EFFECT OF PROCESS FLOW ON MATERIAL PROPERTIES OF MODIFIED 3003 ALUMINIUM ALLOY DEVELOPED FOR BRAZING APPLICATIONS

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ABSTRACT

Al–Mn alloys are used as fin materials in various brazing applications of automotive industry. With the addition of zinc, these alloys are utilized as sacrificial materials to protect tubes in heat exchanger systems. Twin-roll casting (TRC) is one of the techniques to produce sheet/foil aluminum alloys. Materials can be produced in H1X or H2X temper depending on the downstream processes applied. These two different designations are used to emphasize the final process steps. H1X (strain-hardened) production includes an intermediate annealing conducted at a critical thickness prior to final foil rolling pass whereas H2X production is finalized with a back-annealing. If appropriate process parameters are applied, both processes result in similar mechanical properties although they exhibit different microstructural properties. The aim of this study is to reveal the effects of process flow on material properties of a modified 3003 alloy. Microstructures of materials were investigated by employing metallographic techniques at different thicknesses throughout the downstream processes. Complementary studies were carried out with electro-chemical potential measurements, mechanical tests and sagging resistance measurements before and after brazing simulations.