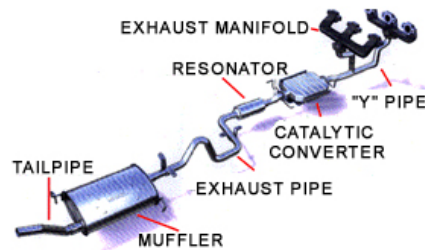


## **AUTOMOBILE SILENCERS (EXHAUST SYSTEM)**



### **1. INTRODUCTION:**

An automobile exhaust system also called silencer comprises of various devices or parts of an automotive engine, which are used for discharging burned gases or steam. Silencers are called so as they are reducing the engine exhaust sound and shock waves.

Exhaust systems consists of tubing and chambers which are usually used for emitting out waste exhaust gases with the help of a controlled combustion taking place inside an automobile engine. All the burnt gases are exhaled from an engine using one or more exhaust pipes. These gases are expelled out through several devices like cylinder head, exhaust manifold, turbocharger, catalytic converter, muffler and silencer.

### **2. PRODUCT & ITS APPLICATION:**

Exhaust systems are engineered to carry or transmit various toxic and noxious gases away from the auto engine. It consists of Headers or manifold is a system in which gases are expelled out directly from an automobile engine. The system consists of pipes and chambers to reduce toxicity of gases and reduce sound and remove particulates.

Many advanced systems use Catalytic Converters, a device that uses various catalysts like platinum, palladium, and rhodium coated on a ceramic honeycomb structure which turns the dangerous gases into nontoxic gases.

Manifold gaskets made of cast or nodular iron, steel, high temperature fiber material, graphite and other ceramic composites. The main function of exhaust manifold gasket is to seal the connection between the manifold and cylinder head.

Exhaust clamps and Heat Protection Products are for securing the system and provide heat shields, for protecting and guarding various exhaust system components

As, exhaust gases are very hot, exhaust components must be durable and heat resistant and anti-corrosive. These are normally double walled pipes are manufactured using different types of metals namely aluminized steel, stainless steel or zinc plated heavy-gauge steel. The exhaust pipes joins exhaust manifold, muffler and catalytic converters together.

### **3. DESIRED QUALIFICATIONS FOR PROMOTER:**

The promoter with experience in sheet metal fabrication and sound reduction and catalytic system designs will be able to be able to manage the project well.

### **4. INDUSTRY OUTLOOK/TREND**

The growth in the global automotive exhaust system industry has been on a constant rise, given the changing emission norms. To meet the rigorous environmental laws, manufacturers of exhaust systems are coming with new and advanced technological advancements. Stringent norms have led to quality enhancement and high value demand for exhaust systems. Advanced exhaust after-treatment products for further reduction in harmful emissions are being made mandatory by governments. This gives further impetus to the exhaust system market in this region.

The major trend in the automotive industry in India, is to deliver more fuel-efficient vehicles and reduction in exhaust emissions. Hence, vehicle manufacturers are striving to improve engine and emission system designs with advanced technologies. The passenger cars accounted to have the largest market size in terms of components of exhaust systems. The growth is attributed to the increase in demand for passenger cars in the country. The global

exhaust system market is projected to grow at a CAGR of 8.45%, to reach a market size of USD 59.02 billion by 2021.

Major driving factors for the exhaust system market are increase in vehicle production and the stringency in the emission norms. However, some of the key restraints such as increase in demand for the substitutes such as electric vehicles and high cost of the light weight components could affect the growth of exhaust system market.

## **5. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:**

All of the internal combustion engines require the exhaust system to expel the burnt gases as per environmentally safe requirements in terms of composition, temperature and reduce the sound reduction.

Apart from automobiles, exhaust system with catalytic converters are widely used in manufacturing mining device, trucks, buses, trains, generator sets, forklifts and other different types of engine equipped machine.

These automobiles and industrial products demand exhaust system also termed as Silencers for OE needs as also for replacement needs.

## **6. RAW MATERIAL REQUIREMENTS:**

MS and SS steel sheets and tubes, fasteners, welding electrodes and catalytic honey comb units are the main raw materials.

## **7. MANUFACTURING PROCESS:**

The main activity of the unit is fabrication as per the design and fitments of silencer element as per OEM specifications.

Fabrication process includes cutting, bending and welding of pipes. Sheet metal rolling and forming the silencer chamber. Cutting and forming the baffle plates. Welding of dual wall tube

construction. The formed sheet steel shells or rolled containers are seam and spot welded after assembling the baffle plates and perforated tubes, the converter are assembled in a chamber shell.

These components are treated with zinc, aluminum coating and other special coatings to reduce hot gas corrosion and erosion.

## 8. MANPOWER REQUIREMENT:

The unit shall require skilled service persons. The unit can start from 11 employees initially and increase to 28 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	20000	2	2	3	5	5
2.	Semi-Skilled/ Helpers	7000	6	9	12	15	18
3.	Supervisor/ Manager	25000	1	1	1	1	1
4.	Accounts/ Marketing	15000	1	1	2	2	2
5.	Other Staff	5000	1	1	2	2	2
	TOTAL		11	14	20	25	28

## 9. IMPLEMENTATION SCHEDULE:

The unit can be implemented within 6 months from the serious initiation of project work.

The unit is based on selection of location, renting premises for the unit.

Sr. No.	Activities	Time Required in Months
1	Acquisition of Premises	-
2	Construction (if Applicable)	-
3	Procurement and Installation of Plant and Machinery	3
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 28.82 lakhs as shown below:

Sr. No.	Particulars	In Lakhs
1	Land	0.00
2	Building	0.00
3	Plant and Machinery	15.45
4	Fixtures and Electrical Installation	1.50
5	Other Assets/ Preliminary and Preoperative Expenses	0.60
6	Margin for working Capital	11.27
	TOTAL PROJECT COST	28.82

## 11. MEANS OF FINANCE:

The project will require promoter to invest about Rs. 15.65 lakhs and seek bank loans of Rs. 13.16 lakhs based on 70% loan on fixed assets.

Sr. No.	Particulars	In Lakhs
1	Promoters Contribution	15.65
2	Loan Finance	13.16
	TOTAL:	28.82

## 12. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr. No.	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	3.67	40	1.47	2.20
2	receivables	7.50	50	3.75	3.75
3	Overheads	3.12	100	3.12	0.00
4	Creditors	7.33	40	2.93	4.40
	TOTAL	21.62		11.27	10.35

### 13. 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	Guillotine Shearing machine	Nos.	1	150000	150000
2	Power Press for deep drawing with 50 T capacity		1	350000	350000
3	Fly Press for small parts	Nos.	2	25000	50000
4	Spot Welding machines (ER)	Nos.	4	80000	320000
5	Metal cutting band-saw machines	Nos.	2	60000	120000
6	CNC Tube bending machines	Nos.	1	250000	250000
7	Pillar drilling machine	Nos.	1	25000	25000
8	Lathe 6' ft. bed	Nos.	1	60000	60000
	subtotal :				1325000
1	Tools and Ancillaries				
2	Bench and Belt Grinders	LS	2	15000	30000
3	Jigs and fixtures for sub-assemblies	LS	1	150000	150000
4	Gauges and tools	LS	1	40000	40000
	subtotal :				220000
	Fixtures and Elect Installation				
	Storage racks	LS	2	15000	30000
	Other Furniture	LS	1	15000	15000
	Telephones/ Computer	LS	1	25000	25000
	Electrical Installation	LS	1	80000	80000
	subtotal :				150000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	60000	60000
	TOTAL PLANT MACHINERY COST				1755000

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 and dies and toolings suppliers are listed here below:

1. PMT MACHINES LTD.  
Behind PCMC Building, Mumbai-Pune Road, Pimpri,  
Pune 411 018. Maharashtra, India.
2. Machineries and Spares  
Ranjit Chawla (Director)201, Karmastambh, LBS Marg, Vikhroli West  
Mumbai - 400083, Maharashtra, India
3. Pacific Engineering Corporation  
A-297, MIDC-Mahape, Near Mahape Bus Depot,  
Anthony Garage, Thane-Belapur Road, MahapeMidc,  
Navi Mumbai-400710, Maharashtra, India
4. Face Automation  
D215A, Ghatkopar Industrial Estate,  
Agra Road Industrial Premises Co Operative Society Limited,  
LBS Marg, Ghatkopar West, Mumbai- 400086, Maharashtra, India

Other well known machine manufacturers can be searched from directories/ internet are ACME TOOLINGS, Ace Manufacturing Systems Ltd., Batliboi Ltd., Bharat Fritz Werner Ltd. , HMT Machine Tools Ltd., Advani Oerlikon Ltd, 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.	Particulars	UOM	Year Wise estimates
-----	-------------	-----	---------------------

No.			Year 1	Year 2	Year 3	Year 4	Year 5
2	Sales	Rs Lakhs	90.00	112.50	135.00	157.50	157.50
3	Raw Materials & Other Direct Inputs	Rs Lakhs	44.00	55.00	66.00	77.00	77.00
4	Gross Margin	Rs Lakhs	46.00	57.50	69.00	80.50	80.50
5	Overheads Except Interest	Rs Lakhs	35.55	35.55	35.55	35.55	35.55
6	Interest	Rs Lakhs	1.84	1.84	1.84	1.84	1.84
7	Depreciation	Rs Lakhs	2.11	2.11	2.11	2.11	2.11
8	Net Profit Before Tax	Rs Lakhs	6.50	18.00	29.50	41.00	41.00

The basis of profitability calculation:

The Unit will have capacity 30000 nos of silencer of various vehicle models for the OEM / replacement market. Partial or replacement components are also to be taken up for the aftermarket sales. The bulk / distributor sales prices range from Rs 250 per to Rs 2500 per unit or sub unit depending on vehicle type/ complexities of design involved as well as volumes. The material requirements are considered for MS/ carbon steel from Rs 30 to 60 per kg including fasteners and tubeetc sections. Catalytic converter types will have additional cost of catalytic cartridge. Consumables costs also considered at prevailing market 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.

#### 14. BREAK EVEN ANALYSIS

The project is can reach break-even capacity at 34.35 % of the installed capacity as depicted here below:

Sr. No.	Particulars	UOM	Value
1	Sales at Full Capacity	Rs Lakhs	225.00
2	Variable Costs	Rs Lakhs	110.00
3	Fixed Cost incl. Interest	Rs Lakhs	39.50
4	Break Even Capacity	% of Inst Capacity	34.35



## **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 are required as per factory inspectorate and labor laws. Other registration as per Labor laws are ESI, PF etc. Before starting the unit will also need GST registration for procurement of materials as also for sale of goods. As such there is 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**

Since unit is basically processing sheet metal, it will be best suited to add several additional products to improve the profitability. The promoter should be dynamic enough to get the market share as also to grab sheet metal market opportunities. The machines and equipment offer scope for diversification in industrial parts/ components. The unit can utilize the spare capacities. As such there is not much scope for organic backward or forward integration.

The 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 production technology. However, foundry technology can be obtained by joining as apprentice in foundry units. The Prototype Development Centers can provide some assistance and for foundry technology, casting, machining, dies and Tools development, courses run by centers of excellence viz Indo German Tool Room at Ahmedabad, Rajkot, Chennai, etc shall be helpful.

The most important scope of learning is in new 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 of Viz. North American, Europe, China etc markets.

Udyamimitra portal (link: [www.udyamimitra.in](http://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.