

PLASTIC WATER STORAGE TANK

1. INTRODUCTION

Polyethylene water storage tanks are ideal for economic and hygienic storage of potable water in residential buildings, industrial units, business complexes, in fact anywhere and everywhere. These tanks are moulded in one piece. Water storage tanks are without any seams, joints or welds.

Because of their light weight, these tanks are easy to install and are extremely mobile. They are very light for the volume of water stored. A tank capable of storing 2000 litres of water weighs only 65 kgs. as against 0.5 MT in case of M.S. tank and 2 MT in case of RCC tank of a similar capacity. These tanks are rust proof and leak proof. Hence they practically require little or no maintenance.

These tanks have double the life than that of RCC tanks and three to four times than that of M.S. tanks. The temperature of water inside is maintained for a considerable longer time than an M.S. tank because polyethylene is a bad conductor of heat.

2. PRODUCTS AND ITS APPLICATION

A water tank is a container for storing water. The need for water tanks is as old as civilization. Tanks were used to provide storage of water for use in many applications, drinking water, irrigation agriculture, fire suppression, agricultural farming, both for plants and livestock, chemical manufacturing, food preparation as well as many other uses.

3. DESIRED QUALIFICATION FOR PROMOTER

The Promoter should have preferably a basic degree in plastic engineering/ processing or a degree/ diploma in engineering / or a degree in chemistry. Experience of at least two to three years in plastic industry is desirable.

4. MARKET POTENTIAL AND MARKETING ISSUES, IF ANY

Rotational moulding is new to the plastic industry because of its importance as processing method. Though the art is an old one but technological advancement during the last twenty years has caused growth of several sizeable industries and is rapidly gaining interest on a widespread basis.

Rot-moulded Plastic Water storage tanks being lighter in weight are easy in handling and can be easily fitted at any desired place, and are hence preferred and practically replacing the conventional tanks of steel, cement concrete or stone. These tanks are available in market in various sizes and shapes. The prices of these tanks are at the rate of Rs. 3 per liter of water capacity approximately. The demand of plastic water storage tanks is increasing day-by-day. They are not only installed in the individual houses and flats but are also fitted in factories, group housing schemes and multistoried buildings as well. Field investigations have revealed that due to increase in the house building activities and preference given by the Government to provide homes to the homeless people, the demand for plastic water storage tanks is likely to increase in the years to come. Hence there is a good scope for establishing a few units for the manufacture of water storage tanks by rot Moulded process.

5. RAW MATERIAL REQUIREMENTS

- LLDPE
- Master batch black
- LPG Industrial gas

6. MANUFACTURING PROCESS

Rotational Moulding is a process for producing hollow seamless containers of all sizes and shapes. The process does not involve high injection pressure or high shear rates. Black polyethylene powder of 35 mesh is weighed and charged in the mould. The mould is heated while it is being rotated about two perpendicular axes. Simultaneously a porous skin is formed on the mould surface which gradually melts as the heating cycle progresses. At the end of heating cycle a layer of homogenous uniform thick wall is formed. The mould then enters a cooling station where forced air/water spray cools the mould. It is then positioned in a work zone where the mould is opened, the tank is removed and the mould is recharged for next cycle.

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 up to 400oC 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 rmp 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 a dforced 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.

7. MANPOWER REQUIREMENT

Sr. No.	Particulars	Numbers	Salary Per Month
1	Production Engineer/Manager	01	10,000
2	Sales Executive	01	10,000
3	Accountant	01	10,000
4	Store Keeper-cum-Clerk	01	8,000
5	Watchman	01	5,000
6	Supervisor	02	16,000
7	Skilled Worker	04	32,000
8	Unskilled worker	05	35,000
	Total	16	1,26,000

8. IMPLEMENTATION SCHEDULE

Sr. No	Particulars	Time
1	The Time requirement for preparation of Project report	Two months
2	Time requirement for selection of Site	One month
3	Time required for registration as Small Scale Unit	One Week
4	Time required for acquiring the loan, Machinery procurement, erection and commissioning	Three months
5	Recruitment of labourer etc.	One month
6	Trial runs	One month

9. COST OF PROJECT

Sr. No.	Particulars	Rs in lakhs
1	Land and Building	30.00
2	Plant and Machinery	63.50
3	Miscellaneous Assets	18.00
4	P & P Expenses	10.00
5	Contingencies @ 10% on land and building and plant and machinery	9.35
6	Working capital margin	28.915
	Total	159.765

10. MEANS OF FINANCE

Sr. No.	Particulars	Rs. (lakhs)
1	Promoter's contribution	47.9295
2	Bank Finance	111.8355
3	Total	159.765

11. WORKING CAPITAL CALCULATION

Sr. No.	Particulars	Rs. lakhs	Stock Period days	Promoter Margin	Margin Amt.	Bank Finance
1	Salaries and wages	1.26	30	1	1.26	-
2	Raw material and packaging material	20.88	30	0.5	10.44	10.44
3	Utilities	1.27	30	0.5	0.635	0.635
4	Debtors	41.45	30	0.4	16.58	24.87
	Total	64.86				

12. LIST OF MACHINERY REQUIRED

Sr. No	Particulars	Rs. In lakhs
1	Bi-Axial rotomoulding Machine	50.00
2	Scrap Grinder	1.00
3	Testing Equipment & Other Accessories	1.50
4	Cost of Moulds & Dies	7.50
5	Office Equipment/Furniture/Computers etc.	3.50
	Total	63.50

13. PROFITABILITY CALCULATIONS

Sr. No	Particulars	Year 1	Year 2	Year 3	Year 4	Year 5
(A)	Sales Realization	31658900	36181600	40704300	40704300	40704300
(B)	Cost of Production					
1	Raw materials	25063500	28644000	32224500	32224500	32224500
2	Utilities	1530000	1740000	1950000	1950000	1950000
3	Salaries	1512000	1904520	2118120	2118120	2118120
4	Repairs and maintenance	60000	70000	85000	95000	105000

Sr. No	Particulars	Year 1	Year 2	Year 3	Year 4	Year 5
5	Selling expenses	78000	84000	90000	90000	90000
6	Administrative Expenses (other expenses)	350000	445000	555000	645000	725000
	Total	28593500	32887520	37022620	37122620	37212620
(C)	Profit before interest & depreciation	3065400	3294080	3681680	3581680	3491680
	depreciation	1402500	1402500	1402500	1402500	1402500
	Profit Before term loan and tax	1662900	1891580	2279180	2179180	2089180
	Interest on term loan (11%)	1186255	1054449	878707	702966	527224
	Profit before tax	476645	837131	1400473	1476214	1561956
	Tax (30%)	142993.5	251139.3	420141.9	442864.2	468586.8
	Total Profit	333651.5	585991.7	980331.1	1033349.8	1093369.2

14. BREAKEVEN ANALYSIS

Fixed Cost (FC):	Rs. In lakhs
Wages & Salaries	15.12
Repairs & Maintenance	0.6
Depreciation	14.03
Admin. & General expenses	3.5
Interest on Term Loan	11.86
Total	45.11

Fixed Cost: 45.11

Profit After Tax: 3.34

$$\text{BEP} = \text{FC} \times 100 / \text{FC} + \text{P}$$

$$45.11 / 48.45 \times 70 / 100 \times 100$$

65.17%