

PLASTIC WATER STORAGE TANK

Introduction:

Plastic tanks and water tanks store substances utilized in industrial processes, such as water, sewage, petroleum and chemicals. They are utilized in numerous industries, such as the agricultural, oil/gas, water, waste treatment, medical, scientific and pharmaceutical industries. The structure of the plastic tank varies. Common tank shapes include cylindrical, square, rectangular, hexagonal and octagonal. The heads and bottoms of plastic tanks also differ, according to their function. Tanks can vary shape and size, even within the same type of application; for example, water tanks can be cylindrical, square, or funnel-shaped, and can hold anywhere from a couple gallons of water to tens of thousands.

The rotational moulding process is the most versatile area of the plastic processing industries. Rotational moulding can be used for making stress free mouldings consisting of several layers of even different material. The rotational moulding process is adaptable to a wide range of plastic raw materials. Raw materials used for rotomoulded process are synthetic polymers in powder form or synthetic resin paste. With rotomoulding, parts can be moulded economically in a variety of shapes and sizes, many of them being impossible to produce by any other process. Common rotationally moulded products include shipping drums, storage tanks, material handling pins, fuel tanks etc.

Plastic tanks have several advantages over the traditional steel tanks. Their seamless construction provides them with greater impact strength and superior resistance to rust, corrosion and fuel additives. These virtually indestructible tanks have a longer lifespan than steel tanks, which can fracture and leak. Plastic tanks can easily be moulded to fit tank compartments, unlike metal tanks, and are simple to install. This characteristic provides savings in size, weight and cost. Plastic tanks also cost less overall than steel tanks.

Market Potential:

The rotationally moulded tank has following field of applications:

- Agriculture (Sprayer tank, Mineral Feed tank, Grain hoppers, Waterier, Nurse tank, Tractor fuel tanks, Vegetable growing trays, Soil composter etc.)
- Industry (Chemical storage tank, Plating tank, Brine tank etc.)
- Transportation and Storage of Milk.
- Overhead water Storage tank mfg.

Considering only the water storage for domestic purpose, it is estimated that by the end of 2008 AD about 65,000 MT of plastic tank equivalent to 11,80,000 pcs of 500 Ltrs. & 1000 ltrs capacity will be required annually. The demand with in seven states of N.E. Region is estimated at the rate of 33,000 pcs per annum for the next 5 years which latter on will grow at the rate of 1.5% per annum. At present there are about 40 units both in organized and SSI sector, manufacturing plastic tank by conventional moulding as well as by Roto Moulding method. The total installed capacity of these units together is estimated at 38,000 TPY.

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	: 500 ltrs. Tank : 2000 pcs. 1000 ltrs. Tank : 1000 pcs.

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 materials required for manufacturing water storage tank are LDPE/LLDPE/HDPE (175 MT per annum), carbon black and other colourants,(5 MT per annum), hinges and inserts.

Process:

The rotational moulding process for manufacturing water storage tank consists of the following major process steps.

- Loading of raw material
- Moulding of the part
- Cooling or curing
- Unloading of finished part

Cycle time generally varies from 6 to 10 minutes. Cycle as low as 2 minutes can be achieved and extremely large part with heavy wall requires 15 minutes for each moulding cycle.

Loading: Raw material in the form of powder (35 to 40 mesh) or liquid state, is loaded into the mould or cavities and mould halves are mechanically locked together. Loading is generally accomplished before the machine has completed its previous cycle and ready to accept the mould.

Moulding the part: The prepared mould is next placed in a closed chamber where it is subjected to intense heat upto 400°C while rotating the mould bi-axially. Rotation is at low speed generally in the range of 1 – 40 rpm on the minor axis and 1 – 12 rpm on the major axis. A 4:1 rotation is common however both variable speeds and variable ratios are used for moulding unusual configuration.

Cooling or curing: The mould containing formed part is then transferred to a second enclosed chamber where it is subjected to a combination of water spray and forced air cooling while continuing to rotate biaxially. This causes the part to cure evenly and mould to reach handling temperature.

Unloading: Like loading this can be accomplished manually by simply opening the mould and physically removing the parts or automatically by using forced air to facilitate the ejection of the part.

Machinery:

The major equipment required by the unit for manufacturing water storage tanks are as follows:

- Rotational moulding machine.
- Thermoforming machine.
- Raw material preparation plant consisting of pulveriser, mixer etc.
- Compressor.
- Cooling water tank.
- Gas fired heating system.
- Inert gas system.

Location:

The suitable locations for the project may be –

- Kokrajhar, Tinsukia, Silchar in Assam.
- Dimapur in Nagaland.
- Naharlagun in Arunachal Pradesh.
- Agartala in Tripura.
- Barapani in Meghalaya.

Infrastructure:

The basic infrastructure required are :

Land	:	10,000 sq.ft.
Building	:	5,000 sq.ft.
Power	:	30 KW
Water	:	1,000 Ltr. Per day.
Manpower	:	12 Nos. (Administrative (3), Factory Staff (9),

Total Capital Requirement:

The total capital requirement including fixed capital and working capital is estimated at Rs 38.70 lakhs as follows. Of this, the project cost comprising fixed capital and margin money on working capital is Rs 35.70 lakhs.

A. Fixed Capital:		(Rs in lakh)
Land		Rented
Building		Rented
Machinery		28.00
Miscellaneous fixed assets		4.00
Preliminary and pre-operative expenses		<u>1.50</u>
	Total (A)	33.50
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B. Working Capital:		
Raw materials & Packing material	1 month	1.40
Finished goods	2 weeks	1.40
Working expenses	1 month	0.80
Receivables	2 weeks	<u>1.60</u>
	Total (B)	5.20
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	Total (A)+(B)	38.70

Note: Working capital may be financed as:

Bank Finance	Rs 3.00 lakhs
Margin Money	<u>Rs 2.20 lakhs</u>
		Rs 5.20 lakhs
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Means of Finance:

The project cost of Rs 35.70 lakhs including margin money for working capital may be financed as under:

Promoter's contribution (35%)	Rs 12.50 lakhs
Term Loan (65%)	<u>Rs 23.20 lakhs</u>
		Rs 35.70 lakhs
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Operating Expenses:

The annual operating expenses are estimated at Rs 32.40 lakhs (70% capacity utilization) as given below:

		(Rs in lakhs)
1. Raw materials		16.50
2. Utilities		1.00
3. Wages & Salaries		7.00
4. Overheads		0.60
5. Selling expenses @ 2.5% on annual sales		1.00
6. Interest on term loan (13.50%)		3.10
7. Interest on Bank Finance for Working Capital (12.75%)		0.40
8. Depreciation @10%		<u>2.80</u>
		32.40
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Sales Realization:

The basis on which average ex-factory sales realization from the sale of water storage tank at 100% capacity utilization is as follows:

Items	Nos.	Unit Sales Price (Rs)	Annual Sales Price (Rs)
Water storage tank- 500 ltrs.	2000	1400/-	28,00,000
Water storage tank – 1000 ltrs	1000	2800/-	28,00,000
TOTAL			56,00,000

Based on this the annual sales realization is estimated to be Rs 56.00 lakhs and at 70% capacity utilization the same is Rs 39.20 lakhs.

Profitability :

Based on the sales realization and the operating expenses, the profit would be Rs 6.80 lakhs per year (70% capacity utilization). This works out to a return on investment of 20%. The plant will break even at 49% of the rated capacity.

Highlight:

The major highlights of the project are as follows:

Total capital requirement	:	Rs 38.70 lakhs
Promoter's contribution	:	Rs 12.50 lakhs
Annual sales realization (70% cap.)	:	Rs 39.20 lakhs
Annual operating expenses (70% cap.)	:	Rs 32.40 lakhs
Annual profit (pre-tax)	:	Rs 6.80 lakhs
Pre-tax Return on Sales	:	17%
Break Even Point	:	49%
No.of persons employed	:	12

List of Machinery Suppliers:**List of Raw Materials Suppliers:**

1.	M/s Brimco Plastic Machinery Pvt. Ltd., "Brimco House", 55, Govt. Industrial Estate, Charkop, Kandivili (West), Mumbai- 400067: for Extruders.	1.	M/s Hoechst Dues and Chemicals Ltd., Hoechst House, 193, Backbay Reclamation, Nariman Point, Mumbai-400021: for HDPE.
2.	M/s R.H. Windsor (India) Ltd. E-6 – UZ Road, Thane Industrial Estate, Thane – 400 604	2.	M/s Indian Petrochemical Corporation Ltd., Badodara, Gujrat: for LDPE
3.	M/s Oswal Engineering Corpn. 142/48 S.V. Road, Ghaswala Industrial Estate, Jogeswari (West) Mumbai – 400 102	3.	M/s Chika Limited, Mehta Chambers, 13, Mathew Road, Mumbai – 400 001
4.	M/s Kwaliti Engineering works, 48A, Muktaram Babu Street, Kolkata – 700 007	4.	M/s Indian Dyestuff Industries Ltd., Mafatlal Centre, Nariman Point, Mumbai – 400 021