

# Auto Pistons

PRODUCT CODE	: N.A.
QUALITY AND STANDARDS	: IS 6331:1971 (Or as per Customer's Specifications)
MONTH AND YEAR OF PREPARATION	: December, 2002
PREPARED BY	: Small Industries Service Institute Kurla Andheri Road, Saki Naka, Mumbai—400 072

## INTRODUCTION

The automobile Industry manufacturing Motor Cycles, Scooters and Mopeds has made fast progress with the liberalization of two wheeler policy in 1980. The break-through for auto components came around the year 1960 when a number of Small Scale Units started manufacturing auto components like forgings, castings, sheet metal components etc. The auto components industry has a wide range of components and this project profile envisages the manufacture of graded C.I. Auto Pistons.

## MARKET POTENTIAL

The market potential for Cast Iron Auto Pistons has increased during last three decades with the development of automobile industries in the country. The economic status of the public is improving and it is within the capacity of every family to purchase at least a moped.

## BASIS AND PRESUMPTIONS

- (i) For capacity utilization, it is considered that 60% efficiency and 8 working hours per day is required.
- (ii) Four years required for achieving full capacity utilization.
- (iii) Labour and wages amount as per local market rates.
- (iv) Interest rate for fixed and working capital is 18% per annum.
- (v) The margin money requirement for obtaining financial assistance is 30% of the fixed capital.

## IMPLEMENTATION SCHEDULE

### *Preparation of Project Report*

Activity	Time Period
1. a) Calling Quotations	1 month
b) Preparation of Report	2 weeks
2. Provisional Registration as SSI Unit	1 week
3. Financial Arrangements	3 months
4. N.O.C. from Pollution Control Board	1 week
5. Purchase and Procurement of Machinery and Equipments	3 months

6. Installation of Machinery and Equipments	1 month
7. Electrification	1 month
8. Recruitment of Staff and Workers	1 month

## TECHNICAL ASPECTS

### Process of Manufacture

The manufacturing process involves melting of Pig Iron and graded scrap in cupola furnace. Green sand moulds are prepared by mixing sand and molasses. Moulds are dried and assembled with cores, molten metal when ready is poured into the prepared and dried moulds. Castings after cooling are taken out from moulds and runners, and the semi finished castings are machined as per drawing. The detailed process flow chart is as follows:

Incoming Inspection → Sand Preparation → Moulding → Shot Blasting → Knock Out → Pouring Charging and Melting → Fettling → Inspection → Machining → Cleaning → Assembly → Despatch → Packing → Final Inspection → Testing.

### Quality Control and Standards

Auto Pistons are produced to serve specific mechanical properties, chemical composition and micro structure. Accordingly, a close control of quality at each stage of manufacturing is essential. Quality control methods usually applied are carbon equivalent determination, hardness determination, tensile strength test, determination of other alloying elements by chemical analysis, etc.

### Production Capacity

The production capacity in this scheme is 600 tons of un-machined C.I. Auto Pistons. The capacity is about 60%

of the installed capacity on the basis of 300 days in a year.

### Pollution Control

The process involves melting of Pig Iron in Cupola Furnace and because of burning of coke pollution occurs. The mixing of sand and fettling of casting is also a cause of pollution in work-shed. In order to avoid/minimize pollution, the chimney for outlet of burning gases/fumes should be of proper height as per recommendations of Pollution Control Board. Secondly, the work-shed height and ventilation measures should be maintained as per standards framed for industrial sheds.

## FINANCIAL ASPECTS

### A. Fixed Capital

(i) Land and Building		(Rs.)
Land—20,000 sq.ft.	@ Rs. 30 per sq. ft.	6,00,000
Foundry Shop Workshop Testing	8,500sq.ft. @ Rs. 150 per sq.ft.	12,75,000
Store Office Boundry Wall, Gate, etc.		85,000
<b>Total</b>		<b>19,60,000</b>

### (ii) Machinery and Equipments

Sl. No.	Machine Name	Qty.	Rate (In Rs.)	Amount (In Rs.)
<i>(A) Production Unit</i>				
1.	Cupola Furnace	1	10,00,000	10,00,000
2.	Sand Muller (Motorised)	1	50,000	50,000
3.	Sand Siever	1	30,000	30,000
4.	Pin Lift Type Moulding Machine	6	30,000	1,80,000
5.	Pneumatic Moulding Machine	2	35,000	70,000
6.	Snagging Grinder	1	30,000	30,000

Sl. No.	Machine Name	Qty.	Rate (In Rs.)	Amount (In Rs.)
7.	Bench Grinder	1	10,000	10,000
8.	Electric Core Oven	1	50,000	50,000
9.	Pillar Type Drilling Machine	1	60,000	60,000
10.	Lathe Machine	1	7,00,000	7,00,000
11.	Tapping Machine	2	50,000	1,00,000
12.	CNC Vertical Machining Centre	1	25,00,000	25,00,000
13.	Centre Lathe Machine	4	5,00,000	20,00,000
14.	Vertical Milling Machine	2	5,00,000	10,00,000
15.	Ultra Sonic Cleaning Machine	1	50,000	50,000
16.	Washing Machine	1	30,000	30,000
17.	Welding Machine	2	25,000	50,000
18.	Hand Drill Machine	2	2,500	5,000
19.	Screw Type Air Compressor	1	30,000	30,000
20.	Mould Boxes	L.S.	50,000	50,000
21.	Patterns and Foundry Tools	L.S.	25,000	25,000
22.	Platform Type Weighing Machine	1	15,000	15,000
23.	Material Handling Trolleys	2	7,500	15,000
24.	Diesel Engine	1	30,000	30,000
25.	Pollution Control Equipment	1	1,00,000	1,00,000
26.	Office Furniture	L.S.	20,000	20,000
27.	Electrification/ Installation	L.S.	3,00,000	3,00,000
			<b>Total</b>	<b>85,00,000</b>

*(B) Quality Control and Testing Equipments*

1.	Moisture Tester	1	9,000	9,000
2.	Permeability Meter	1	10,000	10,000
3.	Universal Strength Machine	1	10,000	10,000
4.	Mould Hardness Tester	1	5,000	5,000
5.	Brinell Hardness Tester	1	50,000	50,000
6.	Carbon Sulphur Analysis Apparatus	1	25,000	25,000

7.	Muffle Furnace (Lab Type)	1	25,000	25,000
8.	Leakage Testing Equipment	1	30,000	30,000
9.	Blow Off Testing Machine	1	20,000	20,000
10.	Muffle Furnace	1	20,000	20,000
			<b>Total</b>	<b>2,04,000</b>
			<b>Total (A + B)</b>	<b>87,04,000</b>

**(iii) Pre-operative Expenses Rs. 50,000**

**(iv) Total Fixed Capital (i+ii+iii) Rs.1,07,14,000**

**B. Working Capital (per month)**

**(i) Raw Material**

Sl. No.	Description	Qty.	Rate (In Rs.)/MT	Amount (In Rs.)
1)	Pig Iron	150 MT	10,000	15,00,000
2)	M.S. Scrap	20 MT	10,000	2,00,000
3)	Ferro Alloys i.e.L.S. Ferro Silicon, Ferro Manganese, Ferro Chrome, Ferro Nickel		-	1,80,000
4)	Sand	L.S.	-	6,000
5)	Lime Stone	L.S.	-	6,000
6)	Graphite Powder	L.S.	-	7,000
7)	Thermocouple Tips	L.S.	-	6,000
8)	Grinding Wheel	L.S.	-	6,000
9)	Foundry Coke	4 MT	9,000	36,000
10)	Kerosene, Oil, Lubricating Oil, Grease etc.	L.S.		10,000
			<b>Total</b>	<b>19,57,000</b>

**(ii) Personnel**

Sl. No.	Particulars	Nos.	Salary (In Rs.)	Amount (In Rs.)
1)	Manager	1	8,000	8,000
2)	Engineer	1	5,000	5,000
3)	Q.C. In-charge	2	4,000	8,000
4)	Foreman	2	4,000	8,000

5) Skilled Workers	10	3,000	30,000
6) Un-skilled Workers	20	1,500	30,000
7) Clerks	5	3,000	15,000
8) Peon	1	1,500	1,500
9) Perks to Staff @ 15%			10,500
<b>Total</b>			<b>1,16,000</b>

(iii) Utilities	(Rs.)
1) Power	40,000
2) Water	1,000
<b>Total</b>	<b>41,000</b>

(iv) Other Contingent Expenses	(Rs.)
1) Publicity	5,000
2) Postal Charges	5,000
3) Stationery	5,000
4) Telephone	5,000
5) Transportation	20,000
6) Consumable Items	5,000
7) Repairs and Renewal	5,000
8) Insurance	5,000
9) Packing Material	5,000
<b>Total</b>	<b>60,000</b>

**Total Recurring Expenditure**  
(i + ii + iii + iv) = **Rs. 21,74,000**

**Total Working Capital for 3 Months**  
Total Recurring Expenditure × 3 = **Rs. 65,22,000**

### C. Total Capital Investment

1) Total Fixed Capital	Rs. 1,07,14,000
2) Total Working Capital	Rs. 65,22,000
<b>Total</b>	<b>Rs. 1,72,36,000</b>

## FINANCIAL ANALYSIS

(1) Cost of Production (per annum)	(Rs.)
a) Total Recurring Cost	2,60,88,000
b) Depreciation on Building @ 5%	98,000
c) Depreciation on Machinery @ 10%	8,70,000
d) Depreciation on Furnace @ 20%	2,00,000
e) Depreciation on Office Equipment @20%	4,000
f) Interest on Total Investment @18%	31,03,000
<b>Total</b>	<b>3,03,63,000</b>

### (2) Turnover (per annum)

Item	Qty.	Rate (Rs.)	Amount (Rs.)
Piston	4,32,000 Pieces	80 per Piece	3,45,60,000

### (3) Net Profit (per annum) (Before Taxes)

Total Sales – Cost of Production  
3,45,60,000 – 3,03,63,000 = **Rs.41,97,000**

### (4) Net Profit Ratio

$$= \frac{\text{Net Profit per annum} \times 100}{\text{Turnover per annum}}$$

$$= \frac{41,97,000 \times 100}{3,45,60,000}$$

$$= 12\%$$

### (5) Rate of Return

$$= \frac{\text{Net Profit per annum} \times 100}{\text{Total Capital Investment}}$$

$$= \frac{41,97,000 \times 100}{1,72,36,000}$$

$$= 25\%$$

### (6) Break-even Point

Fixed Cost (per annum)	(Rs.)
1) Depreciation on Plant and Machinery	8,70,000
2) Depreciation on Furnace	2,00,000
3) Depreciation on Office Equipments	4,000
4) Interest on Total Investment	31,03,000
5) Insurance	60,000
6) 40% of Salary and Wages	5,57,000
7) 40% of Other Contingent Expenses	2,88,000
<b>Total</b>	<b>50,82,000</b>

### B.E.P.

$$= \frac{\text{Fixed Cost} \times 100}{\text{Fixed Cost} + \text{Profit per annum}}$$

$$= \frac{50,82,000 \times 100}{50,82,000 + 41,97,000}$$

$$= \frac{50,82,000 \times 100}{92,79,000}$$

$$= 55\%$$

**Addresses of Machinery and Equipment Suppliers**

- 1) M/s. R.P. Sales Corpn.  
501, Bldg. No. 11,  
Tulsidham Complex,  
Near Tatvadnyan Vidyapeeth,  
Ghodbunder,  
Thane,  
(Maharashtra)
- 2) M/s. HMT Ltd.  
Machine Tool Mktg. Division,  
59, Bellary Road,  
Bangalore - 32.
- 3) M/s. Versatile Equipments Pvt.  
Ltd.  
B-69, MIDC,  
Gokul Shirgaon,  
Kolhapur - 34,  
(Maharashtra)