Multi-dome forming of a Ti–Al–Mn alloy

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ABSTRACT

The main objective of this work is the investigation of Ti–Al–Mn alloy flow behavior using multi-dome-forming test. Flow behavior of an alloy is described by constitutive equations describing the relation between flow stress, effective strain, and effective strain rate at the given forming temperature. This information plays an important role in a design of superplastic forming technologies as it is used for calculation of pressure regimes providing the best forming conditions. Blow forming testing is used to access the information about the constitutive behavior of superplastic materials in conditions of biaxial tension. Multi-dome forming is a technique providing a possibility to perform several blow forming tests at ones and thus get more information from each test. In this work, a series of multi-dome forming tests was performed in order to investigate a Ti–Al–Mn alloy flow behavior. The conditions of the tests were analyzed by finite-element simulation. Different techniques were applied for the interpretation of the experimental data, and the results were compared to each other.

KEYWORDS: titanium alloy, blow forming, multi-dome forming test, SPF, flow behavior