

Abstract

This research aims to enhance the microstructure and mechanical properties of one type of Pb-Sn-Sb alloys which known by Babbitt B23-No.13. The processing going in equal channel angular extrusion technique at temperatures reach up to 100 °C. Three casting techniques were implemented to manufacture the alloy; Chill Casting (CC), New Rheocasting (NRC) and Gravity Die Casting (GDC).

The microscopic examination showed that the structures contain two phases, α -Pb and cubic shaped intermetallic compound (β -SbSn) in a matrix of ternary phases. CC and NRC were equiaxed structure, while GDC structure was a dendrite α -Pb phase with remaining β -SbSn phase as a cubic shape.

The Babbitt alloy manufactured by GDC have the best compressive strength (27%), while the samples produced by New Rheocasting recorded has best yield strength (10%) and higher hardness (25%) among other .

The Study found that the strength values have been significantly influenced by the extrusion temperature. The materials that were processed at elevated temperatures possess grain size larger than those that were processed at room temperature.

The study pointed to microstructural change caused by equal channel angular pressing softens the material due to breaking up the original precipitate, and accelerating from dynamic recrystallization. Additionally, having additional time at lower pressing speeds permits the establishment of more equilibrated microstructures.