

Effect of wire brushing on cold roll bonding of Al 1050 sheets

walaa abdelaziem, nahed elmahalawy, Mohammed Hassan, Adel Fathy

Abstract

In this study, two-layered 1050 aluminum sheets were fabricated by cold roll bonding (CRB). Surface roughness was created by wire brushing using different brushing process conditions. The bond strength of two adjacent sheets produced by the CRB process was evaluated by a modified peel test. The effect of surface roughness and percentage reduction in thickness by rolling on the bond strength was investigated. The results show that for any surface roughness, there is a certain reduction in thickness at which successful bond occurs; this is the threshold reduction. When the sheets were wire-brushed before rolling, the threshold reduction was reduced. Higher surface roughness values improved the bond strength. The minimum reduction at which successful bond occurred was found corresponding to a roughness R_a of $6.7 \mu\text{m}$. In the non-brushed sheets, the samples did not show any successful bonding even at 60% reduction because of its low surface roughness and the presence of oxide layer. The microstructure of the faying surfaces was investigated and related to the results obtained.

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