

## **Rapid algorithm for computer simulation of free bulging process**

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Free bulging testing is an innovative technique allowing one to characterize superplastic materials in conditions of hot forming. A metal blank clamped by cylindrical die is deformed by application of a gas pressure. The significant advantage of this method is that it produces a biaxial tension stress mode in the material. At the same time, complex characterization techniques based on inverse analysis are required to interpret the experimental results. Rapid and robust algorithms for simulation of the bulging process are desired in order to implement such techniques. The objective of this work is a development of semi-analytical computer model for simulation of free bulging process. The proposed model is based on membrane theory supplemented with empirical formulation constructed on a base of numerous computer simulations performed using finite element method. The model was implemented for simulation of free bulging process of a titanium sheet.