

## ABSTRACT

SURFACE-TREATMENT SOLUTION FOR ZINC OR ZINC ALLOY COATED  
STEEL SHEET, METHOD OF PRODUCING ZINC OR ZINC ALLOY COATED  
5 STEEL SHEET WITH SURFACE-COATING LAYER, AND ZINC OR ZINC  
ALLOY COATED STEEL SHEET WITH  
SURFACE-COATING LAYER

Disclosed is a surface-treatment solution for producing a zinc or zinc  
10 alloy coated steel sheet with a surface-coating layer that does not contain a chromium  
compound in the surface-coating layer and that is excellent in all of  
heat discoloration resistance, heat cracking resistance, planar part  
anti-corrosion property, corrosion resistance after alkali degreasing,  
blackening resistance, stack blackening resistance, anti-water stain property, solvent  
15 resistance, perspiration resistance, coating adhesion property, and  
storage stability. The disclosed surface-treatment solution contains a  
glycidyl group-containing silane coupling agent (A), a tetraalkoxysilane (B), a zirconium  
carbonate compound (C), and an anionic polyurethane resin (D)  
having a glass transition temperature (T<sub>g</sub>) of 80 °C to 130 °C, a vanadium compound (E),  
20 a molybdic acid compound (F), and water, the  
surface-treatment solution having a pH of 8.0 to 10.0, and the amount of each component  
satisfying a predetermined relationship.

(FIG. 1)