INFORMATION SHEET – PLATING VARIATION

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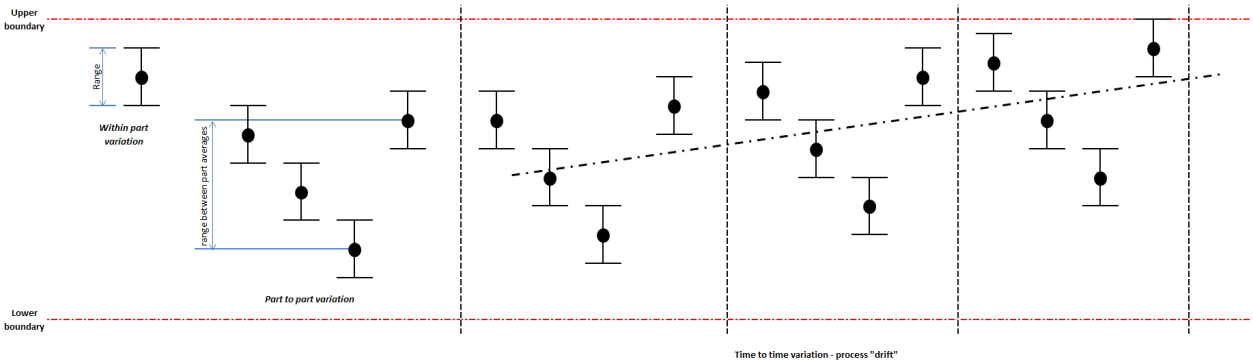
Plating thickness will vary in all electrolytic processes, this variation can be broken down into three components;

1. Within Piece Variation: This is the thickness variation over the plated surface of a single component plated within a load.
2. Piece to Piece Variation: This is the thickness variation measured in the same position on multiple components processed within a load
3. Variation with time: The average piece to piece variation can shift upwards or downwards over time and the within piece variation can change – generally this variation is associated with changing process conditions over time.

We can show this pictorially;



Plating thickness variation is interdependent on;

- The size and shape of the parts being processed
- The plating system, tanks shape and size, jigging and anode placement.
- The process condition, for example current density – current is not uniformly distributed over the surface. Areas on the part will have a higher or lower current than the overall average, this translates to different coating thicknesses in these areas.
- The type and formulation of the process solution.

There are techniques and methods available to minimise variation but there is an associated cost with these techniques.

These include, specialise jigging, the use of auxiliary and conforming anodes, the use of current robbers or shields. These techniques are usually only cost effective on larger production runs.

On larger production runs data is gathered on piece to piece variation within a load and within piece variation at these points. You can then estimate reliably those areas on the component and their position in the plating tank that show the highest and lowest deposit thickness. The components in these areas can be sampled regularly and thickness monitored using normal QC control charting techniques.

On one off jobs it is almost an iterative process where an estimate is made based on experience the components processed and evaluated and any changes to conditions made for the next run or for component re-processing.

Items that are "close tolerance" should be discussed as far as is possible with the supplier preferably at the design stage to determine feasibility and process capability.

The British standard series BS4779 gives some design guide details on designing for plating, and is a useful introduction for designers.

Minimum Average and Minimum Local Thickness

Depending upon the process conditions and the component shape in order to achieve a minimum thickness on the *significant surface* it is necessary to apply an overall average thickness of anything from +25% to +100% of the minimum local thickness to make sure the minimum local thickness is achieved.

The majority of national and international standards call for a given *minimum* thickness on the *significant* surface, this surface is generally accepted as those areas which can be touched by the surface of a 20mm dia ball.