PROJECT REPORT
OF
AUTOMOBILE SILENCER MANUFACTURING UNIT

PURPOSE OF THE DOCUMENT

This particular pre-feasibility is regarding Automobile Silencer manufacturing Unit.

The objective of the pre-feasibility report is primarily to facilitate potential entrepreneurs in project identification for investment and in order to serve his objective; the document covers various aspects of the project concept development, start-up, marketing, finance and management.

[We can modify the project capacity and project cost as per your requirement. We can also prepare project report on any subject as per your requirement.]

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PROJECT AT GLANCE

1	**Name of Proprietor/Director**	XXXXXXXX
2	**Firm Name**	XXXXXXXX
3	**Registered Address**	XXXXXXXX
4	**Nature of Activity**	XXXXXXXX
5	**Category of Applicant**	XXXXXXXX
6	**Location of Unit**	XXXXXXXX
7	**Cost of Project**	20.25 Rs. In Lakhs
8	**Means of Finance**	
i)	**Own Contribution**	2.03 Rs. In Lakhs
ii)	**Term Loan**	13.73 Rs. In Lakhs
iii)	**Working Capital**	4.50 Rs. In Lakhs
9	**Debt Service Coverage Ratio**	3.03
10	**Break Even Point**	0.29
11	**Power Requiremnet**	20 KW
12	**Employment**	10 Persons
13	**Major Raw Materials**	Aluminized steel, Stainless steel, Other materials like Manganese, Copper etc,

14 Details of Cost of Project & Means of Finance

Cost of Project

Particulars	Amount in Lacs
Land	Owned/Leased
Building & Civil Work	Owned/Leased
Plant & Machinery	14.00
Furniture & Fixture	0.25
Other Misc Assets	1.00
Working Capital Requirement	5.00
Total	**20.25**

Means of Finance

Particulars	Amount
Own Contribution	2.03
Term Loan	13.73
Working capital Loan	4.50
Total	**20.25**

1. INTRODUCTION

Automobile sector is the largest industrial sector in India. Automobile sector is largest by production as well as sale. The Internal Combustion Engine is integral part of automobiles. The I.C. engine operated on different cycles defines the strokes in engine. In four stroke engine the strokes are as Intake stroke, Compression stroke, Expansion (Power) stroke and Exhaust stroke. In exhaust stroke the piston moves upwards and squeezing out the gasses that were created during the power stroke.

The exhaust gases produce large noise. The exhaust gases are squeezed out through the tube-shaped device called silencer. Automobile Silencer is defined as, a device used to reduce the noise produced by the engine. Silencer is used in automobile vehicles to reduce the noise produced by the exhaust gases of the engine. Automobile silencer is also called as Muffler.

The muffler or silencer is engineered as an acoustic device to reduce the loudness of the sound pressure created by the I.C. engine by acoustic quieting. The noise of the burning-hot exhaust gas exiting the engine at high speed is abated by a series of passages and chambers lined with roving fiberglass insulation and resonating chambers harmonically tuned to cause destructive interference, wherein opposite sound waves cancel each other out.

An unavoidable side effect of this noise reduction is restriction of the exhaust gas flow, which creates back pressure, which can decrease engine efficiency. Thus, there is required to design and manufacturing of the silencers as per standards of ISO 14163:1998(en) Acoustics — Guidelines for noise control by silencers.

Silencers are come in different types as Baffle type muffler Wave cancellation type muffler, Resonance type muffler, Absorber type muffler, combined resonance and

absorber type muffler. Multiple baffle type silencers are preferably used in automobiles. In a multiple baffle silencer, the exhaust gas escapes through holes that are punched in the walls of the silencer tube. This results in muffling the sound via pulse reflection.

Automobile Silencer

2. PRODUCT DESCRIPTION

2.1. PRODUCT USES

- The automobile silencers are used to reduce noise created by exhaust gases.
- Exhaust gases are removed through silencers.

2.2. RAW MATERIAL REQUIREMENT

There are different raw materials used to manufacture the automobile silencer. The material selection is based on the application of silencer. Sound absorbing property

is not only the criteria for material selection. Thus, only those materials can be used which can be machined on convectional machines. Generally Ferrous alloys used for manufacturing of automobile silencers.

A. Raw material for outer body and inner baffles: -

- **Aluminized steel**

  Aluminized steel is most commonly used material for manufacturing of silencers. The Aluminium steel can easily available in form of sheets, which can further process on machine. Aluminized steel is hot-dip coated with aluminium silicon alloy. It has the ability to maintain its strength at temperatures up to 677 °C. It also resist oxidation, so than there are less chances of corrosion.

Aluminized Steel sheets

- **Stainless Steel**

  Stainless steel can be used as raw material for silencer manufacturing. It offers good strength as well as high heat dissipation capacity. The stainless steel can also be available in the form of sheets. The stainless steel material can easily machined on traditional machines. The gas welding is easily done on the stainless steel material.

Stainless steel sheet

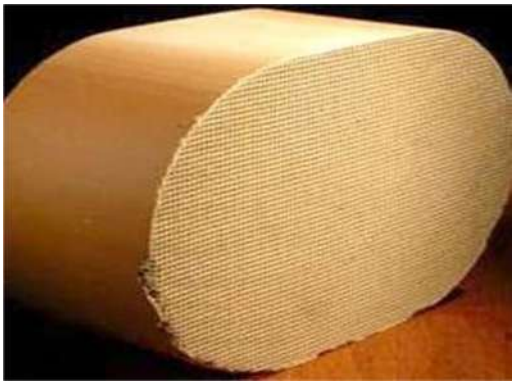
- **Other materials**

  There are other materials can also be used as per the application. The material like Chromium, Nickel, Manganese, Titanium and Copper are used alloying with steel.

B. Materials for catalytic converters: -

Catalytic converters are used in exhaust systems to provide a site for the oxidation and reduction of toxic by-products like NOx, SOx, Carbon monoxide etc. of fuel into less hazardous substances such as carbon dioxide, water vapour, and nitrogen gas.

There are ceramic materials used as catalytic convertor. Also there used Fe-Cr alloy which can satisfy desired requirements by the catalytic converters.



Catalytic converter material

2.3. MANUFACTURING PROCESS

This process can be broken down into the following steps:

1. Raw material procurement
2. Cutting of sheets in required shapes for outer tube
3. Press working
4. Gas welding
5. Assembling all the components
6. Inspection and dispatch

Raw material procurement

To ensure complete quality control, all raw materials are checked strictly as per established quality standards and requirements. Sorting of raw material will be done. In the sorting procedure, the different types of materials or parts will be sorted and separated in proper way. The raw material should keep in clean place. Raw material should keep in rack, so that there can be easily identified the material by worker. Later on it dispatched on assembly line.

Cutting of Sheets

The raw material is available in form of sheets. The sheets are to be cut in desired shape of outer tube. There can use traditional sheet metal cutting machine as well as automatic cutting machine. The machine is simple metal shearing machine.

Cutting of Sheets for muffler

The muffler is made by either the same sheet or there can use other material. This process is also carried out on sheet metal shearing or sheet metal cutting machine.

Press Working

Press working of sheet metal is done in this process. After the cutting of sheet metal, there is required to give tube sized shape to it. For this process, the press working machine is used. The machine is Hydraulic press or automatic press machine.

Gas welding process

The mufflers are then gas welded in one half of the silencer, the other half of the silencer with MS tubing's according to the requirement and are gas welded. The gas welding is carried out on an oxy-acetylene gas welding machine.

Assembling all the components

All the components are assembled as per the design. In some applications the spray painting is also done for reliability of the surface of material.

Testing and Dispatch

The testing and inspection of automobile silencers is necessary process before dispatch. The testing is done on the basis of compressive strength, wear testing, noise reduction testing as per acoustic norms.

3. PROJECT COMPONENTS

3.1 Land /Civil Work

The land require for this manufacturing unit will be approx. around 3000-3500 square feet. We have not considered the cost of Land purchase & Building Civil work in the project. It is assumed that land & building will be on rent & approx. rental of the same will be Rs.40000.00 to 50000.00 per month.

3.2 Plant & Machinery

Sheet metal shearing machine

To cut the sheet metal in desired shape, there required the sheet metal shearing machine. Sheet metal shearing machines are available in different size and shape. Generally, there required the sheet metal shearing machine of 4 blades, and capacity of 16 SWG with5 HP motor.

Sheet metal shearing machine

Power press machine

The power press machine is used to press the sheet metal in the desired shape. It does general press working process. The power press machine is also available in

different capacity. There can use the power press machine of capacity of 30 tons with 3HP motor.

Power press machine

Edge folding machine

Edge folding machine is used to fold the sharp edges of the sheet metal. After giving desired shape there required the edge folding machine. This machine can available in different size.

Edge folding machine

Sheet bending roller

The sheet bending roller is used to bend the tubes created by sheet metal. There required to give desired shape of the silencers, thus the tubes are bent in proper way, for that a three-roller bend machine is required.

Sheet bending rollers

Gas welding kit

The joining of sheet metal edges is done by gas welding process. Oxy-acetylene gas welding is most preferably used for gas welding operation. The conventional gas welding kit is required for gas welding.

Gas welding kit

Spot Welding machine

The spot-welding machine is used to weld the heads and internal welding. After gas welding, in some places spot welding is necessary. Thus, spot welding machine is required for that purpose.

Spot Welding machine

4. LICENSE & APPROVALS

- MSME Udyam registration
- BIS certification
- ISO certification
- Factory license
- GST registration
- NOC for fire safety management plan
- NOC from pollution control department.

PROJECTED BALANCE SHEET **(in Lacs)**

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
Liabilities					
Capital					
Opening Balance		3.17	5.97	9.13	12.15
Add:- Own Capital	2.03				
Add:- Retained Profit	3.14	6.30	8.66	10.77	12.57
Less:- Drawings	2.00	3.50	5.50	7.75	9.50
Closing Balance	3.17	5.97	9.13	12.15	15.22
Term Loan	12.20	9.15	6.10	3.05	-
Working Capital Limit	4.50	4.50	4.50	4.50	4.50
Sundry Creditors	2.17	2.60	3.08	3.59	4.14
Provisions & Other Liabilities	2.50	2.70	2.90	3.10	3.30
TOTAL :	**24.53**	**24.92**	**25.70**	**26.39**	**27.17**
Assets					
Fixed Assets (Gross)	15.25	15.25	15.25	15.25	15.25
Gross Depreciation	2.28	4.21	5.86	7.26	8.45
Net Fixed Assets	**12.98**	**11.04**	**9.39**	**7.99**	**6.80**
Current Assets					
Sundry Debtors	2.98	3.68	4.35	5.07	5.86
Stock in Hand	4.40	5.23	6.12	7.09	8.14
Cash and Bank	2.19	2.97	2.84	2.73	3.37
Loans and advances	2.00	2.00	3.00	3.50	3.00
TOTAL :	**24.53**	**24.92**	**25.70**	**26.39**	**27.17**

PROJECTED PROFITABILITY STATEMENT **(in Lacs)**

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
Capacity Utilisation %	**35%**	**40%**	**45%**	**50%**	**55%**
SALES					
AUTOMOBILE SILENCER	89.32	110.42	130.47	152.19	175.69
Total	**89.32**	**110.42**	**130.47**	**152.19**	**175.69**
COST OF SALES					
Raw material cost	54.18	65.04	76.95	89.70	103.62
Electricity Expenses	1.34	1.84	2.07	2.30	2.53
Depreciation	2.28	1.94	1.65	1.40	1.19
Wages & labour	11.88	13.07	14.37	15.81	17.39
Repair & maintenance	3.57	4.42	5.22	6.09	7.03
Consumables	4.47	5.52	6.52	7.61	8.78
Cost of Production	77.72	91.82	106.79	122.91	140.55
Add: Opening Stock	-	2.59	3.06	3.56	4.10
Less: Closing Stock	2.59	3.06	3.56	4.10	4.69
Cost of Sales	75.13	91.35	106.29	122.38	139.96
GROSS PROFIT	**14.19**	**19.06**	**24.18**	**29.82**	**35.72**
GROSS PROFIT RATIO	**15.89%**	**17.27%**	**18.53%**	**19.59%**	**20.33%**
Salary to Staff	3.96	4.36	4.79	5.27	5.80
Interest on Term Loan	1.35	1.19	0.85	0.52	0.18
Interest on working Capital	0.50	0.50	0.50	0.50	0.50
Rent	4.80	5.28	5.81	6.39	7.03
Selling & Administration Expenses	0.45	1.10	2.61	4.57	7.03
TOTAL	**11.05**	**12.42**	**14.56**	**17.24**	**20.53**
NET PROFIT	3.14	6.64	9.62	12.58	15.19
Taxation	-	0.34	0.96	1.80	2.62
PROFIT (After Tax)	3.14	6.30	8.66	10.77	12.57
NET PROFIT RATIO	**3.52%**	**5.71%**	**6.64%**	**7.08%**	**7.16%**

PROJECTED CASH FLOW STATEMENT **(in Lacs)**

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
SOURCES OF FUND					
Own Margin	2.03				
Net Profit	3.14	6.64	9.62	12.58	15.19
Depriciation & Exp. W/off	2.28	1.94	1.65	1.40	1.19
Increase in Cash Credit	4.50	-	-	-	-
Increase In Term Loan	13.73	-	-	-	-
Increase in Creditors	2.17	0.43	0.48	0.51	0.56
Increase in Provisions & Other liabilities	2.50	0.20	0.20	0.20	0.20
TOTAL :	**30.33**	**9.21**	**11.94**	**14.69**	**17.14**
APPLICATION OF FUND					
Increase in Fixed Assets	15.25				
Increase in Stock	4.40	0.83	0.90	0.96	1.05
Increase in Debtors	2.98	0.70	0.67	0.72	0.78
Increase in loans and advances	2.00	-	1.00	0.50	- 0.50
Repayment of Term Loan	1.53	3.05	3.05	3.05	3.05
Drawings	2.00	3.50	5.50	7.75	9.50
Taxation	-	0.34	0.96	1.80	2.62
TOTAL :	**28.15**	**8.43**	**12.08**	**14.79**	**16.51**
Opening Cash & Bank Balance	-	2.19	2.97	2.84	2.73
Add : Surplus	2.19	0.78	-0.13	-0.10	0.64
Closing Cash & Bank Balance	**2.19**	**2.97**	**2.84**	**2.73**	**3.37**

CALCULATION OF D.S.C.R

PARTICULARS	1st year	2nd year	3rd year	4th year	5th year
CASH ACCRUALS	5.42	8.23	10.31	12.17	13.76
Interest on Term Loan	1.35	1.19	0.85	0.52	0.18
Total	6.77	9.42	11.16	12.69	13.95
REPAYMENT					
Instalment of Term Loan	1.53	3.05	3.05	3.05	3.05
Interest on Term Loan	1.35	1.19	0.85	0.52	0.18
Total	2.87	4.24	3.90	3.57	3.23
DEBT SERVICE COVERAGE RATIO	**2.35**	**2.22**	**2.86**	**3.56**	**4.32**
AVERAGE D.S.C.R.					**3.03**

REPAYMENT SCHEDULE OF TERM LOAN							
					Interest		11.00%
Year	Particulars	Amount	Addition	Total	Interest	Repayment	Closing Balance
Ist	Opening Balance	-					
	1st month		13.73	13.73	-	-	13.73
	2nd month	13.73	-	13.73	0.13	-	13.73
	3rd month	13.73	-	13.73	0.13	-	13.73
	4th month	13.73	-	13.73	0.13	-	13.73
	5th month	13.73	-	13.73	0.13	-	13.73
	6th month	13.73	-	13.73	0.13	-	13.73
	7th month	13.73	-	13.73	0.13	0.25	13.47
	8th month	13.47	-	13.47	0.12	0.25	13.22
	9th month	13.22	-	13.22	0.12	0.25	12.96
	10th month	12.96	-	12.96	0.12	0.25	12.71
	11th month	12.71	-	12.71	0.12	0.25	12.45
	12th month	12.45	-	12.45	0.11	0.25	12.20
					1.35	1.53	
2nd	Opening Balance						
	1st month	12.20	-	12.20	0.11	0.25	11.95
	2nd month	11.95	-	11.95	0.11	0.25	11.69
	3rd month	11.69	-	11.69	0.11	0.25	11.44
	4th month	11.44	-	11.44	0.10	0.25	11.18
	5th month	11.18	-	11.18	0.10	0.25	10.93
	6th month	10.93	-	10.93	0.10	0.25	10.68
	7th month	10.68	-	10.68	0.10	0.25	10.42
	8th month	10.42	-	10.42	0.10	0.25	10.17
	9th month	10.17	-	10.17	0.09	0.25	9.91
	10th month	9.91	-	9.91	0.09	0.25	9.66
	11th month	9.66	-	9.66	0.09	0.25	9.40
	12th month	9.40	-	9.40	0.09	0.25	9.15
					1.19	**3.05**	
3rd	Opening Balance						
	1st month	9.15	-	9.15	0.08	0.25	8.90
	2nd month	8.90	-	8.90	0.08	0.25	8.64
	3rd month	8.64	-	8.64	0.08	0.25	8.39
	4th month	8.39	-	8.39	0.08	0.25	8.13
	5th month	8.13	-	8.13	0.07	0.25	7.88
	6th month	7.88	-	7.88	0.07	0.25	7.63
	7th month	7.63	-	7.63	0.07	0.25	7.37
	8th month	7.37	-	7.37	0.07	0.25	7.12
	9th month	7.12	-	7.12	0.07	0.25	6.86
	10th month	6.86	-	6.86	0.06	0.25	6.61
	11th month	6.61	-	6.61	0.06	0.25	6.35
	12th month	6.35	-	6.35	0.06	0.25	6.10
					0.85	**3.05**	

4th	Opening Balance						
	1st month	6.10	-	6.10	0.06	0.25	5.85
	2nd month	5.85	-	5.85	0.05	0.25	5.59
	3rd month	5.59	-	5.59	0.05	0.25	5.34
	4th month	5.34	-	5.34	0.05	0.25	5.08
	5th month	5.08	-	5.08	0.05	0.25	4.83
	6th month	4.83	-	4.83	0.04	0.25	4.58
	7th month	4.58	-	4.58	0.04	0.25	4.32
	8th month	4.32	-	4.32	0.04	0.25	4.07
	9th month	4.07	-	4.07	0.04	0.25	3.81
	10th month	3.81	-	3.81	0.03	0.25	3.56
	11th month	3.56	-	3.56	0.03	0.25	3.30
	12th month	3.30	-	3.30	0.03	0.25	3.05
					0.52	**3.05**	
5th	Opening Balance						
	1st month	3.05	-	3.05	0.03	0.25	2.80
	2nd month	2.80	-	2.80	0.03	0.25	2.54
	3rd month	2.54	-	2.54	0.02	0.25	2.29
	4th month	2.29	-	2.29	0.02	0.25	2.03
	5th month	2.03	-	2.03	0.02	0.25	1.78
	6th month	1.78	-	1.78	0.02	0.25	1.53
	7th month	1.53	-	1.53	0.01	0.25	1.27
	8th month	1.27	-	1.27	0.01	0.25	1.02
	9th month	1.02	-	1.02	0.01	0.25	0.76
	10th month	0.76	-	0.76	0.01	0.25	0.51
	11th month	0.51	-	0.51	0.00	0.25	0.25
	12th month	0.25	-	0.25	0.00	0.25	-
					0.18	**3.05**	

DOOR TO DOOR	60	MONTHS
MORATORIUM PERIOD	6	MONTHS
REPAYMENT PERIOD	54	MONTHS

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