

PORTABLE WATER FILTER

1. INTRODUCTION:

Water from natural sources contains particulate matter, suspended particles, parasites, bacteria, algae, viruses, fungi, as well as range of dissolved matter. These impurities are harmful for health and therefore "Drinking" water needs to be filtered and purified to make it suitable and safe for human consumption.

Depending on water source, impurities may vary in terms of type and concentration. For purification several methods are used in combination – such as filtration, sedimentation, distillation, activated carbon filtering, chemical processes such as flocculation, chlorination as well as electromagnetic radiation such as ultraviolet light. Due to high dissolved solids in bore well water it is necessary to reduce dissolved salts/ solids through reverse osmosis technology.

2. PRODUCT & ITS APPLICATION:

Water filtration systems for water supply to residences are normally installed by local government agencies like Municipality, Nagarpalika and panchayats. However these are inadequate to treat and purify water from waterborne parasites, bacteria, algae, viruses, fungi as well as level of dissolved salts. This necessitates the need for Portable water filtration and purification system for domestic use to prevent health risks from waterborne diseases and ensure healthy water intake.

At present water filters and purification systems of smaller sizes available containing several small units viz fabric filters for particulates, activated carbon filters for removal of algae, bad smell and taste, UV treatment units to kill bacteria and viruses and Reverse Osmosis filters to reduce the excessive content of dissolved salts/ solids. From simple filters to combination water treatments units are becoming popular for drinking water in almost all residential and other establishments like hotels, hostels, hospitals, offices, etc.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Any ITI, Diploma or graduate with some manufacturing and marketing experience.

4. INDUSTRY OUTLOOK/TREND

The growing awareness about the water-borne diseases has augmented the demand for domestic and commercial water purifiers across India. The uptake of water filtration and purifying technology is also expected to increase as growing number of consumers realize the benefits of consuming cleaner water.

Water filters and purifiers are highly in demand as they are the easiest and safest way to purify the water for human consumption. Growing awareness of health risks from water, inadequate quality of water supplied by local governments, poor maintenance of public water storage facility and accidental risk of sewage and water supply system damages in underground results in huge risks of health hazards.

Various technologies available in the India water purifier market are gravity purifier, Reverse Osmosis purifier, Ultraviolet (UV) purifier, sediment purifier and water softener. Potable water has seen rising total dissolved solids/ salts (TDS) content. This higher TDS cause health problems of kidney stones and digestive system, which has led to trend of installing water purifiers systems with RO filters in addition to other filter systems.

All types of technologies find place, however the RO technology due to its superior filtration efficiency held a lion's share of about 37% of market in terms of revenue, in 2015. Various types of filter are sold in the market viz. faucet mount, water dispenser, under sink filter, pitcher filter, and shower filter. In 2015, water dispenser type units held a leading share in the overall market, accounting for nearly 30%. Eureka Forbes, Kent RO System, Livepure Private Ltd., Ion exchange, Whirlpool India Ltd. Hi-Tech RO Systems, etc. are some of the major players operating within the India water purifier market.

5. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

The water purifier market in India is under penetrated (@ 5%), which presents immense growth potential. The industry is expected to grow rapidly in the next few years, driven by rise in health awareness and increase in affordability.

India's water purifier market is expected to reach \$4.1 billion by the end of 2024 as compared to \$1.1 billion in 2015, according to a recent study. The overall market is expected to register a CAGR of 15.4 percent. The market has seen entry of several small RO and other filtration system for domestic and commercial sector consumers.

The three end users of water purifier technologies are the household, industrial, and commercial sector. In 2015, the household segment has seen the highest growth and its share is 55% of the overall end-user segment. This segment is expected to retain its dominance in the coming years. The demand for affordable water filters continues to be on the rise. Additionally, the demand for commercial water purifier technologies and solutions will also gain momentum as several small shops, restaurants, hotels, hospitals cafés, and public places in India are complying to government initiatives of creating an availability of purified water across the country.

The established suppliers are having greater share of water purifier market due to new technologies, but small sector suppliers using local/ imported components and assembling Water purifiers to lower cost and in the coming years, the competition is expected to get stiffer due to the introduction of several small and local players. The market is very large with lot of unmet demand. There is good scope for a project to design assemble and market various types of portable water purification system.

A supplier with good quality system and competitive pricing can be very successful.

6. RAW MATERIAL REQUIREMENTS:

Most of the components like filter membranes/ elements, UV light elements, RO membranes, activated carbon media, are readily available from reputed manufacturers. The unit can source these from reputed manufacturers/ suppliers. Other components like water tubing, connectors,

micro sized pumps for pressure filtration and RO system, and filter unit body/ containers are to be designed and subcontracted to plastic component molders, pump manufacturers etc. For automation, float switches, etc. can also be procured from manufacturers.

7. MANUFACTURING PROCESS:

The product is product design and assembly oriented. Components like housing, water holding tank, plastic connectors, PVC and PVDF tubing, filtration elements, pump unit, RO membrane etc. are procured from suppliers as per finalized design specifications.

- Filter elements are made by winding filter cloth/ paper on mandrel tube and fitting end caps to form cartridges. Carbon media filters are made by filling Activated carbon media in to a cartridge housing and fitting it with end caps. These elements / cartridges are then place in housing body and kept ready for assembly with Water purification unit.
- RO cartridge Assembly: RO membrane is wound on the perforated clean water collector pipe as mandrel along with interleaved coated filter cloth. End caps with inlet and outlet vent are fitted on wound element. The RO element is then placed in housing tube and cartridge is assembled.
- Filters, pump and RO cartridges are then placed in to main Body and connected with water tubing. Float switch is mounted in water tank for auto shut off of pump. Electrical wiring is done to supply power to pump through float switch.
- The assembled unit is then tested by connecting it to water supply pipe through tap and power is supplied to pump. The water flow coming out is tested for filtration and total dissolved solid etc. quality parameters.
- The final Water purification unit is then cleaned and packed for dispatch.

8. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 14 employees initially and increase to 39 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	4	6	8	10
2	Semi-Skilled/ Helpers	8000	8	10	12	15	18
1	Supervisor/ Manager	30000	1	1	1	1	1
2	Accounts/ Marketing	16000	2	3	4	4	4
3	Other Staff	7000	1	3	6	6	6
	TOTAL		14	21	29	34	39

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	-
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 (Activities run concurrently)	3

10. COST OF PROJECT:

The unit will require total project cost of Rs 47.37 lakhs as shown below:

Sr No	Particulars	In Lakhs
1	Land	0.00
2	Building	0.00
3	Plant and Machinery	26.15
4	Fixtures and Electrical Installation	1.60
5	<i>Other Assets/ Preliminary and Preoperative Expenses</i>	1.00
6	Margin for working Capital	18.62
	TOTAL PROJECT COST	47.37

11. MEANS OF FINANCE:

The project will require promoter to invest about Rs 25.80 lakhs and seek bank loans of Rs 21.57 lakhs based on 70% loan on fixed assets.

Sr No	Particulars	In Lakhs
1	Promoters Contribution	25.80
2	Loan Finance	21.57
	TOTAL:	47.37

12. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr No	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	15.84	40	6.34	9.50
2	Receivables	12.21	40	4.88	7.32
3	Overheads	3.17	100	3.17	0.00
4	Creditors	10.56	40	4.22	6.34
	TOTAL	41.78		18.62	23.16

13. LIST OF MACHINERY REQUIRED:

Sr No	Particulars	UOM	Qty	Rate	Total Value
	Main Machines/ Equipment				
1	Filter cloth winding /element m/c	Nos	1	250000	250000
2	RO membrane winding machine	Nos	1	250000	250000
3	Cartridge Assembly Station	Nos	2	60000	120000
4	Pump testing station	Nos	2	20000	40000
5	Tube cutting M/c	Nos	1	50000	50000
6	Assembly line for Final Products	Nos	3	200000	600000
7	Assembly inspection Station	Nos	3	20000	60000
8	Final Testing Station	Nos	3	250000	750000
9	Packing Station	Nos	1	100000	100000
Sr No	Particulars	UOM	Qty	Rate	Total Value
10	Water Testing Lab	Nos	1	300000	300000

12	Embossing/ Labeling machine	Nos	1	20000	20000
	Tools and Ancillaries				
1	Misc. equipment Dies tools etc.	LS	1	50000	50000
2	Hand Tools and gauges	LS	1	25000	25000
	Fixtures and Elect Installation				
	Storage and transport bins and trolleys	LS	1	60000	60000
	Office Furniture	LS	1	20000	20000
	Telephones/ Computer	LS	1	30000	30000
	Electrical Installation	LS	1	50000	50000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	100000	100000
	TOTAL PLANT MACHINERY COST				2875000

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

1. A2Z Filtration Specialties Private Limited
D-1, Phase-2, Infocity, Sector 33
Gurgaon -122001 Haryana, India
2. Chemietron Clean Tech Pvt. Ltd.
FF-9, Devnandan Avenue, B/h. Seema Party Plot, 100 Ft.
ShyamalKarnavati Club Road, Satellite
Ahmedabad - 380015 Gujarat, India
3. Vishwakala Machine Tools
Amit C. Govindia (Partner)
Plot No. 4-5-6, Jaynath Industrial 4, Survey No. 155
Kothariya Main Road, Lothada Village, Rajkot - 360022
Gujarat, India

4. Kanwal Enterprises
Gali No-3-4, Sheetla Colony, Sector-5
Gurgaon, 122001, Haryana, India
5. ATLAS MACHINES (INDIA)
20, AMBALAL DOHI MARG, (HAMMAM ST.),
FORT, MUMBAI, Maharashtra, India
<http://www.atlasmachinesindia.com>

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.

14. PROFITABILITY CALCULATIONS:

Sr No	Particulars	UOM	Year Wise estimates				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Capacity Utilization	%	30	40	55	70	80
2	Sales	Rs. Lakhs	146.47	195.30	268.53	341.77	390.59
3	Raw Materials & Other Direct Inputs	Rs. Lakhs	126.71	168.94	232.29	295.65	337.88
4	Gross Margin	Rs. Lakhs	19.77	26.35	36.24	46.12	52.71
5	Overheads Except Interest	Rs. Lakhs	16.03	16.03	16.03	16.03	16.03
6	Interest	Rs. Lakhs	3.02	3.02	3.02	3.02	3.02
7	Depreciation	Rs. Lakhs	2.88	2.88	2.88	2.88	2.88
8	Net Profit Before Tax	Rs. Lakhs	-2.15	4.43	14.32	24.20	30.79

The basis of profitability calculation:

The Unit will have capacity of 30,000 units of different types of water filters systems and sub systems per year of most running sizes /types/ designs. The bulk /Distributor sales prices of various types range from Rs 150 to Rs7000 per filter. The RO unit assembly is available from local/ imported sources and cost ranges from Rs 90 to 300 per unit depending on flow rates etc parameters. The pump assembly is available at Rs 150 to Rs 400 per unit. Other

moulded components tubing filter media etc are available in range of Rs 55 to Rs 200 per Kg. The material requirements are considered with wastage/ scrap of 5 % of finished products and scrap to be sold at @ Rs10 ~30 per Kg. and the income of same is added. 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 33.27 % of the installed capacity as depicted here below:

Sr No	Particulars	UOM	Value
1	Sales at Full Capacity	Rs. Lakhs	488.24
2	Variable Costs	Rs. Lakhs	422.35
3	Fixed Cost incl. Interest	Rs. Lakhs	21.92
4	Break Even Capacity	% of Inst Capacity	33.27

16. STATUTORY/ GOVERNMENT APPROVALS

Except the local state industrial registration, IEC Code for Export and local authority clearance, there are no other formalities involved. The industry registration and approval for factory plan, safety for Fire requirement, registration as per Labour laws, ESI, PF etc shall be required as per rules and applicability. Before starting the unit will also need GST registration for procurement of materials as also for sale of goods. There are no pollution control requirements, while unit will have to ensure solid waste/ scrap disposal in proper manner. Entrepreneur may contact State Pollution Control Board where ever it is applicable.

17. BACKWARD AND FORWARD INTEGRATION

The machines and equipments considered for the unit do offer scope for diversification by using the spare capacities and capabilities to produce several other types of water filters systems for pharma/ hospitals and industrial systems and components which may be attempted. As such there is not much scope for organic backward or forward integration.

18. TRAINING CENTERS/COURSES

There are no specific training centers for water filtration technology. However the dies and Tools development courses run by several centers of excellence viz Indo German Tool Room at Ahmedabad, Rajkot, Chennai and CTTC Bhubaneshwar etc shall be helpful.

Besides several International association of specific technologies viz. Filtration Technologies International (FTI), a team of leading experts from North American Filtration Industry is running several courses online that will be helpful in getting product technology education. The most important scope of learning is in new product design and development by associating with technical institute. Entrepreneur may also study the new product designs, product range, features and specifications of leading Brands / competitors across the world by scanning the Internet and downloading data. Viz. North American, Europe, China etc markets.

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 all over India.

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.