



Future Coat Technology

HEFE HARD CHROME SALT 25

INTRODUCTION

HEFE 25 is a proprietary high-speed chromium plating process that deposits functional (hard) chromium up to four times faster than conventional chromium process and up to three times faster than other high speed baths. This speed comes from an increase in current efficiency from the bath chemistry and a significantly higher limiting current density before burning occurs.

Unlike other high speed chromium plating processes, such as those based on fixed catalysts systems, the HEFE25 process does not cause cathodic low current density etching of parts. Deposits from the HEFE25 process have micro hardness values in the 1000-1150 KHN₁₀₀ range and are micro cracked at greater than 1000 cracks per inch. The deposit is bright, shining and smooth.

The HEFE25 system is maintained using either a liquid additive that can virtually eliminate dusting and splash back or a solid additive. Standard pre-treatment cycles and anodes for hexavalent chromium plating are used.

Bath conversions

Most existing chromium plating solutions can be converted to the HEFE 25 process. Directions for conversion will be given in the laboratory report.

Procedure

1. Fill tank to 45% of its final volume with water, preferably deionized
2. While mixing, carefully add the required volume of chromic acid Bring solution level to final Volume with water, if necessary.
3. Heat solution to its operating temperature of 55-60°C
4. Analyze for sulfate concentration.
5. Add sulphuric acid to give sulfate concentration 2.7g/l
6. Dummy plate for 4-6 hours to equilibrate the solution.
7. Commence production plating.

Operation conditions

| | |
|---------------------------------------|--|
| Chromic acid | 250g/l |
| Sulfate | 2.7g/l |
| Temperature | 55-60 ⁰ C |
| HEFE catalyst | 20ml/li |
| Cathode current density: | |
| Range | 2-5ASI (30-75ASD) |
| Optimum | 4ASI (60ASD) |
| Anode current density | One-half that of the cathode current density |
| Deposition rate@ (140 ⁰ c) | <u>3.5mils/hr@5ASI,1.9mils/hr@3ASI</u> |

The plating rate will increase slightly with decreasing temperature and the bright range will narrow.

Basis metal preparation

No special pre-treatment is required. Those procedures used prior to conventional hard chromium plating baths are sufficient before the HEFE25 process.

Solution maintenances

It is recommended to add 15 kg chromic acid and 1.5 ltr of catalyst for 100000Amp/h.

Contamination

Impurities that affect all hard chromium plating solutions will similarly affect HEFE25 baths. The common contaminates, e.g., iron and trivalent chromium, will always reduce solution conductivity in any chromium-plating bath. Where thick deposits (greater than a few mils) are being plated, they may contribute to roughness. Depending on necessary thickness and quality, a total of 7.5g/l of these impurities may be considered a tolerable limit.

Cationic impurities may be removed by the usual methods of cationic exchange resins or electro dialysis with membranes.

Equipment

Plating Tank

Tank linings may be a flexible polyvinyl chloride material of an approved type, either sheet or sprayed, such as Koroseal or equivalent. Lead- lined tanks are not recommended.

Power Supply

A power supply of appropriate amperage and capable of 9-15 volts D.C output with less than 5% ripple should be used.

Anodes

Tin-lead alloy anodes are recommended. Other tin or antimony-lead alloys may be used. Auxiliary or conforming anodes should be made of tin or antimony-lead alloys.

Waste disposal

This material must be disposed of in accordance with all applicable federal, state, and local regulations and permits.

General safety precautions

When working with this product ensure that all health, environmental, and safety regulation and standards are met. Avoid direct contact with this material. Do not inhale associated mist, vapors, or dust. Maintain and limit exposure as recommended by state and local regulations. Wash contaminated clothing before reuse.

“The above information is given in good faith and is based on our experience but no condition of warranty is to be implied”