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. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

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.

There is good market potential for this item, if a competitive price and good quality is offered. The demand of this pump emerges mostly from state irrigation departments, farmers, land owners, domestic users, co-operative societies, etc. Due to massive use in residential and other buildings market and agri – irrigation, there is regular demand for new and replacement markets. The pump sets up to 15 HP for clear water service have steady demand growth in our country and also find good export potential.

5. 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.

6. 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.

7. 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

8. 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

9. 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

10. 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

11. 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

12. LIST OF MACHINERY REQUIRED:

The layout of unit suitable for different activities are planned to ensure smooth material and product flow.

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	250000	250000
4	Lamination Punching Power Press	Nos	1	35000	35000
5	Slotting machine	Nos	2	35000	70000

Sr. No	Particulars	UOM	Quantity	Rate	Total Value
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

13. 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

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