

AIR AND OIL FILTERS



1. INTRODUCTION:

Liquid and Air/ gas needs to be cleaned from particulate contaminants in most industrial applications using filters. Filter paper, non-woven fabrics, wire mesh, PU/PE foam etc. filter media are used to filter fluids. Normally, a semi-permeable paper barrier is used as filter and it is placed perpendicular to a liquid or air flow.

Air Fuel and Oil filters are used in every internal combustion engine to remove particulates as these filters are very vital to improve operational efficiency of engines and prevent damage and wear to vital parts. The project to manufacture primarily mass consumed auto filters is recommended here though, the entrepreneur with knowledge can also take up manufacture of industrial application filters.

2. PRODUCT & ITS APPLICATION:

Air filters and filtration equipment are ubiquitous equipment used in diverse industries and fields, given the universal need to maintain particulate cleanliness to ensure efficient functioning of equipment/machinery as also to improve indoor air quality for precision industries, hospitals and even residential premises. From residential, commercial to industrial sectors, filters equipments are widely used to filter and remove atmospheric particulate matter.

The types of filters in automotive sector are

- Oil filter
- Air Filter
- Fuel Filter
- Cabin Air Filter

The main application for air filters is for supply of clean combustion air to engines. The filter papers are transformed into filter cartridges, which then are fitted to a holder. The construction of the cartridges mostly requires that the paper is stiff enough to be self-supporting without bursting.

The design of filter is different for different applications and models of engines. Normally a filter assembly consists of Aluminum Alloy/Zinc Alloy die casted top & bottom, and perforated sheet metal body that holds the filter paper, clothes or foam.

The filter paper or other media catches particles in the bulk volume or on the surface. Filter paper is mostly used because even a small piece of filter paper will absorb a significant volume of particulates.

Depending on engine size, type etc. specs, the air, fuel and lube flow rate and quantity to be filtered are available for design and mounting on engine decides the size and shape of filter unit. Mostly the specs are given by the engine manufacturers.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

The promoter with experience in sheet metal fabrication and some knowledge of filtration technology will be helpful in managing the project well. Any engineer or science graduate with exposure will be suitable to take up the project.

4. INDUSTRY OUTLOOK/TREND

For automobiles, Asia is expected to emerge as the largest market due to high vehicle production and growing vehicle population, improvement in the economic conditions, and

increasing investments by the industry players within the APAC region. North America and Asia Pacific are expected to witness significant growth over the next decade because of rapidly increasing demand of filters in OEMs as well as the replacement or aftermarkets.

The auto-component industry of India has expanded by 14.3 per cent because of strong growth in the spares or after-market sales to reach at a level of Rs 2.92 lakh crore (US\$ 44.90 billion) in the year 2017. The auto-components industry accounts for almost seven per cent of India's Gross Domestic Product (GDP) and employs as many as 25 million people, both directly and indirectly.

At present, there are more than 90 manufacturers in large and small medium sector of various types of filters for two wheelers, 3 and 4 wheelers, off road and earth moving machines and generating sets. The filter unit clusters are mainly located in North Indian centers like Punjab, Haryana, Delhi and West UP, in Maharashtra in and around Pune and Bombay and Southern India near Bangalore, Chennai and Hyderabad.

Emerging trends, which have a direct impact on the dynamics of the automotive filter industry, include the development of filters with organic materials, development of polyurethane-based adhesive filters, and customized air filter concept.

5. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

The global automotive filter market is likely to grow at a CAGR of 5% for coming decade. The major drivers of growth for this market are increase in the production of vehicles, increasing focus of vehicle owners on preventive maintenance, increasing average age of vehicles in operation, and increasing miles driven per vehicle. However, the Asian and especially Indian market is likely to grow at higher growth rate in view of the huge expansion and additions of production base for automobiles and auto-component industry in the country.

Air and Oil filters are marketed through auto spare parts distributor and dealer network throughout the country. Major centers of distribution centers are Bombay, Delhi, Kolkata, Chennai, and capital towns of all states. There also exists huge export market that offers opportunity for auto-component units in view of shift in production bases, larger volumes and

lower domestic costs.

Filters are widely used in mining machines, trucks, buses, generator sets, forklifts and other types of engine equipped machines in addition to large population of automobiles. In view of these observed factors, there is good scope for the air filter used in large auto market as well as in specialized air filter systems in various industrial systems.

6. RAW MATERIAL REQUIREMENTS:

Main materials are CRCA sheets for canisters and perforated barrels. Cast aluminum/ zinc / molded plastic parts used for top and bottom holding rim, and enclosures. Filter media chosen are filter paper/ non-woven fabric, wire mesh and PU foams. The filter assembly needs rivets/ fasteners all the materials are available in the country. Filter paper/ non-woven fabrics come in various porosity and grades depending on the applications the important parameters are wet strength, porosity, particle retention, volumetric flow rate, compatibility, efficiency and capacity.

7. MANUFACTURING PROCESS:

The main activity of the unit is fabrication as per the design and fitments of filter element and producing major components. The steps normally involve:

- Sheet metal embossing and cutting of canister and top /bottom caps, machining of cast bottoms/tops caps or get finished sheet metal/ plastic filter canisters and rims.
- Perforation and cutting of steel sheet on power press and rolling in to barrels to hold filter media.
- Drilling of fitment holes on bottoms/top.
- Pleating/ corrugation/ winding of Filter paper/ cloth /foam and assembly/ riveting to get the desired filter element.
- Assembly of complete filter element with top and bottom caps with/ without canister units.
- Inspection and packing of filter elements for specified parameters followed by testing samples for specified parameters viz. flow rate, pressure drop, filtration efficiency and life cycle.

- Final Products are packed and dispatched.

8. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 15 employees initially and increase to 47 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	15000	6	8	10	12	12
2	Semi-Skilled/ Helpers	8000	6	14	20	24	28
3	Supervisor/ Manager	25000	1	1	1	1	1
4	Accounts/ Marketing	15000	0	0	1	2	2
5	Other Staff	7000	2	2	4	4	4
	TOTAL		15	25	36	43	47

9. IMPLEMENTATION SCHEDULE:

The unit can be implemented within 7 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)	7

10. COST OF PROJECT:

The unit will require total project cost of Rs 122.49 lakhs as shown below:

Sr. No.	Particulars	In Lakhs
1	Land	15.00
2	Building	30.00
3	Plant and Machinery	44.95
4	Fixtures and Electrical Installation	3.40
5	Other Assets/ Preliminary and Preoperative Expenses	1.50
6	Margin for working Capital	27.64
	TOTAL PROJECT COST	122.49

11. MEANS OF FINANCE:

The project will require promoter to invest about Rs 51.35 lakhs and seek bank loans of Rs 71.14 lakhs based on 70% loan on fixed assets.

Sr. No.	Particulars	In Lakhs
1	Promoters Contribution	51.35
2	Loan Finance	71.14
	TOTAL :	122.49

12. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

(Rs.lakh)

Sr. No.	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	17.95	40	7.18	10.77
2	receivables	21.98	50	10.99	10.99
3	Overheads	2.29	100	2.29	0.00
4	Creditors	17.95	40	7.18	10.77
	TOTAL	60.17		27.64	32.53

13. LIST OF MACHINERY REQUIRED:

(Rs.)

Sr. No.	Particulars	UOM	Quantity	Rate	Total Value
	Main Machines/ Equipment				
1	Power Press 100 T	Nos	1	650000	650000
2	Power Press 10 and 30 T	Nos	2	150000	300000
3	CR sheet Shearing /perforating machines	Nos	1	350000	350000
4	Wire mesh/ sheet canister rolling machine	Nos	2	130000	260000
5	Filter paper Pleating machine	Nos	2	750000	1500000
6	Spot / Seam ER welding machine	Nos	2	150000	300000
7	Riveting machine	Nos	3	25000	75000
8	Lathe machine	Nos	2	75000	150000
9	Drilling machine	Nos	2	25000	50000
10	Assembly Jigs and Fixtures for Diff Filter types	LS	1	200000	200000
11	Filter Test Bench	Nos	2	80000	160000
	subtotal :				3995000
	Tools and Ancillaries				
1	Power press Dies and tools	LS	1	200000	200000
2	Misc. tools Trolleys etc.	LS	1	140000	140000

3	Air compressor system	LS	1	160000	160000
Sr. No.	Particulars	UOM	Quantity	Rate	Total Value
	subtotal :				500000
	Fixtures and Elect Installation				
	Storage racks	LS	1	25000	25000
	Other Furniture	LS	1	25000	25000
	Telephones/ Computer	LS	1	40000	40000
	Electrical Installation	LS	1	250000	250000
	subtotal :				340000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	150000	150000
	TOTAL PLANT MACHINERY COST				4985000

All the machines and equipments are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of filter paper pleating machine to have wider flexibility of filter designs. It may be worthwhile to look at reconditioned imported machines. 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.
Shyamal Karnavati 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>
6. Other well-known machine manufacturers who can be searched from internet are:
 - Ace Manufacturing Systems Ltd.
 - Batliboi Ltd. Mumbai
 - Bharat Fritz Werner Ltd.
 - HMT Machine Tools Ltd.
 - Advani Oerlikon Ltd, Bombay
 - Lakshmi Machine Works Ltd.
 - TAL Manufacturing Solutions Ltd.
 - Vigel Manufacturing Technologies (P) Ltd
 - Lokesh Machines Ltd.
 - Praga Tools Ltd.
 - Toolcraft Systems Pvt. Ltd.
 - Vaddigiri Factory Automation Pvt Ltd

14. PROFITABILITY CALCULATIONS:

Sr. No.	Particulars	UOM	Year Wise estimates				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Sales	Rs Lakhs	263.74	351.65	527.47	615.39	703.30
2	Raw Materials & Other Direct Inputs	Rs Lakhs	215.37	287.16	430.75	502.54	574.33
3	Gross Margin	Rs Lakhs	48.36	64.49	96.73	112.85	128.97
4	Overheads Except Interest	Rs Lakhs	17.55	17.55	17.55	17.55	17.55
5	Interest	Rs Lakhs	9.96	9.96	9.96	9.96	9.96
6	Depreciation	Rs Lakhs	9.58	9.58	9.58	9.58	9.58
7	Net Profit Before Tax	Rs Lakhs	11.27	27.39	59.64	75.76	91.88

The basis of profitability calculation:

The Unit will have capacity of 10, 00,000 units of Air and Oil Filters per year of most running sizes /types/ designs. The bulk /Distributor sales prices of various types range from Rs 50 to Rs 120 per Air filter and from Rs 120 to Rs 300 for Oil filter depending on type/design/volume and customer base. The CRCA steel strips costs range from range from Rs 55 to Rs 85 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 23.01 % of the installed capacity as depicted here below:

Sr. No.	Particulars	UOM	Value
1	Sales at Full Capacity	Rs Lakhs	879.12
2	Variable Costs	Rs Lakhs	717.91
3	Fixed Cost incl. Interest	Rs Lakhs	37.09
4	Break Even Capacity	% of Inst Capacity	23.01

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.

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 filters as well as sheet metal 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 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 institutes Automobile Research Institute, Pune etc. 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.