

MANUFACTURING OF MONO PUMP SETS

1. INTRODUCTION:

Pump sets are widely used devices to lift and supply water or other liquids to distant locations. There are various type of centrifugal pumps used for different purposes like industrial, domestic, agricultural etc. Prime mover can be either diesel engine or electric motor. The running cost of electrical driving is less than the diesel engine.

2. PRODUCT & ITS APPLICATION:

Mono set Pumps are one of the widely used devices for domestic and agricultural purposes in preference to other type of pumps on account of their low cost, simplicity of construction and easy maintenance.

In Mono set pump, the prime mover – electric motor and pump units are mounted on the same shaft and that is why this arrangement is called mono set pump. This pump set is of centrifuge type. This pump set offers advantage viz better efficiency, less maintenance as and very compact size.

Normally the pumps used in large quantities are offered in capacity of power range of

0.25 KW to 15 KW range construction type of normal design or submersible type design with self-priming type. These products are widely used for domestic and general agricultural purposes. Mono set pumps are available in different sizes from 1/2" × 1/2" to 4" × 4" inlet size and operating range of head 20 Ft. to 110 Ft. and in discharge 9 LPM to 1250 LPM.

In the domestic range 0.5 H.P. to 1.0 H.P., pump sets can also be designed and manufactured with the Aluminum extruded body instead of conventional Cast Iron.

This is mainly reduces the weight of the pump and makes it non-corrosive thus giving better life.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Graduate with mechanical engineering background and experience.

4. INDUSTRY OUTLOOK/ TREND

Water Pumps market in India is witnessing an impressive rate of growth on the back of depleting ground water level, rapid urbanization, and various infrastructure initiatives launched with the purpose of improving infrastructure including construction of roads, homes, toilets, schools and cleaning of major water bodies and rivers such as the Ganges, Yamuna, etc.

Mono set Pumps are one of the widely used devices in domestic and agriculture for water supply. Some of these are also used in industries like food, dairy, chemical, pharma etc. for water systems. It is estimated that the production of pumps in the country is presently of the order of Rs. 3500 crores, (US\$ 750 million), produced by some 800 odd manufacturers of large, medium and small scales. The pump manufacturers are able to meet most of the domestic market demand and they also export pumps to both developing and developed countries. The SME cluster is located near Ahmedabad, Rajkot in Gujarat, Coimbatore in South India, and Agra, UP and Delhi/ Haryana region. The products from the regional vendors are much cheaper especially in price sensitive agriculture and domestic water supply markets. The prominent vendors in the market are Best Pumps, Falcon Pumps, Sam Turbo Industry, Sulzer, Jyoti, Shakti Pumps, WPIL, C.R.I. Pumps, Kirloskar, KSB etc.

5. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

Domestic pump sets have very good market potential as its demand emerges mostly from new and replacement needs of domestic users. In view of ever growing need for potable and irrigation water, pumps have good market potential in Govt. sector as well as in urban housing sector.

Our country is embarking on massive housing and irrigation expansion, which will lead to growing demand for the monoset pumps product. The water pump market in India is projected to surpass \$ 3.8 billion by 2022 and expected to grow at a CAGR of 13 %. This is mainly attributed to the massive irrigation and domestic water supply needs.

The massive investment in housing sector is coming up under the “Housing for All” mandate of government and infrastructure will lead to huge investment in commercial buildings lead to water supply pump sets. Besides new installation, there is substantial and growing demand from replacement markets.

There is good market potential for this item, if a competitive price and good quality is offered. The pump sets up to 15 HP for clear water service have steady demand growth in our country and also find good export potential.

6. RAW MATERIAL REQUIREMENTS:

The pump set construction demands almost 70% material from cast iron viz motor body and pump impellers. The shaft is made of steel and requires steel bars. The motor construction requires electrical stamping and enameled and plastic insulated copper winding wires of different gauges. Other parts are bearing bushes of brass/bronze.

7. MANUFACTURING PROCESS:

The following items are main components of a Mono set pump:

Cast Iron body /Aluminum Extruded Section as a body.

Electrical Stamping and enameled copper wire winding

En-8 rod for Shaft

C.I. /Gun Metal/NORYL - Plastic Impeller

C.I. Pump body

Mechanical Seal

Precision ball bearings

Cast Iron/Plastic foot valve - No foot valve in the case of self-priming pump design.

The process of manufacture involves getting the castings from foundry as per design and machining. The Stator Lamination stamping are Staked in motor body and the Stator Winding is carried out. The rotor is assembled from machined Shaft followed by assembly of Rotor Core Staking; Brazing of rotor core with copper conductors and end rings, pressing of rotor core with shaft and coating Insulation in Rotor followed by assembly of Motor and testing is carried out.

The pump body casting and pump impeller casting is machined. These are then mounted on motor shaft and to get the final mono set pump - motor assembly.

The pump set is tested on the testing station for pump head, flow rate and motor power rating.

Pump sets are then Painted name plate is fixed with pump specifications. It is advised to follow Quality Control and Standards as per IS 9079:1989 for Mono set Pumps for Clear, Cold Water for agricultural purposes.

8. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 8 employees initially and increase to 21 or more depending on business volume.

Sr. No	Type of Employees	Monthly Salary	No of Employees				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Skilled Operators	18000	1	2	2	3	4
2	Semi-Skilled/Helpers	8000	4	6	8	10	12
1	Supervisor/Manager	25000	1	1	2	2	2

2	Accounts/ Marketing	16000	1	1	2	2	2
3	Other Staff	8000	1	1	1	1	1
	TOTAL		8	11	15	18	21

9. IMPLEMENTATION SCHEDULE:

The unit can be implemented within 6 months from the serious initiation of project work.

Sr. No	Activities	Time Required in Months
1	Acquisition of Premises	1
2	Construction (if Applicable)	2
3	Procurement and Installation of Plant and Machinery	2
4	Arrangement of Finance	2
5	Manpower Recruitment and start up	2
	Total Time Required (Some Activities run concurrently)	6

10. COST OF PROJECT:

The unit will require total project cost of Rs 71.58 lakhs as shown below:

Sr No	Particulars	In Lakhs
1	Land	15.00
2	Building	25.00
3	Plant and Machinery	18.40
4	Fixtures and Electrical Installation	2.15
5	Other Assets/ Preliminary and Preoperative Expenses	1.20
6	Margin for working Capital	9.83
	TOTAL PROJECT COST	71.58

11. MEANS OF FINANCE:

The project will require promoter to invest about Rs 25.27 lakhs and seek bank loans of Rs 46.31 lakhs based on 70% loan on fixed assets.

Sr. No	Particulars	In Lakhs
1	Promoters Contribution	25.27
2	Loan Finance	46.31
	TOTAL:	71.58

12. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr. No	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	3.74	40	1.50	2.25
2	Receivables	5.57	50	2.79	2.79
3	Overheads	4.05	100	4.05	0.00
4	Creditors	3.74	40	1.50	2.25
	TOTAL	17.11		9.83	7.28

13. LIST OF MACHINERY REQUIRED:

Sr. No	Particulars	UOM	Quantity	Rate	Total Value
	Main Machines/ Equipment				
1	Hacksaw machine	Nos	2	40000	80000
2	CNC Lathe machine	Nos	2	350000	700000
3	Milling machine	Nos	1	25000	250000

				0	
4	Lamination Punching Power Press	Nos	1	35000	35000
5	Slotting machine	Nos	2	35000	70000
6	Lathe Machine	Nos	3	75000	225000
7	Drilling Machine	Nos	2	40000	80000
8	Press for Lamination pressing	Nos	1	75000	75000
9	Motor Varnishing tank	Nos	1	45000	45000
10	Motor Testing Equipment	LS	2	15000	30000
11	Pump Test system as per BIS	Nos	1	150000	150000
	Subtotal:				1740000
	Tools and Ancillaries				
1	tools and gauges	LS	1	70000	70000
2	Misc. tools etc.	LS	1	30000	30000
	Subtotal:				100000
	Fixtures and Elect Installation				
	Storage racks and trolleys	LS	1	25000	25000
	Other Furniture	LS	1	20000	20000
	Telephones/ Computer	LS	1	30000	30000
	Electrical Installation	LS	1	140000	140000
	Subtotal:				215000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	120000	120000
	TOTAL PLANT MACHINERY COST				2175000

All the machines and equipment are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines and tooling to have modern and flexible designs. It may be worthwhile to look at reconditioned imported machines, dies and tooling. Some of the machinery and dies and tooling suppliers are listed here below:

1. Techno Machines

Chikkanahalli Road, Opp. Shahi Exports (Unit No 6),
Near Annapoorneshwari Temple, Bommanahalli,
BENGALURU-560 068, INDIA

2. S. S. Engineering Works
Plot No. 100, Sector 6 IMT Manesar, Gurgaon - 122050, Haryana, India
3. Taurus Private Ltd Co
No. 24, D 2 / E 3, Kiab Industrial, Area At Pivele
Kiab Industrial Area, Bengaluru - 560100 Karnataka, India
4. Micro Engineering Works;
No. 6/140, Gandhi Nagar, Nallampalayam Road Nanjai Gounden, Pudur, G. N.
Mills Post, Coimbatore - 641029, Tamil Nadu, India
5. S. G. Profile
Plot No. 201/1, Gala No. 56, Morya Industrial Estate, MIDC, Bhosari, Bhosari
Midc,
Pune-411026, Maharashtra, India

The above list of machine supplier is illustrative. There are many machinery, dies and tools suppliers and consultants at several industrial clusters all over India where you may find suppliers of services and machinery for a chosen product mix. Other well known machine manufacturers can be searched from directories/ internet.

14. PROFITABILITY CALCULATIONS:

Sr. No	Particulars	UOM	Year Wise estimates				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Capacity Utilization	%	40	50	60	70	80

2	Sales	Rs Lakhs	66.89	83.61	100.33	117.05	133.78
3	Raw Materials & Other Direct Inputs	Rs Lakhs	29.94	37.42	44.91	52.39	59.88
4	Gross Margin	Rs Lakhs	36.95	46.19	55.42	64.66	73.90
5	Overheads Except Interest	Rs Lakhs	25.94	25.94	25.94	25.94	25.94
6	Interest	Rs Lakhs	6.48	6.48	6.48	6.48	6.48
7	Depreciation	Rs Lakhs	4.68	4.68	4.68	4.68	4.68
8	Net Profit Before Tax	Rs Lakhs	-0.14	9.09	18.33	27.57	36.81

The basis of profitability calculation:

Unit will have capacity of 5000 nos per year of Monoset pumps of various type/ ratings. Depending on the type/ size/ ratings the price range is taken from Rs. 1500 to Rs 15000 or more per unit. The material requirements are forged, cast parts, MS Rods, bars, Carbon alloy steel, electrical stamping, copper winding wire etc. They cost in range of Rs 25 per Kg to Rs 400 per kg. Other items like cables, insulation varnish, tapes etc. are bought out at market rates. The unit may generate scrap which is to be sold at @ Rs 20 ~ 80 per Kg depending on type. The income of same is added. Consumables costs also considered based on prevailing rate. Energy Costs are considered at Rs 7 per Kwh. The depreciation of plant is taken at 10 % and Interest costs are taken at 14 -15 % depending on type of industry.

14. BREAK EVEN ANALYSIS

The project is can reach break-even capacity at 40.16 % of the installed capacity as depicted here below:

Sr. No	Particulars	UOM	Value
1	Sales at Full Capacity	Rs Lakhs	167.22
2	Variable Costs	Rs Lakhs	74.85
3	Fixed Cost incl. Interest	Rs Lakhs	37.09
4	Break Even Capacity	% of Inst Capacity	40.16

16. STATUTORY/ GOVERNMENT APPROVALS

The unit will require state industry unit registration with District Industry center. No other procedures are involved. For export, IEC Code and local authority clearances. The industry registration and approval for factory plan, safeties etc. are required as per factory inspectorate and labor laws. Other registration are as per Labor laws are ESI, PF etc. Before starting, GST registration will be required for procurement of materials as also for sale of goods. As such there is no pollution control registration requirement, however the unit will have to ensure safe environment through installation of chimney etc. as per rules. Solid waste disposal shall have to meet the required norms. Entrepreneur may contact State Pollution Control Board where ever it is applicable.

17. BACKWARD AND FORWARD INTEGRATION

The machines and equipment offer scope for diversification in to producing several industrial parts/ components and parts of hydraulic systems and auto components. The unit can utilize the spare capacities. As such there is not much scope for organic backward or forward integration. The entrepreneur needs to ensure proper selection of product mix and also be careful in maintaining product parameters in terms of dimensions, tolerances and geometric profiles along with final weights of products.

The workshop business needs building up reputation, ensuring reliability and quality of services rendered. Also personal rapport of key persons can generate good business volumes from OEM units and ancillary component unit. The location with good catchment area ensures good market potential to new business units.

18. TRAINING CENTERS/COURSES

There are no specific training centers for product technology. The Prototype Development Centers can provide some assistance for precision machining, Tools development, etc. Other centers of excellence viz Indo German Tool Room at

Ahmedabad, Rajkot, Chennai, etc. shall be helpful. The most important scope of learning is in product design and development by study of the new product designs, product range, features and specifications of leading Brands / competitors across the world by scanning the Internet and downloading data from websites.

Udyamimitra portal (link: www.udyamimitra.in) can also be accessed for hand-holding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

Entrepreneurship program helps to run business successfully is also available from Institutes like Entrepreneurship Development Institute of India (EDII) and its affiliates.

Disclaimer:

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.

Source:- Udyami Mitra/Sidbi