

# 9911 Plant Trial of Non-Chromium Passivation Techniques for Electrolytic Tin Plate

## Benefits

The successful completion of this project will result in the establishment of one or more environmentally acceptable, chromium-free passivation systems for electrolytic tin plate (ETP).

## Applications

A replacement for cathodic dichromate passivation systems for electrolytic tin plate.

## New non-chromium passivation systems for electrolytic tin plate offers environmental and cost saving benefits

Cathodic dichromate treating (CDC) has been the primary passivation technique for electrolytic tin plate for over forty years. CDC provides excellent protection against tin oxide growth during humid storage and lacquer baking, and imparts resistance to sulfate staining by certain foods. Even the new lacquer formulations and lacquering practices require the continued use of chromate solutions. However, for environmental reasons the industry desires to restrict or eliminate the use of chromate solutions in the future. Also, continued use of chromate treating solutions will result in ever-increasing operating cost

The successful completion of the project "Development of a Chromium-Free Passivation Treatment of Electrolytic Tin Plate (ETP)," has resulted in the identification of three non-chromium passivation systems:

- ❖ British Steel Tinplate Experimental System #2 (zirconium sulfate),
- ❖ Betz Dearborn Permatreat 1001 (zirconium-based proprietary treatment) and
- ❖ PPG Chemfil Nupal (total organic proprietary treatment).

All the three systems exhibited acceptable performance in various tests, but showed some susceptibility to sulfide staining.

This is a three-phase project to compare these systems. It will consist of laboratory work, plant trials and evaluation of the materials resulting from the plant trials. In addition, the materials will be subjected to comprehensive test pack programs at the facilities of the National Food Processors Association (NPFA).

## Project Description

**Goal:** The objective of this project is to complete a plant trial comparing three previously developed non-chromium passivation treatments for electrolytic tin plate and to thoroughly evaluate these processes to determine their viability.

## Progress and Milestones

- ❖ Develop procedures to minimize sulfide staining.
- ❖ Determine the optimum operating parameters for proprietary systems.
- ❖ Develop procedures to stabilize zirconium sulfate.
- ❖ Provide a report on the development of procedures, practices and recommendations with impact on cost.
- ❖ Complete detailed planning necessary for plant trials.
- ❖ Conduct plant trials.
- ❖ Provide a plant trial report.
- ❖ Complete laboratory evaluation on plant trial materials.
- ❖ Complete comprehensive test pack evaluation on plant trial materials.
- ❖ Provide a trial report and recommendations.

## Total Project Cost/Duration

\$411,000/three years.

### Research Organization

AISI, Tin Mill Collaborative  
Research Board (TMCRB)  
Washington, D.C.

### Industry Participants

Bethlehem Steel Corporation  
Bethlehem, PA

Dofasco Inc.  
Hamilton, Ontario, Canada

National Steel Corporation  
Mishawaka, IN

USX-US Steel Group  
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