

INFLUENCE OF MICROSTRUCTURAL CONSTITUENTS AND APPLIED THERMOMECHANICAL PROCESSES ON CORROSION BEHAVIOUR OF ALUMINUM ALLOYS PRODUCED WITH TWIN ROLL CASTING (TRC) TECHNIQUE

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ABSTRACT

Aluminum alloys produced with Twin Roll Casting (TRC) technology still necessitate to be thoroughly investigated in some areas. Corrosion mechanisms operating under special conditions with the contribution of unique features of the microstructure are among those. Influence of CLS on corrosion behaviour of two different alloys in 3000 and 8000 series employed for heat exchangers and packaging applications, respectively, are studied in the present study. Metallographical preparation techniques were used to reveal the centerline segregation (CLS). Samples were dipped in to the HCl-NaCl containing test solution to observe the progress of corrosion in the matrix and heavily populated CLS areas during the course of test. Open-circuit potential (OCP) measurements were carried out on the rolled free surface, quarter plane and mid plane of the samples after milling the surface of the samples. Results show that composition of the alloy and applied thermomechanical processes influence the corrosion characteristics of CLS and accordingly the overall corrosion performance. Other important finding is the contribution of manufacturing method to corrosion mechanism whether it reveals the CLS by creating new free cross sectional surfaces.

Keywords: Twin Roll Casting, Corrosion, heat exchanger, packaging application, OCP measurement