MANUFACTURING OF PUMP SETS FOR AGRICULTURAL (SUBMERSIBLE)

1. INTRODUCTION:

Submersible Pump sets are the ones which are submerged in water to pump up – lift the water from deep bore wells and wells. Since these pumps are submerged in water it does not have priming problem. Submersible pump is used for continuous discharge of water in large quantity as well as for high heads.

It is widely used devices to lift and supply water from deep bore wells to distant locations.

2. PRODUCT & ITS APPLICATION:

These pump sets have electric prime mover mounted integrally on same shaft. The shape and construction of pump and motor is very compact and it is made cylindrical to fit the bore diameter so that it can be lowered down drilled bore hole easily inside a bore casing pipe. The pump is mostly multistage centrifugal type due to depth from which it lifts water. 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
5 Hp to 75 HP range submersible design. These products are available in different sizes from 1/2" to 6" outlet size and operating range of head 30 mtrs to 500 mtrs head and with discharge capacity of discharge 50 LPM to 3000 LPM.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Graduate with mechanical engineering background and experience.

4. INDUSTRY OUTLOOK/ TREND

The pumps market in India is characterized by the presence of several international vendors, large regional vendors, and small and mid-sized regional pump manufactures. The market is highly competitive and Indian vendors compete directly with global players very effectively.

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.

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.

The submersible pump is used by for Irrigation and for domestic potable water supply. Also the residential societies and commercial buildings to augment the water needs. Of the total water supply pump demand, the agriculture sector has 35% share of total demand while domestic water supply segment demand is pegged at 18% and balance from various other segments in industry, commercial and waste water treatment sector.

5. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

In view of ever growing need for potable and irrigation water, submersible 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

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 rise in urbanization increases the need for water and other utilities such as oil and gas, water, and power, in turn, creating the demand for pumps.

The agriculture segment account for about 35% of the total pumps market in India. The increase in consumption rate, rise in agriculture exports, the growth in the food processing industry, and growth in organic farming will result in the growth of the agriculture sector, additionally; the expected investments from the government toward irrigation projects will also drive the demand for the market.

There is regular demand for new and replacement of pumps. The pump sets up to 50 HP for clear water service will have steady demand growth in our country. These pumps also have very export potential in developing countries of Asia and Africa. It is suggested to take up 5 hp to 30 HP as product range with axial and mixed flow design of pumps. These are having mass requirement. With good design, quality and competitive price, the project will have good success.

6. RAW MATERIAL REQUIREMENTS:

The submersible pump set construction demands almost 70% materials of cast iron castings for motor and pumps body. The pump impellers are cast from bronze. The shaft is made of EN 8 and requires steel bars. The motor construction requires electrical grade stamping. The winding wire is usually insulated with PVC or PE copper wire as motor is submerged. Other parts “O” rings seals of Vinyl, Viton etc., mechanical seal and bearings.

7. MANUFACTURING PROCESS:

The process of manufacture involves getting the castings from foundry as per design and machining. The shaft and pump impeller casting are machined. 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 impeller bearings/ bushes etc. are then mounted on motor shaft to get the final submersible 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 and name plate is fixed with pump specifications. It is advised to follow Inspection & testing of the submersible pump as per IS: 8034.

8. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 11 employees initially and increase to 22 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	2	3	4	5	6
2	Semi-Skilled/ Helpers	8000	6	8	10	12	12
3	Supervisor/ Manager	25000	1	1	1	1	1
4	Accounts/ Marketing	16000	1	1	2	2	2
5	Other Staff	8000	1	1	1	1	1
	TOTAL		11	14	18	21	22

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	2
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 86.31 lakhs as shown below:

Sr No	Particulars	In Lakhs
1	Land	20.00
2	Building	30.00
3	Plant and Machinery	22.75
4	Fixtures and Electrical Installation	2.60
5	Other Assets/ Preliminary and Preoperative Expenses	1.50
6	Margin for working Capital	9.46
	TOTAL PROJECT COST	86.31

11. MEANS OF FINANCE:

The project will require promoter to invest about Rs 28.67 lakhs and seek bank loans of Rs 57.64 lakhs based on 70% loan on fixed assets.

Sr No	Particulars	In Lakhs
1	Promoters Contribution	28.67
2	Loan Finance	57.64
	TOTAL	86.31

12. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr. No	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	4.39	40	1.75	2.63
2	Receivables	7.74	50	3.87	3.87
3	Overheads	2.08	100	2.08	0.00

4	Creditors	4.39	40	1.75	2.63
	TOTAL	18.59		9.46	9.13

13. LIST OF MACHINERY REQUIRED:

Sr No	Particulars	UOM	Quantity	Rate	Total Value
	Main Machines/ Equipment				
1	Hacksaw machine	Nos	1	75000	75000
2	CNC Lathe machine	Nos	1	450000	450000
3	Milling machine	Nos	1	300000	300000
4	Lamination Press	Nos	1	35000	35000
5	Slotting machine	Nos	1	35000	35000
6	Lathe Machine	Nos	1	75000	75000
7	Drilling Machine	Nos	2	40000	80000
8	Dynamic Balancing Machine	Nos	1	600000	600000
9	Motor Varnishing & baking Oven	Nos	1	175000	175000
10	Motor Testing Equipment	LS	1	60000	60000
11	Pump Test system as per BIS	Nos	1	230000	230000
	subtotal :				2115000
	Tools and Ancillaries				
1	Tools and gauges	LS	1	100000	100000
2	Misc. tools etc.	LS	1	60000	60000
	subtotal :				160000
	Fixtures and Elect Installation				
	Storage racks and trolleys	LS	1	25000	25000
	Other Furniture	LS	1	25000	25000
	Telephones/ Computer	LS	1	40000	40000
	Electrical Installation	LS	1	170000	170000
	subtotal :				260000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	150000	150000
	TOTAL PLANT MACHINERY COST				2685000

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	46.42	58.02	69.62	81.23	92.83
3	Raw Materials & Other Direct Inputs	Rs Lakhs	26.32	32.90	39.48	46.06	52.64
4	Gross Margin	Rs Lakhs	20.09	25.12	30.14	35.17	40.19
5	Overheads Except Interest	Rs Lakhs	8.58	8.58	8.58	8.58	8.58
6	Interest	Rs Lakhs	8.07	8.07	8.07	8.07	8.07
7	Depreciation	Rs Lakhs	5.69	5.69	5.69	5.69	5.69
8	Net Profit Before Tax	Rs Lakhs	-2.24	2.78	7.80	12.83	17.85

The basis of profitability calculation:

Unit will have capacity of 3000 no's per year of Submersible pumps depending on design type/ ratings. Depending on the type/ size/ ratings of machines the price range is taken from Rs. 3000 to Rs 15000 or more per unit. The material requirements are forged, cast parts, MS sections, bars, sheets, 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.

15. 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	116.04
2	Variable Costs	Rs Lakhs	65.80
3	Fixed Cost incl. Interest	Rs Lakhs	22.34
4	Break Even Capacity	% of Inst Capacity	44.46

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, safety etc. is 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. 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 business needs building up reputation, ensuring reliability and quality of services rendered. Also personal rapport of key persons can generate good business volumes. 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.