenously manufactured. Other compounding materials like plasticizers, stabilizers, lubricants and fillers are also manufactured in India. No problem is envisaged for procurement of PVC resin and the other required compounding materials. The raw materials required are as follows:

• PVC resin	:	150.00 MT
• DOP	:	6.80 MT
• Stabilizer	:	3.20 MT
• Processing acids	:	1.20 MT
• Colourant	:	0.70 MT
• Filler	:	10.20 MT

Process:

The various process steps involved in the manufacture of rigid PVC pipes are as follows:

- Extrusion
- Sizing
- Traction
- Cutting

Extrusion: PVC uncompounded resin, unlike some other thermoplastics is not suitable for direct processing. To confer the required processing and end instability, it is necessary to mix additives to the PVC resin. Following are some of the additives which are generally used for the manufacture of rigid PVC pipes.

Plasticizers: The common plasticizer in use are DOP, DIOP, DBP, DOA, DEP, Reoplast, Paraplex etc.

Stabilizers: The common stabilizers are lead, barium, cadmium, tin, stearate etc.

Lubricants: Widely used lubricants are Buty-Stearate, Glycerol Moni-Stearate, Epoxidised Monoester of oleic acid, stearic acid etc.

Fillers: Fillers are also used for producing special quality product (e.g. calcined clay is used to improve the electrical properties of cable compounds).

Before the extrusion operation PVC resin is to be compounded with plasticizers, stabilizers, lubricants and fillers to improve processibility and improve the endure stability. PVC resin is compounded with other ingredients in a high speed mixer. The compound resin is fed to the double screw extruder where the inserts and die body for the required pipe diameter are fitted. The PVC compounds are then passed through a heated chamber and they get melted under the compression of the screw and temperature of the barrel. The marking on the pipe is done at the time of extrusion.

Sizing: The pipes coming out from the extruder is cooled in the sizing operation. There are basically two types of sizing used for manufacturing of pipes. They are (i) Pressure sizing & (ii) Vacuum sizing.

Traction: The next operation needed after sizing is traction. The tube traction unit is required for continuous haulage of the pipes being extruded by the extruder.

Cutting: The last operation needed is cutting. There are basically two cutting techniques for rigid PVC pipes viz. manual and automatic. The pipes are then tented for ISI marks and are ready for dispatching.

Machinery:

The major equipment required for the unit are as follows:

- Windsor Model TSC-80 Rigid PVC Pipe plant for pipes 90 and 110mm OD – 1 No.
- High speed mixer capacity 100 kgs with controls and cooling arrangement – 1 No.
- Heavy duty scrap grinder – 1 No.
- Overhead water tank – 1 No.
- Air compressor 2 HP – 1 No.
- Pipe storage racks – 10 Nos.

Location:

The suitable locations for the project may be –

- Tinsukia, Bongaigaon in Assam.
- Jorabat/ Byrnihat in Meghalaya.
- Naharlagun in Arunachal Pradesh.
- Dimapur in Nagaland.
- Agartala in Tripura
- Gangtok and Jorthing in Sikkim

Infrastructure:

The basic infrastructure required are :

Land	:	6,000 sq.ft.
Building	:	1,800 sq.ft.
Power	:	25 KW
Water	:	1,500 Ltr. Per day.
Manpower	:	10 Nos. (Administrative (3), Factory Staff (7),

Total Capital Requirement:

The total capital requirement including fixed capital and working capital is estimated at Rs 45.00 lakhs as follows. Of this, the project cost comprising fixed capital and margin money on working capital is Rs 39.00 lakhs.

A. Fixed Capital:		(Rs in lakh)
Land & Building		Rented
Machinery		30.00
Miscellaneous fixed assets		3.30
Preliminary and pre-operative expenses		<u>2.20</u>
	Total (A)	35.50
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B. Working Capital:		
Raw materials & Packing material	1 month	4.60
Finished goods	2 weeks	2.50
Working expenses	1 month	0.90
Receivables	1 week	<u>1.50</u>
	Total (B)	9.50
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	Total (A)+(B)	45.00

Note: Working capital may be financed as:

Bank Finance	Rs 6.00 lakhs
Margin Money	<u>Rs 3.50 lakhs</u>
		Rs 9.50 lakhs
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Means of Finance:

The project cost of Rs 39.00 lakhs including margin money for working capital may be financed as under:

Promoter's contribution (35%)	Rs 13.65 lakhs
Term Loan (65%)	<u>Rs 25.35lakhs</u>
		Rs 39.00 lakhs
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Operating Expenses:

The annual operating expenses are estimated at Rs 71.95 lakhs (70% capacity utilization) as given below:

		(Rs in lakhs)
1.	Raw materials	55.00
2.	Utilities	1.00
3.	Wages & Salaries	6.00
4.	Overheads	1.50
5.	Selling expenses @ 1% on annual sales	1.10
6.	Interest on term loan (14%)	3.55
7.	Interest on Bank Finance for working capital (13%)	0.80
8.	Depreciation @10%	<u>3.00</u>
		<u>71.95</u>
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Sales Realization:

The basis on which average ex-factory sales realization from the sale of PVC pipe is based is provided below:

Items	Production (Meter)	Unit Sales Price (Rs per Meter)	Annual Sales Price (Rs)
PVC pipe 90mm	75,000	75/-	56,25,000
PVC Pipe 110mm	53,571	100/-	53,57,100
TOTAL			109,82,100 Say : Rs 110.00 lakh

Based on this the annual sales realization is estimated to be Rs 110.00 lakhs and at 70% capacity utilization the same is Rs 77.00 lakhs.

Profitability :

Based on the sales realization and the operating expenses, the profit would be Rs 5.05 lakhs per year (70% capacity utilization). This works out to a return on investment of 13%. The plant will break even at 54% of the rated capacity.

Highlight:

The major highlights of the project are as follows:

Total capital requirement	:	Rs 45.00 lakhs
Promoter's contribution	:	Rs 13.65 lakhs
Annual sales realization (70% cap.)	:	Rs 77.00 lakhs
Annual operating expenses (70% cap.)	:	Rs 71.95 lakhs
Annual profit (pre-tax)	:	Rs 5.05 lakhs
Pre-tax Return on Sales	:	8%
Break Even Point	:	54%
No. of persons employed	:	10

List of Machinery Suppliers:

1. M/s R.H. Windsor (India) Ltd.
E-6 – UZ Road,
Thane Industrial Estate,
Thane – 400 604
2. M/s British Plastic & Engineering Works
89.2, Block – A,
Naraina Industrial Area,
Phase-1,
New Delhi – 110 028
3. M/s Oswal Engineering Corpn.
142/48 S.V. Road,
Ghaswala Industrial Estate,
Jogeswari (West)
Mumbai – 400 102
4. M/s Kwaliti Engineering works,
48A, Muktaram Babu Street,
Kolkata – 700 007

List of Raw Materials Suppliers:

1. M/s National Organic Chemical Industries Ltd.,
Mafatlal Centre, Nariman Point,
Mumbai – 400 021
2. M/s Shriram Chemical Industries,
Shriram Nagar, Kota -4,
Rajasthan
3. M/s Calico Chemicals, Plastics & Fibres Division, Anik Chamber,
Mumbai – 400 074
4. M/s Indofil Chemicals Ltd.
Nirlon House,
Dr. Annie Besant Road,
Mumbai – 400 025
5. M/s Chika Limited,
Mehta Chambers, 13, Mathew Road,
Mumbai – 400 001
6. Indokem Limited,
Fort House, 221 D.N. Road,
Mumbai – 400 001
7. M/s Indian Dyestuff Industries Ltd.,
Mafatlal Centre, Nariman Point,
Mumbai – 400 021