

KAWASAKI STEEL TECHNICAL REPORT

No.12 (July 1985)

Special Issue on Hot-and Cold-rolled Steel Sheets

Lightly Tin-Coated Steel Sheet "RIVERWELT" for Welded Cans by Ni-Diffusion Treatment

Kazuo Mochizuki, Hisatada Nakakouji, Hajime Ogata, Toshio Ichida, Toshio Irie

Synopsis :

A new type of lightly tin-coated steel, named "RIVERWELT", was developed for welded cans. In the manufacturing process, base steel with a thin Ni-diffusion layer which was prepared by annealing Ni-plated steel on the continuous annealing line is lightly tin-coated, partially flow-melted, and cathodically electrodeposited in a chromic acid solution. The nickel diffusion layer plays an important role in improving corrosion resistance by decreasing the corrosion potential difference between tin deposit and base metal, and by forming a dense and homogeneous Fe(Ni)-Sn alloy layer. RIVERWELT has a good weldability because of the sufficient amount of residual metallic tin after

Lightly Tin-Coated Steel Sheet "RIVERWELT" for Welded Cans by Ni-Diffusion Treatment*¹

Kazuo MOCHIZUKI*²
Toshio ICHIDA*⁴

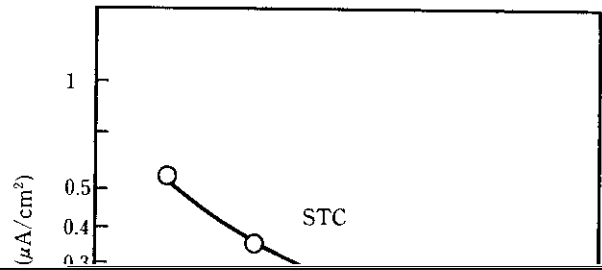
Hisatada NAKAKOUJI*³
Toshio IRIE*⁵

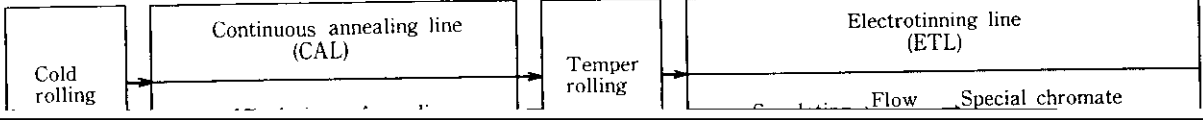
Hajime OGATA*³

A new type of lightly tin-coated steel, named "RIVERWELT", was developed for welded cans. In the manufacturing process, base steel with a thin Ni-diffusion layer which was prepared by annealing Ni-plated steel on the continuous annealing line is lightly tin-coated, partially flow-melted, and cathodically electrodeposited in a chromic acid solution.

have been desired as a replacement for No. 25 tinplate. As a result, many types of lightly tin-coated steels (hereinafter called LTS)¹⁻⁹⁾ and nickel-coated steels^{5,10)} were developed, and some have been commercialized.

As a result of research and development efforts, Kawasaki Steel came to manufacture surface treated steel sheets with excellent weldability and corrosion resistance which are suitable for food and beverage cans.





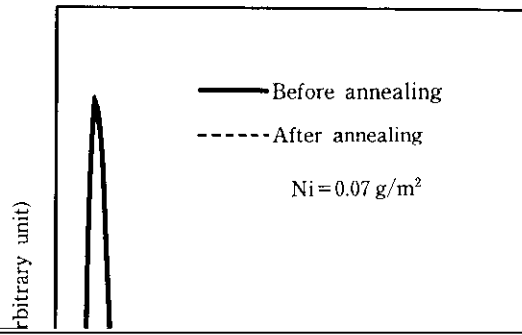
... .. steel «DIVE/DM /ET»

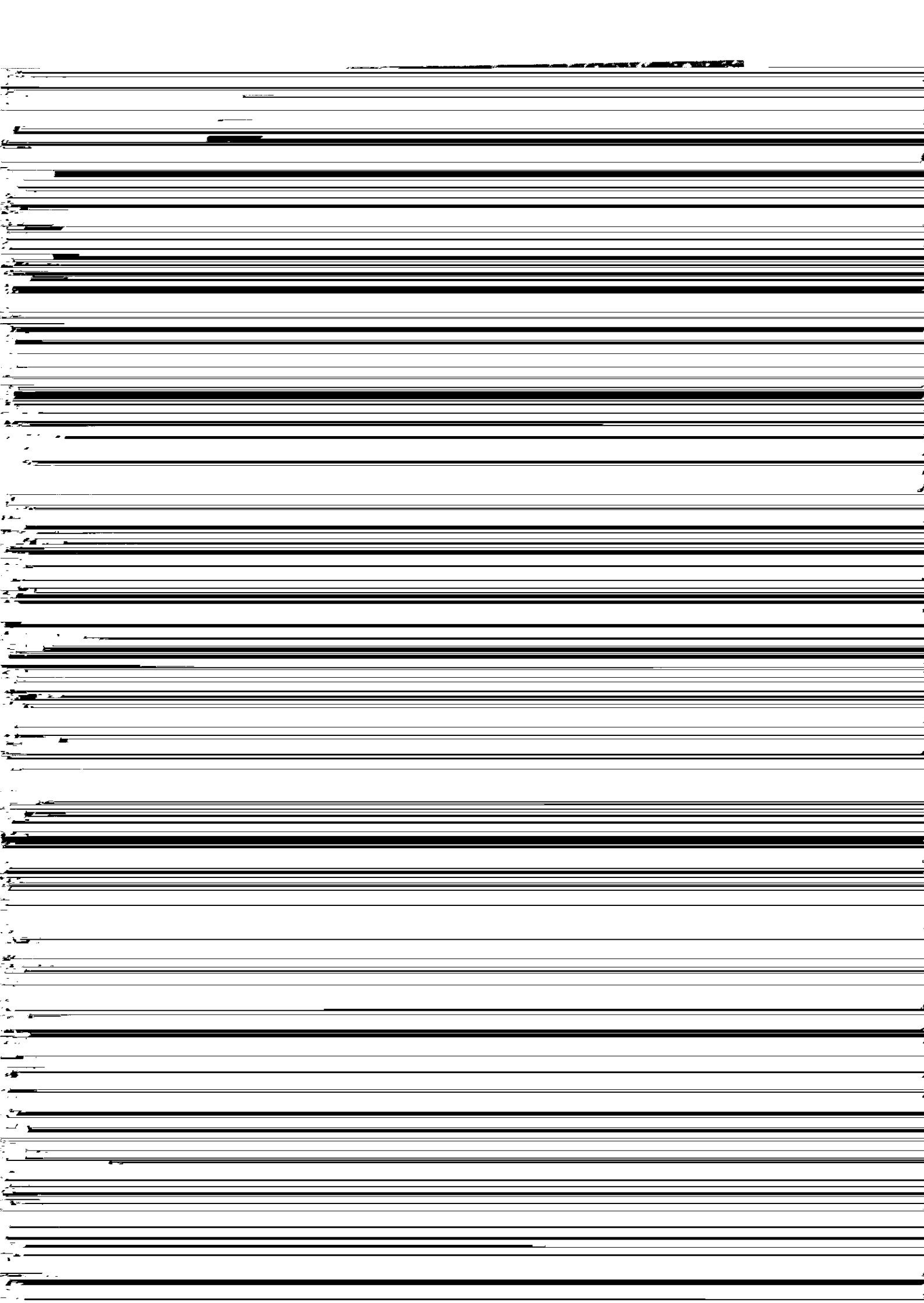
60 min. Sulfide blackening of the bulged and nonbulged portions was observed.

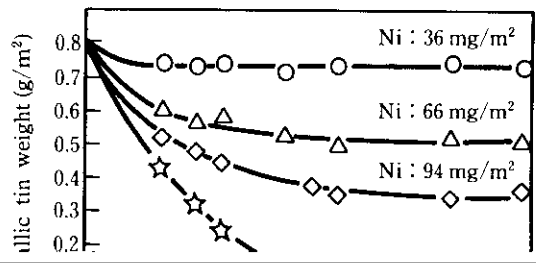
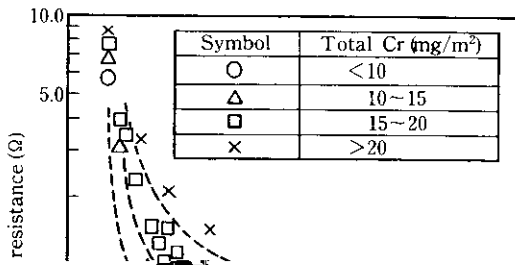
4 Results and Discussion

4.1 Film Structure

Results obtained with various analysis devices suggest that the LTS coating film, as illustrated in Fig. 3 is composed of an Ni-diffusion layer (Fe-Ni alloy) formed from the base metal.







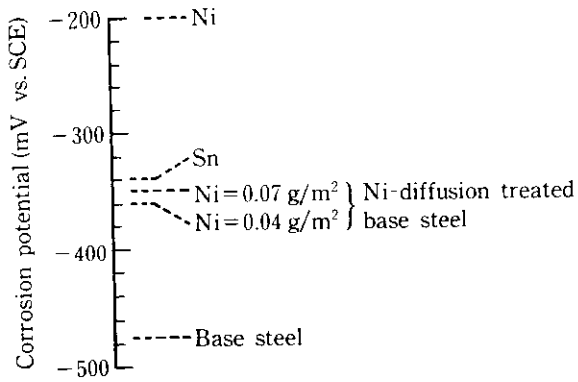


Fig. 9 Corrosion potentials of pure Ni, pure Sn, Ni-diffusion treated base steels, and base steel in 1.0% NaCl solution

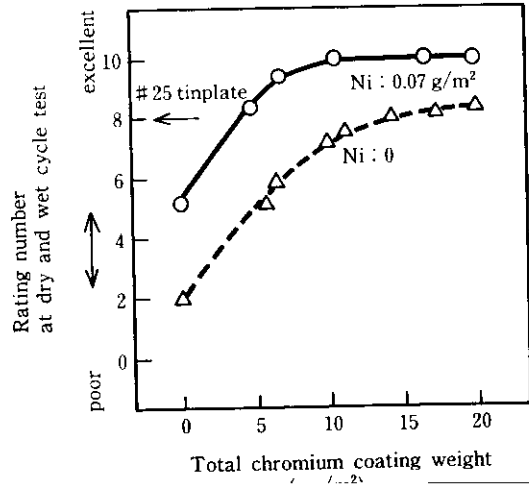
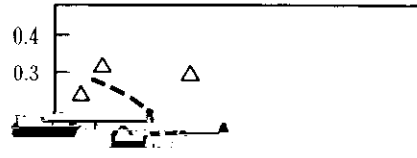


Fig. 10 Effects of Ni-diffusion treatment and total chromium coating weight on the rating number at dry and wet cycle test

width of lacquer film in the UCC test. In this figure, the coating films with a metallic chromium coating weight of zero are composed only of hydrated chromium oxides, which are produced by the CDC treatment



16 Sulfide Stain Resistance

under film corrosion.

(a) ~~XXXXXXXXXX~~ ~~XXXXXXXXXX~~ ~~XXXXXXXXXX~~

[REDACTED]