

Project Information



Subject: Production of metal bipolar plates by media-supplied forming

Applicant: Gräbener Maschinenteknik GmbH & Co. KG
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Description:

One of the major challenges of the future lies in the consumption and the finiteness of the fossil resources of our planet, and also in the endeavour of the reduction of the emission of pollutants.

For this reason people are looking more and more for alternative systems for the production of energy and for new engine concepts to save the mobility.

One solution is the usage of fuel cells. An important component of the fuel cell is the bipolar plate. Today, this bipolar plate is mainly made out of a graphitic composite material. This material has got a number of disadvantages, such as high production costs, high weight and dissatisfying heat conductivity.

An alternative is the metallic bipolar plate. It is made out of metal sheets with a thickness of 0.1 mm and less. Furthermore, a high performance fuel cell needs channel geometries with a depth of 0.8 mm and an extreme contour accuracy. Therefore, conventional forming processes like stamping cannot be used for the production of the plates.

The target of the project was the production of metallic bipolar plates with a thickness of 0.1 mm and below having a contour accuracy of 0.02 mm and a reproducibility of 100 %. These targets were reached. Sheets up to a size of 600 x 600 mm² can be formed.

The process which is designed for a series production is a media supplied forming process, the so called "hydroforming process". This process meets all expectations and is also economic.

The first industrial production plant for metal bipolar plates is now available. The new tool technology allows an economic production of plates with different flow field designs and sizes. The plant has got a capacity between 1 and 5 million plates per year and is ready to be used by the customers.