NEOCHROME L 500

A UNIQUE NON FLUORIDE PROCESS FOR
HIGH SPEED HARD CHROMIUM PLATING

Salient Features

- Higher Cathode efficiency 23-26% resulting in saving of expensive electrical power by 30-40%.
- Does not create cathodic low current density etching.
- Hardness above 1000 vickers.
- Less high current burning.
- Increased Wear Resistance by 20-25% results in longer life of the plated components.
- Produces micro-cracked deposits (600-1000 cracks per linear cm) resulting in better corrosion resistance.
- Easy to maintain the constituent of the bath as NEOCHROME L-500 is provided as a single additive and is in liquid form.
- Bath operates satisfactorily within a wide range of operating parameters without affecting the deposit characteristics.
- Wide cathode C. D. operation 30-100 A/dm².
- Is as good as Heef 25

Bath Make-up

	Unit	**Optimum**
NEOCHROME L-500 Make-UP	ml/lit.	500
Sulphuric Acid Extra Pure	ml/lit.	1.65
NEOCHROME Catalyst M	ml/lit	100

OPERATING CONDITIONS		
Density	20° Be	19 - 21° Be
Sulphate	3.0 g/ Lit	2.5-4 g/Liter
Temperature	55° C	55 - 60° C
Cathode Current Density	50 A/dm²	30 - 70 A/dm²
Anode Current Density	17.5 A/dm²	15 - 22 A/dm²
Voltage	6	4 – 12 Volts
Anode/Cathode Area Ratio	2	

It is advisable that for getting hard chromium deposit, the current density and temperature both are maintained at optimum levels although this process gives consistent quality results with wide operating condition.

The base metal surface has to be smooth and uniform and surface imperfections are to be removed by mechanical polishing and burnishing operations.

The components to be hard chromium plated should be pre-cleaned in suitable hot alkaline soak cleaner and rinsed well. To ensure good adhesion of hard chromium deposit on mild steel components, anodic etching in conventional chromic / sulphuric acid bath at 50° to 65° C for 30 secs.-120 seconds, should be carried out in a separate tank. The parts should be transferred into the plating bath without rinsing. After plating, the parts are dipped in drag-out and neutralizer followed by water rinse and hot water rinse.

SOLUTION PREPARATION

The preparation of plating solution is very simple and is given as under:

1. Fill the cleaned plating tank with D.M. water to almost one-half of the operating level.

2. Add the calculated quantity of NEOCHROME L-500 Make-Up Solution and Catalyst NEOCHROME M.

3. Add DM water with constant stirring upto the density 21°Be which will maintain the working level and stir for another 1-2 hours.

4. When the solution becomes homogenous, heat the solution to 55° C. Place the anodes and electrolyze the bath for 3-4 hours at operating temperature of 55° and at a current density of 35-45 amps./ dm^2. It is very much important to achieve usual 'chocolate brown' film on the anodes during initial electrolysis for smooth and trouble-free production.

EQUIPMENT

Chlorinated, flexible PVC lined mild steel tanks are suitable. Lead lined tanks are not suitable and if tanks are lead lined, they should further be lined with flexible grade PVC.

The plating tanks should be equipped with a suitable heating device and thermostat control to maintain the temperature within the specified range. Suitable exhaust system with scrubber facilities should be provided to keep the environment clean. Cooling is required to control the temperature of the solution since heat is evolved due to higher voltage and operating current. For direct heating and cooling titanium coils are normally used. Teflon or PVDF coils are also suitable for heating and cooling.

ANODES

The Anodes should be 7-10% tin / 93-90% lead alloy. Round anodes are normally preferred as compared to flat type. However, the life expectancy of tin/lead alloy anodes is comparatively less than in conventional chrome plating solution. When the bath is not in use, anodes must be removed. Lead-Tin-Silver (93:6:1) anodes have longer life than Lead-tin anodes.

Platinized titanium anodes can also be used. But care should be taken that these are completely covered with lead dioxide film (brown black layer).

POWER SUPPLY

A direct current source at 6-12 volts depending on the current density requirements is suitable for use with this plating process. The rectifiers used should be of 3 phase rectification and provided with stepless voltage control between 0-100%. The residual ripple must be below 5%.The current carrying capacity of all electrical connections, busbars and plating jigs must be designed to carry the required amount of current continuously.

SOLUTION MAINTENANCE

The solution should be analyzed regularly and maintained as under:

Chromic Acid	:	200 – 275 g/l (Optimum 240 g/Liter)
Sulphate	:	2.5 – 4 g/l (1.25% to 1.5% of CrO_3 Content)

The solution concentration can be maintained on the basis of hydrometer reading and the solution density can be maintained by regular additions of NEOCHROME L-500 Solution and NEOCHROME M & R Catalysts. Usually a maintenance addition of 1000 ml per 3000 Amp.-hr. of NEOCHROME L-500 along with 55ml NEOCHROME M and 55ml NEOCHROME R should automatically maintain the electrolyte composition. However, it is always advisable to analyze periodically the sulphate and chromic acid content and maintain the electrolyte accordingly. The sulphate is adjusted with Extra Pure Sulphuric Acid. Addition of 0.55ml/Liter of Acid will increase 1 gm/Liter of Sulphate Content.

We do not recommend any addition of Chemicals other than specified in this instruction manual as this may adversely affect the performance of the bath.

TABLE 1 – PLATING SPEED

Time in minutes to deposit 1.0 Micron (Average)

Current Density A/dm²	NEOCHROME L-500 (Mins)	Conventional (Mins)
30.0	2.0	3.6
40.0	1.45	2.6
50.0	1.1	2.1
60.0	0.9	1.8