PROJECT REPORT

Of

AUTOMOBILE PISTON

PURPOSE OF THE DOCUMENT

This particular pre-feasibility is regarding **Automobile Piston**.

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 A GLANCE

1	Name of the Entreprenuer		xxxxxxxxxx	
2	Constitution (legal Status)	:	xxxxxxxxxx	
3	Father / Spouse Name		xxxxxxxxxxxx	
4	Unit Address	:	xxxxxxxxxxxxxxxxxxxxxxx	
			District : xxxxxxx	
			Pin: xxxxxxx	State: xxxxxxxxxx
			Mobile xxxxxxx	
5	Product and By Product	:	**Automobile Piston**	
6	Name of the project / business activity proposed :		**Automobile Piston Manufacturing Unit**	
7	Cost of Project	:	Rs.24.17 Lakhs	
8	Means of Finance			
	Term Loan		Rs.15.75 Lakhs	
	Own Capital		Rs.2.42 Lakhs	
	Working Capital		Rs.6 Lakhs	
9	Debt Service Coverage Ratio	:	2.27	
10	Pay Back Period	:	5	Years
11	Project Implementation Period	:	5-6	Months
12	Break Even Point	:	49%	
13	Employment	:	13	Persons
14	Power Requirement	:	10	HP
15	Major Raw materials	:	Aluminium Alloy, Packing material	
16	Estimated Annual Sales Turnover (Max Utilized Capacity)	:	101.79	Lakhs
17	Detailed Cost of Project & Means of Finance			

COST OF PROJECT

(Rs. In Lakhs)

Particulars	Amount
Land	Own/Rented
Building /Shed 1000 Sq ft	Own/Rented
Plant & Machinery	16.50
Furniture & Fixtures	1.00
Working Capital	6.67
Total	**24.17**

MEANS OF FINANCE

Particulars	Amount
Own Contribution	2.42
Term Loan	15.75
Working Capital	6.00
Total	**24.17**

AUTOMOBILE PISTON

PRODUCT DESCRIPTION:

The piston begins as a solid aluminum ingot. The reason aluminum is used is that it's lightweight, rust-proof, and easy to cut. In an Internal Combustion engine, piston converts the thermal energy of fuel into mechanical energy. It is the moving component that is contained by a cylinder and is made gas-tight by piston rings. In an engine, its purpose is to transfer force from expanding gas in the cylinder to the crankshaft via a piston rod and/or connecting rod.

FUNCTIONS & MARKET POTENTIAL:

The main functions of the piston are: -

(a) To transmit the gas forces via connecting rod to the crank shaft.

(b) To seal the clearance in between piston rings and cylinder liner against gas leakage to the crankcase and to prevent the infiltration of oil from crankcase into the combustion chamber.

The global automotive piston market size is projected to grow to USD 2.2 billion by 2025 from USD 1.9 billion in 2020, at a CAGR of 3.5%. The shift towards direct gasoline engines (GDI) will lead to demand for gasoline pistons in the coming years. The growth in Automobile sector will directly increase the demand for pistons in the market and is a never ending product.

MACHINERY REQUIREMENT:

Basic machineries requirement are as follows:

1. Crucible type Tilting Furnace (Electric)
2. Die Casting Machine
3. Band Saw
4. Boring Machine
5. Lathe Machine, Bed length 4'6", swing dia 350 mm, 1.5 KW / 2 H.P
6. Precision Lathe Machine
7. Pillar type Drilling Machine, 0.5 H.P
8. Tempering Furnace, 400°C
9. Laboratory comprising chemical and physical testing
10. Other machineries and equipment's

RAW MATERIAL:

Aluminium Alloys are the preferred material for pistons both in gasoline and diesel engines due to their specific characteristics: - low density, high thermal conductivity, easy machinability, high reliability and very good recycling characteristics. Proper control of the chemical composition, processing conditions and final heat treatment results in a micro structure which ensures the required mechanical and thermal performance, in particular the high thermal fatigue resistance. The standard material for piston is Al-12%Si alloy containing in addition approximately 1% each of Cu, Ni and Mg.

MANUFACTURING PROCESS:

The aluminium alloy is formed into roughly shaped piston body by die casting process.

1. **Foundry:** Foundry is the beginning of piston manufacturing. At the foundry, die is prepared for taking molten aluminium alloy by heating it to operating temperature for approximately one hour. This process allows the die to readily accept the molten material when it is poured. The process starts by heating the aluminium alloy well above the melting point but below its boiling point, i.e, upto 700°C. Molten aluminium alloy is then poured into the die through sprue. The material is then allowed to cool into the die for solidification, followed by placing it into a bin of hot water. After appropriate cooling the sprue section of casting is cut by a band saw, which is then resent for melting in furnace, while piston body is sent for further machining.

2. **Pin Boring:** At this stage, the piston casting has the gudgeon pin hole rough machined by a boring machine.

3. **Turning:** Turning of the piston casting is carried out on precision lathe machines. The castings are placed in the lathe and held in place by a solid rod through the gudgeon pin hole. A draw bolt is activated in the chuck which draws the rod towards chuck and holds the piston in place during its machining. The piston is now ready for finishing processes.

4. **Drilling:** The process includes drilling of oil holes in gudgeon pin bosses and oil ring grooves, cutting slots in the skirt, valve relieving and crank relieving.

5. **Finishing Process**

(a) Grinding: This process involves the final size being machined on the piston. The process involved is cam grinding which machines the skirt of the piston only.
(b) Reaming: This is the final machining process which involves the piston being placed in a bath of oil and reamed to reach the final size required.

6. **Final Inspection:** At this stage, the piston is cleaned, then size and category are stamped and then sent for dispatch.

PROJECTED BALANCE SHEET

PARTICULARS	I	II	III	IV	V
SOURCES OF FUND					
Capital Account					
Opening Balance	-	3.04	4.37	7.04	10.28
Add: Additions	2.42	-	-	-	-
Add: Net Profit	2.63	3.83	6.17	8.74	11.19
Less: Drawings	2.00	2.50	3.50	5.50	7.00
Closing Balance	3.04	4.37	7.04	10.28	14.47
CC Limit	6.00	6.00	6.00	6.00	6.00
Term Loan	14.00	10.50	7.00	3.50	-
Sundry Creditors	0.46	0.52	0.59	0.67	0.75
TOTAL :	**23.51**	**21.40**	**20.64**	**20.45**	**21.22**
APPLICATION OF FUND					
Fixed Assets (Gross)	17.50	17.50	17.50	17.50	17.50
Gross Dep.	2.58	4.77	6.64	8.23	9.59
Net Fixed Assets	14.93	12.73	10.86	9.27	7.91
Current Assets					
Sundry Debtors	4.06	4.77	5.38	6.06	6.79
Stock in Hand	3.27	3.63	4.07	4.55	5.07
Cash and Bank	1.26	0.27	0.33	0.57	1.45
TOTAL :	**23.51**	**21.40**	**20.64**	**20.45**	**21.22**
	-	-	-	-	-

PROJECTED PROFITABILITY STATEMENT

PARTICULARS	I	II	III	IV	V
A) SALES					
Gross Sale	60.90	71.48	80.66	90.92	101.79
Total (A)	**60.90**	**71.48**	**80.66**	**90.92**	**101.79**
B) COST OF SALES					
Raw Mateiral Consumed	27.68	31.49	35.60	40.05	44.88
Electricity Expenses	1.34	1.46	1.57	1.68	1.79
Repair & Maintenance	0.30	0.36	0.40	0.45	0.51
Labour & Wages	10.76	11.83	13.02	14.32	15.75
Depreciation	2.58	2.19	1.87	1.59	1.36
Cost of Production	42.66	47.33	52.45	58.10	64.29
Add: Opening Stock /WIP	-	1.42	1.53	1.70	1.88
Less: Closing Stock /WIP	1.42	1.53	1.70	1.88	2.08
Cost of Sales (B)	41.23	47.22	52.29	57.91	64.09
C) GROSS PROFIT (A-B)	19.67	24.25	28.37	33.01	37.70
	32.29%	**33.93%**	**35.17%**	**36.30%**	**37.04%**
D) Bank Interest (Term Loan)	1.71	1.40	1.01	0.63	0.24
ii) Interest On Working Capital	0.66	0.66	0.66	0.66	0.66
E) Salary to Staff	8.58	9.44	10.38	11.42	12.56
F) Selling & Adm Expenses Exp.	6.09	8.93	10.08	11.37	12.72
TOTAL (D+E)	**17.04**	**20.43**	**22.13**	**24.07**	**26.19**
H) NET PROFIT	2.63	3.83	6.24	8.94	11.51
	4.3%	**5.4%**	**7.7%**	**9.8%**	**11.3%**
I) Taxation	-	-	0.06	0.20	0.33
J) PROFIT (After Tax)	2.63	3.83	6.17	8.74	11.19

PROJECTED CASH FLOW STATEMENT

PARTICULARS	I	II	III	IV	V
SOURCES OF FUND					
Own Contribution	2.42	-			
Net Profit	2.63	3.83	6.24	8.94	11.51
Depreciation & Exp. W/off	2.58	2.19	1.87	1.59	1.36
Increase In Cash Credit	6.00				
Increase In Term Loan	15.75	-	-	-	-
Increase in Creditors	0.46	0.06	0.07	0.07	0.08
TOTAL :	**29.83**	**6.08**	**8.17**	**10.60**	**12.95**
APPLICATION OF FUND					
Increase in Fixed Assets	17.50	-	-	-	-
Increase in Stock	3.27	0.36	0.44	0.48	0.52
Increase in Debtors	4.06	0.71	0.61	0.68	0.72
Repayment of Term Loan	1.75	3.50	3.50	3.50	3.50
Taxation	-	-	0.06	0.20	0.33
Drawings	2.00	2.50	3.50	5.50	7.00
TOTAL :	**28.58**	**7.07**	**8.11**	**10.36**	**12.07**
Opening Cash & Bank Balance	-	1.26	0.27	0.33	0.57
Add : Surplus	1.26	- 0.99	0.06	0.24	0.88
Closing Cash & Bank Balance	**1.26**	**0.27**	**0.33**	**0.57**	**1.45**

COMPUTATION OF AUTOMOBILE PISTON MANUFACTURING UNIT

Items to be Manufactured Automobile Piston

Manufacturing Capacity per Day		250.00	pcs
No. of Working Hour		8	
No of Working Days per month		25	
No. of Working Day per annum		300	
Total Production per Annum		75,000	pcs
Year		Capacity	Automobile Piston
		Utilisation	
I		60%	45,000
II		65%	48,750
III		70%	52,500
IV		75%	56,250
V		80%	60,000

COMPUTATION OF RAW MATERIAL

Item Name		**Quantity of Raw Material**	**Unit**	**Unit Rate of**	**Total CostPer Annum (100%)**
Aluminium Alloy		28,000.00	kg	160.00	4,480,000.00
Packing material					130,000.00
Total		**28,000.00**			**4,610,000.00**

Total Raw material in Rs lacs	at 100% Capacity		46.10
Cost per pcs		(In Rs)	**61.50**

Raw Material Consumed	**Capacity Utilisation**	**Rate**	**Amount (Rs.)**
I	60%	61.50	27.68
II	65%	64.60	31.49
III	70%	67.80	35.60
IV	75%	71.20	40.05
V	80%	74.80	44.88

COMPUTATION OF SALE

Particulars	I	II	III	IV	V
Op Stock	-	1,500.00	1,625.00	1,750.00	1,875.00
Production	45,000.00	48,750.00	52,500.00	56,250.00	60,000.00
	45,000.00	50,250.00	54,125.00	58,000.00	61,875.00
Less : Closing Stock(10 Days)	1,500.00	1,625.00	1,750.00	1,875.00	2,000.00
Net Sale	43,500.00	48,625.00	52,375.00	56,125.00	59,875.00
Sale Price per pcs	140.00	147.00	154.00	162.00	170.00
Sale (in Lacs)	**60.90**	**71.48**	**80.66**	**90.92**	**101.79**

COMPUTATION OF CLOSING STOCK & WORKING CAPITAL

PARTICULARS	I	II	III	IV	V
Finished Goods					
(10 Days requirement)	1.42	1.53	1.70	1.88	2.08
Raw Material					
(20 Days requirement)	1.85	2.10	2.37	2.67	2.99
Closing Stock	**3.27**	**3.63**	**4.07**	**4.55**	**5.07**

COMPUTATION OF WORKING CAPITAL REQUIREMENT

Particulars	Amount	Margin(10%)	Net Amount
Stock in Hand	3.27		
Less:			
Sundry Creditors	0.46		
Paid Stock	**2.81**	**0.28**	**2.53**
Sundry Debtors	4.06	0.41	3.65
Working Capital Requirement			**6.18**
Margin			0.69
MPBF			**6.18**
Working Capital Demand			**6.00**

BREAK UP OF LABOUR

Particulars		Wages Per Month	No of Employees	Total Salary
Supervisor		20,000.00	1	20,000.00
Plant Operator		15,000.00	1	15,000.00
Unskilled Worker		8,500.00	4	34,000.00
Helper		5,000.00	1	5,000.00
Security Guard		7,500.00	1	7,500.00
				81,500.00
Add: 10% Fringe Benefit				8,150.00
Total Labour Cost Per Month				89,650.00
Total Labour Cost for the year (In Rs. Lakhs)			8	10.76

BREAK UP OF SALARY

Particulars		Salary Per Month	No of Employees	Total Salary
Accountant cum store keeper		15,000.00	1	15,000.00
Administrative Staffs		12,500.00	4	50,000.00
Total Salary Per Month				65,000.00
Add: 10% Fringe Benefit				6,500.00
Total Salary for the month				71,500.00
Total Salary for the year (In Rs. Lakhs)			5	8.58

COMPUTATION OF DEPRECIATION

Description	Land	Building/shed	Plant & Machinery	Furniture	**TOTAL**
Rate of Depreciation			**15.00%**	**10.00%**	
Opening Balance	Own/Rented		-	-	-
Addition	-		16.50	1.00	17.50
	-		16.50	1.00	17.50
TOTAL		-	16.50	1.00	17.50
Less : Depreciation	-	-	2.48	0.10	2.58
WDV at end of Ist year	-	-	14.03	0.90	14.93
Additions During The Year	-	-	-	-	-
	-	-	14.03	0.90	14.93
Less : Depreciation	-	-	2.10	0.09	2.19
WDV at end of IInd Year	-	-	11.92	0.81	12.73
Additions During The Year	-	-	-	-	-
	-	-	11.92	0.81	12.73
Less : Depreciation	-	-	1.79	0.08	1.87
WDV at end of IIIrd year	-	-	10.13	0.73	10.86
Additions During The Year	-	-	-	-	-
	-	-	10.13	0.73	10.86
Less : Depreciation	-	-	1.52	0.07	1.59
WDV at end of IV year	-	-	8.61	0.66	9.27
Additions During The Year	-	-	-	-	-
	-	-	8.61	0.66	9.27
Less : Depreciation	-	-	1.29	0.07	1.36
WDV at end of Vth year	-	-	7.32	0.59	7.91

REPAYMENT SCHEDULE OF TERM LOAN 11.0%

Year	Particulars	Amount	Addition	Total	Interest	Repayment	Cl Balance
I	Opening Balance						
	Ist Quarter	-	15.75	15.75	0.43	-	15.75
	Iind Quarter	15.75	-	15.75	0.43	-	15.75
	IIIrd Quarter	15.75	-	15.75	0.43	0.88	14.88
	Ivth Quarter	14.88	-	14.88	0.41	0.88	14.00
					1.71	1.75	
II	Opening Balance						
	Ist Quarter	14.00	-	14.00	0.39	0.88	13.13
	Iind Quarter	13.13	-	13.13	0.36	0.88	12.25
	IIIrd Quarter	12.25	-	12.25	0.34	0.88	11.38
	Ivth Quarter	11.38		11.38	0.31	0.88	10.50
					1.40	3.50	
III	Opening Balance						
	Ist Quarter	10.50	-	10.50	0.29	0.88	9.63
	Iind Quarter	9.63	-	9.63	0.26	0.88	8.75
	IIIrd Quarter	8.75	-	8.75	0.24	0.88	7.88
	Ivth Quarter	7.88		7.88	0.22	0.88	7.00
					1.01	3.50	
IV	Opening Balance						
	Ist Quarter	7.00	-	7.00	0.19	0.88	6.13
	Iind Quarter	6.13	-	6.13	0.17	0.88	5.25
	IIIrd Quarter	5.25	-	5.25	0.14	0.88	4.38
	Ivth Quarter	4.38		4.38	0.12	0.88	3.50
					0.63	3.50	
V	Opening Balance						
	Ist Quarter	3.50	-	3.50	0.10	0.88	2.63
	Iind Quarter	2.63	-	2.63	0.07	0.88	1.75
	IIIrd Quarter	1.75	-	1.75	0.05	0.88	0.88
	Ivth Quarter	0.88		0.88	0.02	0.88	-
					0.24	3.50	

Door to Door Period	60	Months
Moratorium Period	6	Months
Repayment Period	54	Months

CALCULATION OF D.S.C.R

PARTICULARS	I	II	III	IV	V
CASH ACCRUALS	5.20	6.02	8.04	10.33	12.54
Interest on Term Loan	1.71	1.40	1.01	0.63	0.24
Total	6.91	7.41	9.05	10.96	12.78
REPAYMENT					
Repayment of Term Loan	1.75	3.50	3.50	3.50	3.50
Interest on Term Loan	1.71	1.40	1.01	0.63	0.24
Total	3.46	4.90	4.51	4.13	3.74
DEBT SERVICE COVERAGE RATIO	**2.00**	**1.51**	**2.01**	**2.66**	**3.42**
AVERAGE D.S.C.R.			**2.27**		

COMPUTATION OF ELECTRICITY

(A) POWER CONNECTION				
Total Working Hour per day		Hours	8	
Electric Load Required		HP	10	
Load Factor			0.7460	
Electricity Charges		per unit	7.50	
Total Working Days			300	
Electricity Charges				1.34
Add : Minimim Charges (@ 10%)				
(B) DG set				
No. of Working Days			300	days
No of Working Hours			0.5	Hour per day
Total no of Hour			150	
Diesel Consumption per Hour			8	
Total Consumption of Diesel			1,200	
Cost of Diesel			65.00	Rs. /Ltr
Total cost of Diesel			0.78	
Add : Lube Cost @15%			0.12	
Total			**0.90**	
Total cost of Power & Fuel at 100%				2.24
Year		**Capacity**		**Amount**
				(in Lacs)
I		60%		1.34
II		65%		1.46
III		70%		1.57
IV		75%		1.68
V		80%		1.79

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