

A PROJECT PROFILE (UPDATED)

PRODUCT : **GOLD PLATING ON METALLIC OPTICAL FRAMES**

QUALITY STANDARD : **AS PER THE CUSTOMER'S SPECIFICATION**

PRODUCTION CAPACITY :

QUANTITY : 6 lakh Nos.

VALUE : Rs. 2.40 crores

MONTH AND YEAR OF PREPARATION: Feb, 2011

PREPARED BY : **Metal Finishing Division**
MSME-DI
Industrial Estate,
Nunhai, AGRA- 282006

Introduction: -

The Gold is a relatively scarce yellow metal, often found in the native state, which is the most malleable of all metals. It is extremely corrosion resistant but it may be desolved by aqua-regia, potassium cyanide solution and in aqueous solution of the halogens, bromine and iodine. The metal does not form a coherent oxide film on its surface even at very high temperature and therefore it has very low contact resistant.

First of all the gold plating was practised by the ancient Egyptians, but this was only a thin hammered film on other metals. In the middle ages the process called fire gilding was used to 'plate' objects. In this method the article was coated with a mercury/gold amalgam and subsequently heated to drive off the mercury, a layer of pure gold was left. True electroplating of gold dates from the discovery of the double cyanide of gold and potassium about the middle of the 19th Century.

Electroplating of gold is mostly carried out to obtain long lasting decorative finishes and in some cases to improve electric contacts and conductivity. It is deposited from alkaline or acidic solutions, the metal concentration is low because of the high price of gold. The electrolytes are heated to 50 to 70 °C to obtain a reasonable speed of deposition. The cathode efficiency depends upon the metal concentration and the temperature.

The colour of gold deposits depends upon the operating temperature, current density and metal concentration and also on the composition of the electrolyte. Light yellowish coatings are obtained at low current density, low temperature and high metal concentration. A light colour is also obtained by adding nickel salts while red gold is deposited from baths containing copper. The anodes are composed of very pure sheet gold or some times insoluble carbon. In the latter case the concentration must be maintained by adding metal salt.

Market Potential:-

There are a large number of applications available for electroplating units. These are as –

Decorative Uses :- The important uses are in the jewelry, outlery and allied trades, fancy goods such as hand bag frames, powder compacts & costumes jewelry . Thin deposit of pure gold may be applied over bright nickel and this can be more economic where wear resistance is required, e.g. watch cases, pen cases, plumbing fixtures. In all these decorative uses the colour of the gold is a very important feature, ranging from white gold, yellow to rose, red to green golds. Many of these colours are the subject of strict requirements such as Swiss watch case colour standards.

Industrial Uses:- The most important industrial use of electroplated gold is in the electronic industries, which has grown in the last few years. Because of its unique properties it has become a valuable element in the fabrication of micro-electronic devices such as calculators, transistors & diodes. Large items such as heat sinks, headers, wires, springs, connectors, printed circuits often use gold to form or protect the tracks.

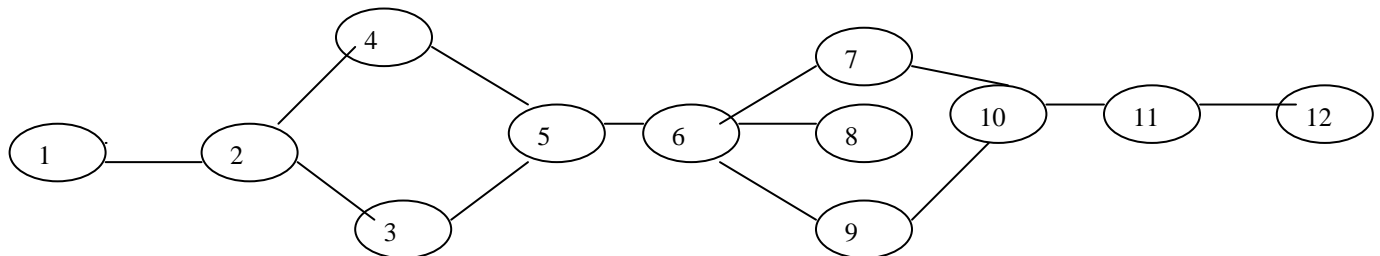
Gold electroplating is also being used in many other engineering, aerospace and scientific applications e.g. reflector material in lasers and where the infra red reflectivity is required. Hence the good market is available for this unit.

III. Basis & Presumption:-

1. The Project Profile has been prepared on the basis of Single Shift of 8-hrs. a day and 25-working days in a month at 75% efficiency.
2. It is presumed that Ist year, the capacity utilization will be 70% followed by 85% in the next year and 100% in the subsequent year.
3. The rates quoted in respect of salaries and wages for skilled worker and others are on the basis of minimum rates in the State of U.P.
4. Interest rate for the fixed and working capital has been taken @ 12% on an average whether financed by the Bankers or Financial Institutional.
5. The margin money required is minimum (30% of the total capital investment).
6. The rental value for the accommodation of office, workshop and other covered area has been taken @ n.a./- per sq. mtr.
7. The rate quoted in respect of machinery, equipment and raw materials are those prevailing at the time of preparation of the Project Profile and are likely to vary from place to place and suppliers to suppliers. When a tailor made project profile is prepared, necessary changes are to be made.
8. The pay back period may be 5-years after the initial gestation period.
9. The gestation period in implementation of the project may be to the tune of 6 to 9 months which includes making all arrangements, completion of all formalities, market surveys and tie-ups etc. Once all the above arrangements are made and quality/standards achieved the 100% project capacity may be achieved at the end of three years. However, a detailed PERT/CPM/chart with implementation period has been given in the report.

IV. Implementation Schedule: -

The implementation of the project includes various jobs/exercises such as procurement of technical know how, transfer of technology, market surveys and tie-ups, preparation of project report, selection of site, registration, financing of project, procurement of machinery and raw materials etc., recruitment of staff, erection/ commissioning of machines, trial production and commercial production etc. In order to efficiently and successfully implement the project in the shortest period the slack period is curtailed to minimum possible and as far as possible simultaneous exercises are carried out. In view of above a CPM-PERT Chart has been illustrated below, According to which a minimum period of 227 days is involved in finally starting the project on commercial basis. By following this process a time period of 82 days can be saved.



Details of Activities

C.P.M.

Activity	Days	Activity	Days	Particulars of activity
1-2	15	1-2	15	Procurement of Tech. know how/ transfer of technology.
3-4	15	3-4	15	Market survey, tie up and obtaining quotations.
4-5	7	2-3	7	Selection of site.
5-6	70	4-5	7	Preparation of Project report
6-7	45	5-6	70	Registration and financing.
7-10	30	6-7	45	Placement of orders for machinery and receipt of machines.
10-11	30	6-8	30	Recruitment of staff and training
11-12	15	6-9	30	Addition/Alteration in rental premises
		8-10	15	Procurement of raw material/ Bought out components
		7-10	30	Erection, Electrification and Commissioning
		10-11	30	Trial Production
		11-12	15	Commercial Production
227 days		309 days		

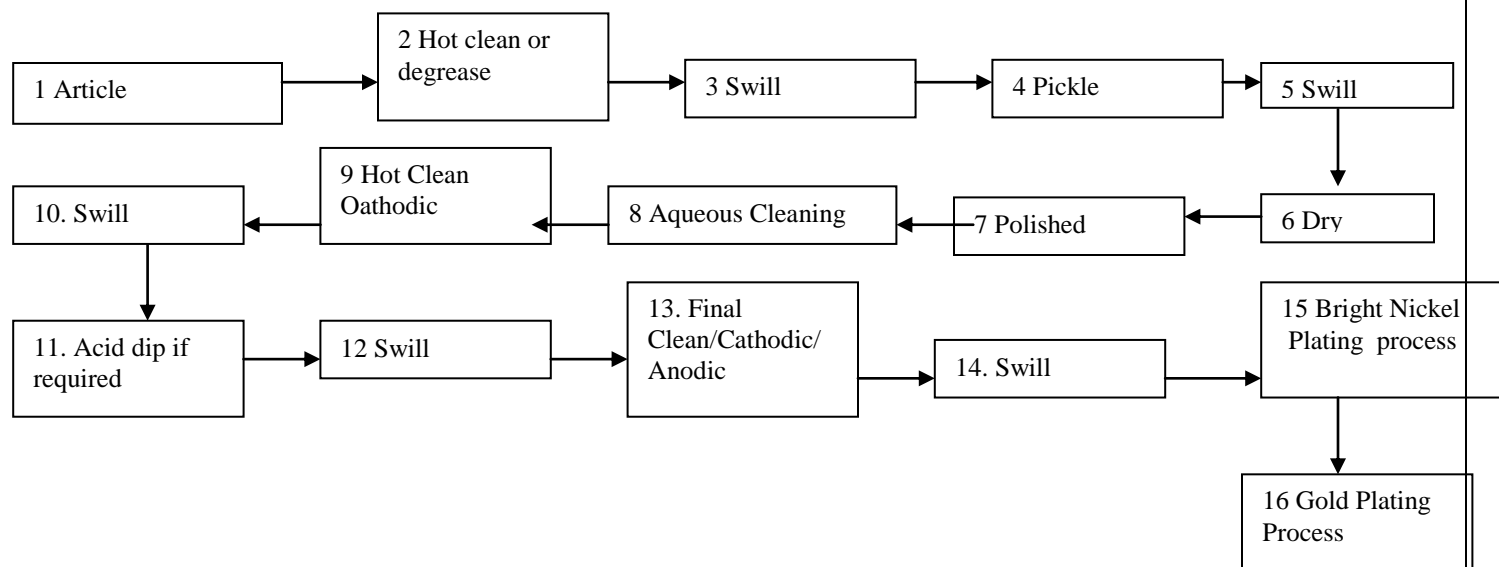
V. Technical Aspect

Manufacturing Process:-

The gold is mainly electro-deposited from Potassium gold cyanide solution which contain a certain minimum quantity of gold.

The articles, which are to be plated first perfectly, cleaned in a suitable hot alkaline soak cleaner and rinsed well. Then pickled and etched the article in the chromic sulphuric acid for 1 to 2 minutes approximately at temperature of 60 to 70 degree C o. Then swill and dry the article. Then polished the article if required and again soak the article in hot, clean and swill well. After the etching the articles are transferred to plating bath, where the gold is deposited from the bath. The following sequence of operation is usually followed for gold plating.

Process Flow Chart:-



The articles are hanged on the cathode bar of the plating bath where the plating is done. Anode is made of the pure good gold metal (electrode). Then D.C. current between anode and cathode is passed and thereby the plating process is starts. The time of plating depends upon the thickness of the coating required. After being nickel plated the article drag out, water swill and the article should be moped out with suitable mop.

Preparation of the Bath :-

To prepare the gold plating bath first clean the PVC lined plating tank with hot die acid and washed out and filed it to one third of its capacity with distilled water. The temperature of the water is raised to 60 o C and the required weight of potassium gold cyanide, caustic potash & potassium sulphite is slowly added. The mixture beings agitated well stirred until all the salts are desolved. Now the bath can be filled up to the required final level and the solution must be purified to remove the traces of the mattalic impurities

Many formulations have been prepared so far for the gold plating. However a typical formulation and operation conditions are given below:-

- Potassium Cyanide	- 12 grams
- Potassium Gold Cyanide	- 18 grams
- Caustic Potash	- 12 grams
- Potassium sulphite	- 5 grams

One litre distilled water

temperature	- 120 o F to 180o F
Current density	- 2 – 6 Amp/sq. ft.
Volt	- 1.5 – 2 Volts.

Now a day ready-made gold plating salts are available in the market in which the required proportion of the chemicals are mixed. Therefore this salt can also be utilised for the purpose.

Alternate Technology if any:-

Production (Target & Value):-

(a) Quantity (Kgs.)	-	6 Lakhs No. of optical frames.
(b) Value	-	Rs.2,40,00,000/-

Quality Control & Standards:- As per the customer's specification.

- 1. Power Requirement:-** 7 K.W.H.
Water Requirement: K.L./monthly

2. Energy Conservation:-

The following steps may be taken for the conservation of energy.

1. Machinery & Equipment's parts, which are revolving and reciprocating should be properly, lubricated from time to time with suitable lubricant oil.
2. Lay out of the unit should be in such a way in that no back tracking of material is there.
3. All electric switches may be kept off, when not required.
4. The entire transmission belt will be tightened before starting the work is wherever applicable.
5. Fluorescent tube with electronic Chokes may be used for energy saving. Further recently developed compact fluorescent tubes called (CFT) of 10,15, watts Philips/Glaux made may be used for energy saving and decoration. These self ballasted fluorescent lamps are high efficiency replacements for ordinary bulbs. For same light output, CFLEBs consume about one-fifth the power consumed by ordinary bulbs, thereby saving a lot of energy. The savings get further multiplied when CLEBs are used in air conditioned areas, since the saving of energy by using CLEBs also corresponds to less heat dissipation reducing load on air conditioners. The life of CFLEBs is about 8000/10000 hours i.e. about 10 times that of ordinary bulb.

The typical payback period in terms of savings of energy bills and cost of ordinary lamps is about 6 months operation. Unlike ordinary bulbs, these CFLEBs provide choice of three colours designated A, B & C, to suit individual requirements.

Electronic Ballast, with protection against high voltage spikes, along with high quality CFLs make these composite CFLEBs (or self ballasted CFLs) Slim, lightweight, efficient and reliable units.

6. As far as possible Solar Energy and day light will be used keeping all the other lights off.
7. As far as possible inductive load of motor will be reduced and high power factor will be used with the aid of capacitors of appropriate sizes.

7. Pollution Control:-

1. This industry involves pollution to some extent for which State Pollution Control Board has to be approached.

2. Minimum height of shed will be maintained with exhaust fans should be installed for removing decongestion proper ventilation, removal of cokes fumes etc.

VI. Financial Aspects:-

1. Fixed Capital:-

Land and Building	
Land 100 Sq. meter @ Rs.300/-Sq. meter	2,00,000
Build up Area 75 Sq. meter @ 200/- Sq. meter	<u>7,00,000</u>
Total	9,00,000

2. Machinery and equipment:-

S.No.	Description	HP/KW Ind/Imp.	Qty.	Value (Rs)
(a) <u>Production Unit</u>				
	<u>Name of machine with specification</u>			
1.	Rectifier single phase DC output 200 Amp. 6 Volts complete with matter penal etc.		1	1,00,000
2.	Cleaning /swilling tank, MS Cap. 2'X 2'X 2' including other Accessories and immersion heater 1 KW		2	50,000
3.	Nickel Plating tank size 3'X3'X3' MSPVC with electrode pipe & immersion heater		1	30,000
4.	Etching tank 2'x2x'2' MSRL with with lip duct and blower and blower arrangement.		1	20,000
5.	Gold Plating tank 3'x3'x3' MSPVC with lip dust and blower arrangement		1	1,00,000
6.	Buffing machine single phase 220 to 240 volt RPM 1440 with other accessories		1	10,000
7.	Miscellaneous machineries PP tubes, Jigs etc.		L.S.	40,000
(b) Testing Equipments:				2,00,000
(c) Pollution Control Equipment, if required:~				30,000
(d) Energy Conservation Facilities/ Equipment, if used:				
	Furnace should have heat resistant fire bricks to avoid wastage of heat energy			
	CFL Tubes			
	Fluorescent Tubes with electronic chokes			20,000
(e) Electrification & Installation Charges @ 10%				60,000

(f) Cost of Office Equipment/ Working Table etc. 1,40,000

Total Cost of Machinery & Equipments **7,00,000**
(a + b + c + d + e + f)

3. Pre-Operative Expenses:- 1,00,000

Total Fixed Capital (1+2+3) **8,00,000**

VII. Working Capital (Per month)

Staff and Labour (per month):-

(1) Personnel

S.No.	Description	No.	Salary @	Total Value (Rs.)
i)	Manager/Chemist	1	10000	10,000
ii)	Supervisor/ Quality Controller	1	8000	8,000
iii)	Accountant-cum-Store Keeper	1	6000	6,000
iv)	Clerk-cum-Typist	1	5000	5,000
v)	Peon-cum-watchman	3	4000	12,000
vi)	Skilled workers	3	5000	<u>15,000</u>
				56,000
		Perquisites @ 15 %		<u>8,400</u>
			Total	64,400
			Say	65,000

(2) Raw Material (per month):-

S.No.	Description with specification	Qty.	Rate	Value (Rs.)
1.	Pure Gold	100 gm.	21000/- 10 gm.	2,10,000
2.	Potassium gold cyanide	500 gm.	2000/ gram	10,00,000
3.	Caustic Potash	50 Kgs.	200/- Kg.	10,000
4.	Potassium Sulphite	25 Kgs.	50/- Kg.	1,250
5.	Bright Nickel Salt	50 Kg.	750/- Kg.	37,500
6.	Miscellaneous Chemicals	L.S.		<u>51,250</u>
				13,00,000

(3) Utility (per month):-

Electricity (7 x 8 x 25 x 6) 8,400
Water L.S. 600

Total Rs. 9,000

(4) Other Expenditure (per month)

1.	Postage & Stationary	1,000
2.	Advertisement/Publicity	3,000
3.	Repairs & Maintenance	3,000
4.	Telephone/Fax/Computer	5,000
5.	Transportation	2,000
6.	Consumable	1,000
7.	Insurance	2,000
8.	Misc. Expenses	<u>3,000</u>
	Total	20,000

II. Total Recurring Expenditure (per month):-

1) Salary & Wages	65,000
2) Raw Material	13,00,000
3) Utilities	9,000
4) Other Contingent Expenses	<u>20,000</u>

Total: 13,94,000

IX. Working Capital for three months:-

= 13,94,000 x 3= 41,82,000

X. Total Capital Investment:-

Fixed capital:	8,00,000
Working capital (on 3 months Basis)	<u>41,82,000</u>

Total 49,82,000

XI. MACHINERY UTILIZATION:-

It is expected that during first year machine utilization will be 70% and during second year 85% and 100% in subsequent years.

XII. Additional Information if any;**XIII. FINANCIAL ANALYSIS****1. Cost of Production (per annum):-**

(a) Total Recurring Cost per year	1,67,28,000
(b) Depreciation on Machinery & Equipment @ 10%	70,000
(c) Depreciation on Office Equipments @ 20%	28,000
(d) Interest on Total Capital Investment @ 12%	5,97,840
(e) Depreciation on Building @ 5% if any	<u>35,000</u>

Total 1,74,58,840
Say 1,74,60,000

XIV. Turn Over per annum:-

S.No.	Description	Qty. /Nos.	Rate./Nos	Value (Rs.)
1.	Gold plating on optical Metalic farmes	5 Lakh	40	2,40,00,000
	Scrap if any			
			Total	

XV. Net Profit per annum before Income Tax :-

$$2,40,00,000 - 1,74,60,000 = 65,40,000$$

XVI. Net Profit Ratio:-

$$\frac{\text{Net profit} \times 100}{\text{Turn over}} = \frac{65,40,000 \times 100}{2,40,00,000} = 27.25\%$$

XVII. Rate of Return:-

$$\frac{\text{Net profit} \times 100}{\text{Total investment}} = \frac{65,40,000 \times 100}{49,82,000} = 13.1\%$$

XIV. BREAK EVEN ANALYSIS: -**(1) Fixed Cost (per annum)**

(a) Total Depreciation (on m/c. & equipment, dyies, tools, furniture):	98,000
(b) Depricreation on building @5%	35,000
(c) Interest on borrowing:(Total Investment)	5,97,840
(d) Insurance	24,000
(e) 40% of salary:	3,12,000
(f) 40% of other contingent expenses: (Excluding rent & insurance)	<u>86,400</u>

Total
Say 11,53,240
11,53,000

$$\begin{aligned} \text{XX. Break Even Point} &= \frac{\text{Fixed Cost} \times 100}{\text{Fixed cost} + \text{profit}} \\ &= \frac{11,53,000 \times 100}{11,53,000 + 65,40,000} \\ &= \frac{11,53,000 \times 100}{76,93,000} = 14.9\% \end{aligned}$$

XXI . LIST OF MACHINERY & RAW MATERIAL SUPPLIERS

1. M/s. Jindal Electrical, 390 A Ind. Area, A Ludhiana - 141003
2. M/s. Usha Rectifier Co-op (I) Ltd. 12/1 Mathura Rd. Faridabad
3. M/s. Delta Chemicals P. Ltd. Kamani Chambers, Nicol Road, Ballard Estate Bombay-1
4. M/s. Bright Metal Indls. AK.-13 Arakashan Road, Paharanganj, New Delhi-55
5. M/s. Delta Chemicals P. Ltd. Delta House, J-1 Cama Indls. Jone Goregoan (E) Bombay-63

RAW MATERIAL SUPPLIERS

- (i) M/s. Delta Chemicals P.Ltd Delta House, J-1 Cama Indls. Jone Goregoan (E) Bombay-63
- (ii) M/s. Platewal Processes & Chemicals, Padra Road Atladra, Vadodara-390012
- (iii) M/s. Canning Mitra Phoenic Ltd. Eucharistic Congress Bldg. III,5, Convent street, Bombay-39