

Effect of die surface roughness on deformation characteristics and  
cavitation during blow forming in a superplastic 5083 alloy

吳泓瑜, 邱垂泓, 許士宏, 李雄, 王建義

Mechanical Engineering

Engineering

ncuwu@chu.edu.tw

Abstract

Effect of die surface roughness on deformation behavior of a superplastic material has relatively been less examined, though it is important for industrial application during die design. In this paper, a superplastic 5083 Al alloy under bi-axial deformation was investigated by deforming the sheet into a rectangular die cavity with different degrees of die surface roughness. It was found that reducing the interfacial friction by use of a die with a smaller surface roughness improved the metal flow after the deformed sheet had made contact with the die bottom surface. Changes of the metal flow during forming not only developed a better thickness distribution of the formed part, but also reduced the cavitation levels.

Keyword : superplastic forming, superplastic 5083 aluminum alloy, surface roughness, cavitation.