CASE STUDY

TIN PLATING CONVERSION - SLUDGE REDUCTION
QUAKERTIN™

CHALLENGES
A Korean steel producer of tin plated coils using a competitor’s MSA process was experiencing excessive sludge generation with a narrow operational window for temperature and electroplating (ASD) which caused tin loss and a lesser quality plated product. The company wanted a process that could:

» Decrease sludge formation
» Improve the quality of the plated surface
» Increase plating efficiency
» Reduce chemical cost and energy consumption

A conversion to Quaker’s MSA (methylene sulfonic acid) based process was proposed since it provide the features:

» MSA acid to dissolve tin and carry the current
» Additive that promotes uniform plating
» Antioxidant to limit the formation of stannic tin (sludge)

THE SOLUTION
Quaker Chemical Corporation (“Quaker”), introduced the QUAKERTIN™ range of tin plating products. An initial lab scale evaluation comparing QUAKERTIN™ against the existing tin plating solution showed positive results to move forward with the conversion process which took five days.

Compared to the previous system, the QUAKERTIN™ MSA conversion produced similar quality results:

» Approximately the same ISV (Iron Solution Value) and TCS (Tin Crystal Size) readings
» Similar plating surface microstructure on the melting surface, but with a more circular tin morphology on the no melting surface with the MSA
» Comparable paint wettability and lacquering properties

However, a dramatic line performance was achieved:

» Reduced chemical consumption at an average of 38% resulting in lower total fluid costs
» Increased the per month electrode lifetime by 40%
» No white edge and no current density defect leading to a decrease in tin ion concentration
» Significant reduction in the sludge levels

Overall, the conversion to the QUAKERTIN™ MSA process was successful in terms of overall cost of operation, expanding operational windows, increased productivity and product quality.
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PROCESS AND EQUIPMENT

<table>
<thead>
<tr>
<th>ELECTRO TIN PLATING LINE</th>
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</thead>
<tbody>
<tr>
<td>Operation</td>
<td>Cleaning/Pickling/Plating/Coating</td>
</tr>
<tr>
<td>Coil Thickness</td>
<td>0.15 – 0.6 mm</td>
</tr>
<tr>
<td>Coil Width</td>
<td>600 – 990 mm</td>
</tr>
<tr>
<td>Speed</td>
<td>230 - 300 m/min</td>
</tr>
<tr>
<td>Plating Process</td>
<td>Insoluble Anode</td>
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</tbody>
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THE EXPERTISE

Tin plating fluids represent a very minor part of the costs of producing quality tin plated steel, typically considerably less than 1%. This case illustrates the importance of using the leverage of advanced tin plating technology to achieve consistent performance while at the same time reducing total applied costs. That is why Quaker focuses on developing products with the highest performance without compromise, products that sharpen your competitive edge.

THE PRODUCT

QUAKERTIN™ is a pure tin process formulated for use on high speed electro-tin line applications. With a simple process control and solution analysis, the product has very low foam characteristics and excellent solderability. Its wide current density window allows for a consistent appearance across the strip width. QUAKERTIN™ offers a uniform tin grain structure which is suitable in both matte and melted applications. Additives are analyzable and can be auto-dosed on an ampere/hour basis.