The Electroplating of Osprey CE Alloys

Before attempting to apply electroplated coatings to Osprey CE Alloys, you are advised to discuss your plating requirements with Sandvik Osprey's Technical Support representative (contact:). The plating procedure given below is intended as an *aide memoire* for those who have already received a full briefing by Sandvik Osprey.

SCOPE

The preparatory steps in the plating of Osprey Metals' CE Alloys of silicon-aluminium, including those with a silicon content greater than 50% (by weight) silicon, are given below.

OUTLINE OF THE PROCESSING STEPS

The processing steps are as follows:

A. Surface preparation
B. Application of an initial thin zinc coating
C. Electroless deposition of a nickel coating
D. Consolidation heat-treatment
E. Application of the final coatings by electroplating

NOTE ON SURFACE PREPARATION

Good surface preparation is the key to obtaining satisfactory adhesion of the electroplated layer. Surfaces must be free from friable material and porosity. Provided that the initial electroless nickel layer is subsequently activated correctly any metals capable of being electro-deposited can then be applied. There is no significant degradation of the surface finish due to the pre-treatment process. No blistering of the electroplated coatings has been experienced at temperatures up to 450^{o}C, when the processing is correctly applied.

CLEANING AND PLATING CHEMICALS

The following materials have been found to be satisfactory in the coating operation but it may be possible to substitute similar commercial products. Trials should, however, be carried out to determine whether the alternatives produce a satisfactory result.

Minco cleaner; Kelco cleaner; Bondal zincating solution; Ammonium bifluoride

Recommended Supplier: Macdermid Electronic Solutions

UK contact phone no.: 0195-243-3575 (Birmingham)
US contact phone no.: 800-521-2589 (Waterbury, CT)
Further information, including contact details for MacDermid in other countries can be found on the following web-site: www.imacdermid.com

Circuitprep 40
Recommended Supplier: Enthone Inc. (Cookson Electronics)
UK contact phone no.: 01483-758-400 (Woking, Surrey)
US contact phone no.: 203-934-8611 (West Haven, CT)
Further information, including contact details for Enthone-OMI in other countries can be found on the web-site: www.enthone.com

Electroless Nickel - e.g. Nichem CS
Recommended Supplier: Atotech
UK contact phone no.: 0121-606-7777 (West Bromwich)
US contact phone no.: 803-817-3500 (Rock Hill, SC)
Further information, including contact details for Atotech in other countries can be found on the web-site: www.atotech.com

PREPARATION OF PARTS AND OPERATION OF SOLUTIONS

A. Surface Preparation

1. Wire the parts to a holder using aluminium wire.
2. Vapour degrease.
3. Immerse in Minco cleaner at 55°C using **ultrasonic** agitation for 5 minutes or until all loose surface material (including residual Si-Al dust from the machining operations) is removed**.** Do not exceed 5 minutes of ultrasonic agitation and care must be taken not to raise the ultrasonic power to a level where it generates instant cavitation of the CE Alloy.
4. Rinse thoroughly in running water.
5. Immerse in Kelco cleaner at 35°C for 30 secs.
6. Rinse thoroughly in running water.
7. Immerse in 70% nitric acid containing 30 g/l ammonium biflouride at room temperature for 60 - 90 secs.
8. Rinse thoroughly in running water.

B. Application of an initial thin zinc coating

9. Immerse in Bondal zincating solution at 30°C for 20 - 30 secs.
10. Rinse thoroughly in running water.
11. Repeat step 7.
12. Rinse thoroughly in running water.
13. Repeat steps 9 to 12.

C. Electroless deposition of a nickel coating

14. Immerse in the electroless nickel solution for the required time. It is recommended that at least 5 microns of electroless nickel be applied to minimise porosity.
15. Rinse thoroughly in running water.
16. Rinse in de-ionised water.
17. Dry.

D. Consolidation heat-treatment

18. Heat-treat at 200°C for 2 hours in a protective (oxygen-free) atmosphere.

E. Application of the final coatings by electroplating

19. Wire the parts to the cathode using copper wire.
20. Immerse in Circuitprep 40 solution for 1 minute.
21. Rinse thoroughly in running water.
22. Electroplate with the required metals (gold, silver, etc) using standard procedures.