Welded Tubes and Box Sections

When sealed and semi sealed units such as welded tubes and box sections are electroplated there are several characteristics that need to be considered both by the design engineer and the electroplater.

Electroplating Process

Electroplating processes consist of multiple 'dipping' operations of caustic, acid and other chemical stages separated by clean water rinse stages. Thorough rinsing between chemical stages is paramount both inside and out.

Design Considerations

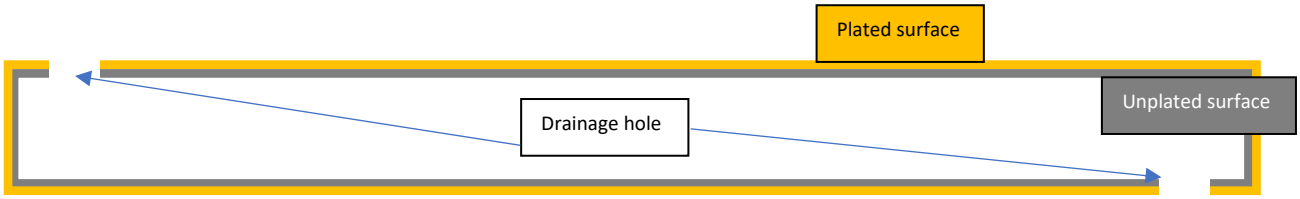
Completely sealed units should be avoided as ingress of chemical processing liquid solutions can enter the sealed unit through pin holes and will be difficult to remove completely. Additionally, accumulation of different chemicals can occur inside.

Design of such articles must consider drain holes, ideally two for each sealed compartment to allow solution flow in and flow out unless a single drainage hole is large enough to allow sufficient drainage. Drain holes should be at opposite ends where possible to permit air to be expelled during the dip process and air to displace the solution when lifted from the solution.

Limitations

This article assumes zinc electroplating of non-corrosion resistant steel, but similar conditions can occur with other processes including anodising.

By the nature of current density distribution and throwing power of plating electrolytes, plating can only occur outside of components (Similar to the faraday cage effect.) unless internal anodes (electrodes) are used. Therefore, no plating will occur inside of sealed or part sealed units.



Frequent Problems with Electroplating Welded Tubes and Box Sections

The lack of plating inside enclosed items presents unprotected surfaces. However, corrosion is minimal if sufficient rinsing and drying has occurred. Surface rust can be expected inside of steel parts on surfaces that are unplated.

Best Practise Recommendation

By far the best way to approach this problem is to ensure the processor is aware of the geometry of enclosures and has the capability to pay attention to detail when processing.

Process control documentation should include the requirement of enough rinsing after each process stage to cater for enclosures. Final drying should be sufficient to include inside of enclosures. The post process of dewatering oil can be applied inside **after** any subsequent paint process, but this should be detailed on drawing data.