

Deformation characteristics and cavitation during multiaxial blow forming
in superplastic 8090 alloy

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Abstract

This work examined the effect of multiaxial stress on deformation characteristics of a superplastic aluminum alloy 8090 by deforming the sheet into a die with a cylindrical cavity. Several interrupted tests were performed to bulge the sheets to various depths for different strain rates, the formed parts were utilized to evaluate the deformation status, thickness distribution, local strain states, and cavitation. It was found that evolution of cavity volume fraction with forming time could be related to the thinning behavior of the deformed sheet during forming. Decrease in cavity volume fraction at the central region was observed in the later stage of forming as the thickness of the deformed sheet remained constant for all test forming rates.

Keyword : Superplastic forming; Superplastic aluminum alloy; Metal flow; Cavitation