The Characteristics of Galvanized Steel Coated with Organic-Inorganic Resin

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Abstract : We could confirm the results such as excellent anti-corrosion compared to chromate, conductivity, chemical resistance and detergent resistance as the result of analysis of various characteristics of the galvanized steel coated with organic-inorganic developed in this research.

1. Introduction

Surface treatment consumer products are becoming individualized, diversified, high-class, and high-quality to satisfy the life and pleasantness demand. The representative metal that satisfies these demands is the Zn coated sheets which are produced with a one-side, both-side, or two-layer plate of Zn, Zn-Fe, and Zn-Ni, and to provide corrosion resistance, paintability, weldability and drawability, after-treatment such as phosphated, chromated, and anti-fingerprint treatment is executed which becomes the main cause of various wastewater and cost increase. As the worldwide concern of environmental problems in increasing, the involvement of specific materials on environment is being observed closely such as the ELV(End of Life Vehicle) issue of EU. In the field of surface treatment sheets have used chromated treatment for rust prevention, and in this case various measures have been performed towards the working environment and draining treatment due to the poisonousness of Cr^{6+} contained in the chromated treatment liquid. However, recent problems have occurred with the soil and river contamination problem due to the elution of Cr^{6+} included in the product during the recycling and abolishment treatment of cars and household electronic appliances using the surface treatment sheet. Therefore the research development of Cr-free surface treatment sheets is under progress.

2. Experimental procedure

In this study, the influence of colloidal silica on inhibiting penetration of corrosive substances such as oxygen or water. Silane coupling agent was added to promote cross-linkage between substrate and metal complex/metallic compound. phosphorus were added to enhance inhibition property. Organic/inorganic acid were added for stability of resin. Laboratory test variables for producing specimens were curing temperature, resin coating weight, the amount of colloidal silica. Corrosion resistance was evaluated by salt spray test according to ASTM B117 standard. Electiral conductivity, black patina resistance, solvent resistance and electropainting property was evaluated as well.

3. Results

Specimens prepared in the laboratory showed no white rust after 72hours of salt spray test. Electrical conductivity, black patina resistance, solvent resistance and electropainting property were equivalent or superior compared to chromate.

Reference

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