Hard Chrome Plating

PRODUCT CODE	:	N..A.
QUALITY AND STANDARDS	:	IS 1337:1959 For Hard Chrome Plating on Steel IS 1337:1993 For Hard Chrome plating for Engineering Purpose
PRODUCTION CAPACITY	:	Qty. (per annum) Value (Rs.) 5,000sq.met. 30,00,000
MONTH AND YEAR OF PREPARATION	:	January, 2003
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Introduction

Hard chrome coating finds extensive application in the industry due to their extreme hardness resistance to heat wear, corrosion and low co-efficient of action. Due to these qualities it is applied excellent on cutting tools, gauges, dies, moulds, piston rods, rollers, textile machinery parts etc. Although the equipment and general principles are similar for decorative and hard chrome processes, the technique of hard chrome deposition is somewhat different from that involved in decorative plating and the thickness and hardness of the metal applied is more than decorative plating.

Market Potential

The hard chrome plating has very wide applications. There exists excellent scope for jobbing units to undertake plating on tools, dies, moulds, cylinder liners, rollers, textile machinery parts etc. and hard chrome for other industrial applications.

Basis and Presumptions

1. The efficiency of machinery is taken at 70% the unit will work for 8 hours on single shift basis per day, 25 days in a month a 300 days in a year.
2. The time period to achieve the full-envisaged capacity utilization is one year.
3. The labour wages are as per the prevailing rates in market.
4. The interest rates for fixed and working capital are taken at 14%.
5. The margin money requirement will be 30% of the total cost of this project.
6. The pay back period is 5 years.

Implementation Schedule

Time required for preparation of project report	1 month
Selection of Site	1 week
Registration as SSI	3 weeks
Time required for acquiring the loan	2 months
Machinery commissioning and erection	2 months
Trial runs	1 month
Recruitment of labour etc.	1 month

Technical Aspects

Process of Manufacture

The steel parts to be hard chrome plated are precleaned in a suitable hot alkaline soak cleaner and rinsed well. To obtain a good adhesion of the deposits, anodic etching in simple chromic sulphuric acid bath for 1-2 minutes is carried out in a separate tank normally. After the etching, the parts are transferred to plating bath. After plating the parts are immersed in drag out for rise followed by another water rinse and hot water rinse.

In case of hardened steel, components are heated to 200°C or above to eliminate hydrogen embitterment.

Sequence of Operation

The following sequence of operation is usually followed for hard chrome process:

I. Butting and degrease
II. Soak clean
III. Electro clean (anodic)
IV. Water swill
V. Anodic etching in chromic acid solution of 200 gms. per ltr. for 1 to 2 minutes at CD of 185-275 A/sq. Inch.

Preparation of Bath	Optimum	Range
Hard chrome salt	250 g/l	200-300g/l
Density in Be	19° Be	18-22°Be
Temperature	55°C	52-65°C
Cathode C.D. A/dm^2	25 A/dm^2	20-60 A/dm^2
Anode C.D. A/dm^2	10 A/dm^2	10-20 a/dm^2
Voltage	6 Volts	6-15 Volts
Anodes	7% Antimony lead Anode	7% Antimony lead Anode
Chromic acid gms/ltr.		200-250
Sulphate l gms/ltr.		1-2.5

Quality Control and Standards

IS1337:1959	for Hard chrome plating on steel
IS1337:1993	Hard Chromium for engineering purpose

Production Capacity (per annum)

a. Quantity : 15000 Square meter
b. Value : Rs. 30,00000

Motive Power

The Power requirement is 20 kWH, 3 Phase, 440 volts.

Pollution Control

Since this unit has been classified as polluting industry, a No Objection Certificate has to be taken from the State Pollution Control Board. However, suitable arrangement has to be made to control the pollution.

Energy Conservation

Proper insulation of bath and other related pipes should be made so as to save the energy.

FINANCIAL ASPECT

A. Fixed Capital

(i) Land and Building	Area	Values (Rs.)
Land	200 Sq. meters	50,000
Built-up area	100 Sq. Meters	1,50,000
	Total	2,00,000

(ii) Machinery and Equipments

(a) Production Unit

Sl. No.	Particulars	No.	Value (Rs.)
1	Oil cooled silicon rectifier with Stepless control, out put current rating 1,000 Amps. Out put voltage 12 volt complete with meter panel	1	1,00000
2	M.S tank 3 mm, PP lining 7' (L) × 3' × 3' (H) with lip duct Blower and thermostatic control	1	25,000
3	Soak cleaning M.S tank 6' × 2'× 2 2/1.2 with 3MM PP Unit.	1	25,000
4	Drag out tank 5' × 2' × 2'/1.2	1	5,000
5	Water Swill Tanks	2	10,000
6	Immersion heater 3 kW	3	3,000
7	P.P Tube 200 Litres Cap.	5	5,000
8	Polishing Machine 3 H.P.	2	24,000
	(b) Testing Equipments		
	PH meter reagent glassware Apparatus, conductivity meter etc.		37,500
	C. Pollution Control Equipment		2,00,000
	1. Electrification and Installation Charges @ 10% of cost of machinery and equipment		Rs 43,450
	2. Total cost of machinery and equipment		4,77,950
	3. Cost of office equipment		50,000
	Total		5,27,950
	Or say		5,27,900

(iii) Pre-operative Expenses Rs. 20,000

Total Fixed capital

2,00,000 + 52,7,900 + 20,000=

Rs. 7,47,900

B. Working Capital

(i) Personnel

Description	Nos.	Salary (Rs.)	Total (Rs.)
1) Chief Chemist-cum-Manager	1	4,000	4,000
2) Skilled worker	1	3,000	3,000
3) Workers	6	1500	9,000
4) Account-cum store keeper	1	2,000	2000
5) Clerk-cum-Typist	1	1,500	1,500
6) Peon	1	1,500	1,500
Total			21,000
Perquisites @ 15% Salary			3,150
Total			24,150
Or say			24,000

(ii) Raw Material Including Packaging Requirement (per month)

Particulars	Qty./ Kg.	Rate (Rs.)	Value (Rs.)
I. Hard chrome salt	400 Kgs.	158/Kg	63,200
II. Soak cleaner	200 Kgs.	28/Kg	56,00
III. Chromic acid	300 Kgs.	100/Kg	30,000
IV. Misc. chemicals, polishing materials and antimony Lead Anode		11,200	
Total			1,10,000

(iii) Utilities (per month)	(Rs.)
Power 20 kwh	18,000
Water LS	2000
Total	20,000

(iv) Other Contingent Expenses (per month)	(Rs.)
Postage and Stationery	1,000
Telephone	2000
Consumable Stores	1,000

Repair and Maintenance		1,500
Transportation charges		1,500
Advertisement publicity		1,000
Insurance		1,000
Miscellaneous Expenses		1,000
	Total	10,000

(v) Total Recurring Expenditure (per month) (Rs.)

(i+ii+iii+iv)

= Rs. 24,000+1,10,000+20,000+10,000

= Rs. 1,64,000

(vi) Total Working Capital (on 3 months basis) Rs. 4,92,000

C. Total Capital Investment

i) Fixed Capital		Rs. 7,47,900
ii) Working capital		Rs. 4,92,000
	Total	Rs. 12,39,000

Machinery Utilization

Since the unit totally depends on the job work, the work should be assured before starting the unit. The suggested plant and machinery are sufficient to achieve the target.

FINANCIAL ANALYSIS

(1) Cost of Production (per year)	(Rs.)
(i) Total recurring cost	19,68,000
(ii) Depreciation on building @ 5%	7,500
(iii) Depreciation on machinery and equipment @ 10%	47,7,95
(iv) Depreciation on office equipment @ 20%	10,000
(v) Interest on total capital investment @14%	1,73,586
Total	22,06,881
Or say	22,07,000

(2) Turnover (per year)

Item	Qty (Sq.mtrs.)	Rate (Rs.)	Value (Rs.)
Hard chrome plating	15000	200	30,00,000

(3) Net Profit (per year)

= Turnover – Cost of production
Rs. 30,00000 – 22,07,000

= Rs. 7,93,000

(4) Net Profit Ratio

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

$$= \frac{7,93,000 \times 100}{30,00000}$$

= 26.4%

(5) Rate of Return

$$= \frac{\text{Net profit per annum} \times 100}{\text{Total investment}}$$

$$= \frac{7,93,000 \times 100}{12,39,900}$$

= 63.9%

(6) Break-even Point

(i) Fixed Cost	(Rs.)
a) Depreciation on Building @ 5%	7,500
b) Depreciation on Machinery and Equipment 10%	47,795
c) Depreciation on office Equipment @ 20%	10,000
d) Insurance	12,000
e) Interest on total investment	1,73,586
e) 40% of salary and wages	1,15,200
f) 40% of other contingent expenses	43,200
Total	4,09,281
Or say	4,09,000

(ii) Net Profit (per year) Rs. 7,93,000

$$\text{B.E.P.} = \frac{FC \times 100}{FC + \text{Profit per year}}$$

$$= \frac{4,09,000 \times 100}{4,09,000 + 7,93,000}$$

= 34%

Addresses of Machinery and Equipment Suppliers

1. M/s. Jindal Electricals
   390-A Industrial Area "A",
   Ludhiana-140003.

2. M/s. Usha Rectifier Corporation (India) Ltd.
   12, Mathura Road,
   Faridabad.
3. M/s. Hind Rectifier Pvt. Ltd.
   Kamani Chambers,
   Nicol Road,
   Ballard Estate,
   Mumbai.
4. M/s. Bright Metal Industries
   Arakashan Road,
   Paharganj,
   New Delhi-110055.

Addresses of Raw Material Suppliers

1. M/s. Delta Chemicals Pvt. Ltd.
   J-1, Cama Industrial Zone,
   Goregaon (E),
   Mumbai-400063.
2. M/s. Platewal processes and Chemicals
   Pandra Road,
   Atlandra,
   Vadodra-390012.
3. M/s. Grawer and Weil (India) Ltd.
   Sukh Sagar,
   6th Floor,
   N.S Patkar Marg, Chowpatty,
   Mumbai-400077.