PRESSURE BOOSTER SYSTEMS FOR HOUSEHOLD USE

1. INTRODUCTION:

A booster pump is a machine which will increase the pressure of a fluid like water and maintains the line pressure. The construction details will vary depending on system. Booster pumps are usually piston or plunger type pumps with or without accumulators.

A single-acting, single-stage booster is the simplest configuration, and comprises a cylinder, designed to withstand the operating pressures. When the booster is inactive, the line pressure is sensed by piston position. If line pressure is within limit, piston is stationary; fluid will flow from the inlet to outlet, through a valve into the space between the cylinder head and piston. When the pressure in the outlet is lower, piston position changes and activates the booster pump to start and pump will boost the supply pressure to the outlet side. Once pressure is achieved piston comes to the balanced position and booster pump action stops. Sometimes a pressure accumulator is placed to compensate sudden pressure loss as also to activate booster pump through accumulator piston position.

2. PRODUCT & ITS APPLICATION:

The booster system is used mainly to maintain line pressure in water supply system as constant pressure keeps lines clog free and prevents scale formation.

The booster system is favored in most high end residential and commercial housing construction like big hotels etc. to provide water supply at consistent pressure for operation of gadgets like showers, water heaters, etc. for large no of users.

The pressure booster systems can be designed in several ways with either pure hydraulic/ mechanical system or with help of pressure sensors and electronic controls. In remote areas, booster system with hydro mechanical controls operated with pressure cylinder can be designed. In large hotels, in urban area electronic systems are used to maintain line pressure.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Any ITI, Diploma or Graduate with some background in manufacturing or marketing.

4. INDUSTRY OUTLOOK/ TREND

With rise in water consumption leading to scarcity and lower supply, Water supply systems all over the country are plagued by several limitations. Leading to pressure drops. Due to this water is supplied for few hours in most cases and use of bore wells has increased. Despite all these the residential water supply is normally intermittent.

In establishments like Hotels, Hospitals, etc. requiring critical 24 hour fail safe supply, use of pressure booster systems has started. The domestic pressure booster systems can be designed in several ways with either pure hydraulic/ mechanical system or with help of pressure sensors and electronic controls. In remote areas, booster system with hydro mechanical controls operated with pressure cylinder can be designed. In large hotels, hospitals and in urban area electronic systems are used to maintain line pressure.

5. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

Pressure boosting systems in domestic water supply system is a new trend. In industrial applications these are used invariably to ensure smooth operations and production rate/ quality management. The domestic product designs are mostly based on scaed down versions of industrial systems. The products with automatic pressure controlled pump operations and a bladder tank with air/gas modules are popular.

The need for pressure booster units are becoming in establishments like Hotels, Hospitals, railways, airports metro and high end residential colonies. This being new trend the demand is in nascent stages. Due to its advantages these product installations are likely to increase and become popular so that residents can use their shower, wash room and other facilities in kitchens, bathrooms etc. Therefore a good system provider will always have potential.

6. RAW MATERIAL REQUIREMENTS:

Main materials required for the system are piston or plunger pumps, hydraulic cylinder, steel sheets and piping. For control system, components and modules like micro-controllers, hardware and plumbing items etc. bought out items will be required.

7. MANUFACTURING PROCESS:

The pressure booster systems are normally custom made considering the water supply system of customers. Depending on the water supply system, pressure booster system will consider the sizing of pumps, hydraulic accumulator, piping controllers etc. Most of the standard items are available in open market that are chosen and the pressure boosters units are designed, fabricated and assembled. These systems can be tested upon assembly for assuring functional reliability. These are then installed at site and final testing and handover is done. For certain sizes of houses and building, standard capacity systems that have demand volume can be designed and supplied.

8. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 7 employees initially and increase to 20 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	3	4	5	6
2	Semi-Skilled/ Helpers	8000	3	4	6	8	9
3	Supervisor/ Manager	30000	1	1	1	1	1
4	Accounts/ Marketing	18000	1	2	2	3	3
5	Other Staff	8000	1	1	1	1	1
	TOTAL		7	11	14	18	20

9. IMPLEMENTATION SCHEDULE:

The unit can be implemented within 3 months from the serious initiation of project work.

Sr No	Activities	Time Required in Months
1	Acquisition of Premises	1
2	Construction (if Applicable)	-
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)	5

10. COST OF PROJECT:

The unit will require total project cost of Rs 34.73 lakhs as shown below:

Sr No	Particulars	In Lakhs
1	Land	0.00
2	Building	0.00
3	Plant and Machinery	10.70
4	Fixtures and Electrical Installation	1.65
5	*Other Assets/ Preliminary and Preoperative Expenses*	1.00
6	Margin for working Capital	21.38
	TOTAL PROJECT COST	34.73

11. MEANS OF FINANCE:

The project will require promoter to invest about Rs 24.71 lakhs and seek bank loans of Rs 10.02 lakhs based on 70% loan on fixed assets.

Sr No	Particulars	In Lakhs
1	Promoters Contribution	24.71
2	Loan Finance	10.02
	TOTAL:	34.73

12. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr No	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	16.99	40	6.80	10.19
2	Receivables	19.50	50	9.75	9.75
3	Overheads	1.43	100	1.43	0.00
4	Creditors	8.49	40	3.40	5.10
	TOTAL	46.42		21.38	25.04

13. LIST OF MACHINERY REQUIRED:

Sr No	Particulars	UOM	Quantity	Rate	Total Value
	Main Machines/ Equipment				
1	Hacksaw machine	Nos	1	25000	25000
2	CNC Lathe machine	nos	1	300000	300000
3	Milling machine	Nos	1	250000	250000
5	Slotting machine	Nos	1	35000	35000
6	Lathe Machine	Nos	2	60000	120000
7	Drilling Machine	Nos	2	40000	80000
8	Welding Machines	Nos	1	25000	25000
8	Press for Lamination pressing	Nos	1	50000	50000
9	Motor Varnishing tank	Nos	1	20000	20000
10	Motor Testing Equipment	LS	1	15000	15000
11	Pump Test system as per BIS	Nos	1	75000	75000
	subtotal:				995000
	Tools and Ancillaries				
1	Tools and gauges	LS	1	50000	50000
2	Misc. Items	LS	1	25000	25000
	subtotal:				75000
	Fixtures and Elect Installation				
	Storage racks and trolleys	LS	1	20000	20000
	Other Furniture	LS	1	15000	15000

Sr No	Particulars	UOM	Quantity	Rate	Total Value
	Telephones/ Computer	LS	1	30000	30000
	Electrical Installation	LS	1	100000	100000
	subtotal:				165000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	100000	100000
	TOTAL PLANT MACHINERY COST				**1335000**

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 AtPivele
   Kiab Industrial Area, Bengaluru – 560100 Karnataka, India

4. Micro Engineering Works;
   No. 6/140, Gandhi Nagar, Nallampalayam Road NanjaiGounden, 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, BhosariMidc, Pune-411026, Maharashtra, India

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	117.02	146.27	175.53	204.78	234.03
3	Raw Materials & Other Direct Inputs	Rs Lakhs	101.94	127.42	152.91	178.39	203.88
4	Gross Margin	Rs Lakhs	15.08	18.85	22.62	26.39	30.16
5	Overheads Except Interest	Rs Lakhs	10.04	10.04	10.04	10.04	10.04
6	Interest	Rs Lakhs	1.40	1.40	1.40	1.40	1.40
7	Depreciation	Rs Lakhs	1.34	1.34	1.34	1.34	1.34
8	Net Profit Before Tax	Rs Lakhs	2.30	6.07	9.84	13.61	17.38

The basis of profitability calculation:

Unit will have capacity of 1500 nos per year of automatic pump based and hydraulic accumulator type pressure booster systems of different on design / ratings. Depending on the type/ size/ ratings of machines the price range is taken from Rs. 5000 to Rs 2.5 lakh or more per unit. The material requirements are sensors, accumulator cylinders, cast parts, MS sections, bars, sheets, Carbon alloy steel, etc. They materials cost in range of Rs 25 per Kg to Rs 400 per kg. The items like pressure switches, sensors, controllers, electrical, hydraulic and pneumatic components etc. are bought out and its cost depend on system ratings. 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 33.90 % of the installed capacity as depicted here below:

Sr No	Particulars	UOM	Value
1	Sales at Full Capacity	Rs Lakhs	292.54
2	Variable Costs	Rs Lakhs	254.85
3	Fixed Cost incl. Interest	Rs Lakhs	12.78
4	Break Even Capacity	% of Inst Capacity	33.90

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 are no pollution control registration requirements, 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.