

Effect of multi-axial stress on deformation characteristics of 8090  
superplastic aluminum alloy

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Abstract

Effect of multi-axial stress on deformation characteristics of a superplastic aluminum alloy 8090 was studied by use of Visioplasticity in this work. Several interrupted tests were performed to bulge the sheets to various depths for different strain rates, the formed parts could then be utilized to evaluate the deformation status, thickness distribution, and local strain rates. The results showed that the deformation characteristics of forming the sheet into a right cylindrical die should be separated into two stages. Forming rates would influence cavitation characteristics. The surface friction would restrict thinning of the sheet after the sheet was overlaid on the die surface, cavity shrinkage developed from sintering effect in the overlaid region resulted in a decrease in cavity volume in the later stage of forming.

Keyword : Superplastic forming, Superplastic aluminum alloy, Cavitation, Metal flow.