

Enhancing Aluminum-Alloy Composites with Interlocking: A Hybrid Casting Approach

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Abstract: *This study explores a hybrid casting technique to reinforce aluminum-alloy composites with interlocking steel inserts. Modified cold rolling creates surface structures facilitating interlocking during solidification. Results demonstrate a 30% increase in compound strength with elevated temperatures. Conversely, reductions in piston position and melt velocity diminish strength by 41% and 30%, respectively. Concerns include the aluminum alloy melt's presolidification and gas entrapment. This research highlights the efficacy of structured cold rolling in high-pressure die casting for aluminum-alloy multi-material components.*

Keywords: interlocking; aluminum-alloy components; structured cold rolling; high-pressure die casting